11 NOISE

This chapter includes definitions of common noise descriptions; descriptions of applicable noise regulations, acoustic fundamentals, and existing ambient noise conditions; and an analysis of potential short- and long-term noise impacts associated with implementation of the proposed project.

11.1 CHARACTERISTICS OF ENVIRONMENTAL NOISE

Prior to discussing the noise setting for the project, background information on sound, noise, vibration, and common noise descriptors is needed to provide context and a better understanding of the technical terms and regulations referenced throughout this chapter.

11.1.1 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.

11.1.2 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.

11.1.3 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 (0.00000000001) 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).

11.1.4 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 if only one of the sound sources was producing sound 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.

11.1.5 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 [dBA]) 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. Thus, noise levels are typically reported in terms of A-weighted decibels or dBA. Table 11-1 describes typical A-weighted noise levels for various noise sources.

Table 11-1 Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	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	– 80 –	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, daytime, Gas lawn mower at 100 feet	– 70 –	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	– 60 –	
Quiet urban daytime	– 50 –	Large business office ,Dishwasher next room
Quiet urban nighttime	– 40 –	Theater, large conference room (background)
Quiet suburban nighttime	– 30 –	Library, Bedroom at night
Quiet rural nighttime	– 20 –	Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	– 0 –	Lowest threshold of human hearing

Source: California Department of Transportation 2009

11.1.6 Human Response to Changes in Noise Levels

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 distinctly 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 detectable.

11.2 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, Caltrans 2013). 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). This is based on a reference value of 1 micro inch per second (µin/sec).

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Ground 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).

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 sufficient ground vibrations to pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2006).

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 11-2 describes the general human response to different ground vibration-velocity levels.

Table 11-2 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

11.3 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 used throughout this chapter.

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 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 p.m. and 7 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 p.m. and 7 a.m. and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

11.4 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.

11.4.1 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. Roads and 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, thus propagating at a slower rate in comparison to a point source. 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.

11.4.2 Ground Absorption

The propagation path of noise from a source 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. This would hold true for point sources, resulting in an overall drop-off rate of up to 7.5 dB per doubling of distance.

11.4.3 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, as wind can carry sound. Sound levels can be increased at large distances (e.g., more than 500 feet) from the source 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.

11.4.4 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 source and receiver is rarely effective in reducing noise because it does not create a solid barrier.

11.5 ENVIRONMENTAL SETTING

11.5.1 Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, schools, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship and transient lodging, and other places where low interior noise

levels are essential, are also considered noise-sensitive. Those noted above are also considered vibration-sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. In addition, buildings of older age are more prone to vibration-induced damage.

Existing sensitive land uses exist throughout the project vicinity with the closest receptors at or around the existing Village and the East Parcel. Receptors located closest to the proposed Specific Plan development include The Intrawest Village, The Olympic Village Inn, Squaw Valley Chapel, Squaw Valley Lodge, and other scattered residences located around the project site, such as the residences on Indian Trail Court adjacent to the East Parcel, the condominiums at Squaw Valley Road and Far East Road, and the residential neighborhood along Squaw Valley Road to the north of the project site. Refer to Exhibit 11- 1 for specific locations.

11.5.2 Regional Setting

Regional noise sources include traffic-related noise on roadways and highways, airplanes flying overhead, and noise associated with typical residential development (e.g., people talking, dogs barking, children playing, yard maintenance equipment).

As discussed above, sound is affected by distance from the source, surrounding obstacles, and atmospheric properties. Thus, regional noise sources would not typically interfere or combine with noise sources within or in close proximity to the project site. Therefore, noise sources and levels that would affect the proposed project or nearby sensitive receptors are discussed below in Section 11.5.3, “Local Setting.”

11.5.3 Local Setting

The sound levels in most communities fluctuate, depending on the activity of nearby and distant noise sources, time of the day, or season of the year. To characterize the existing environment, noise measurements were taken at various locations in the existing Village, at the East Parcel, and at surrounding sensitive land uses. A total of 18 short-term measurements and one long-term (24 hour) measurement were taken. The location of each measurement is shown in Exhibits 11-1 and 11-2. Measurement location numbers in Exhibits 11-1 and 11-2 correspond to the measurement location numbers indicated in Table 11-3, which presents the results of the short-and long-term ambient noise measurements. As shown in Table 11-3, the noise measurements captured sound generated from a variety of sources, including traffic, ski operations, snow making, snow removal, and human voices (e.g., people talking, children playing), which represent typical activities and noise sources at the existing Squaw Village.

Exhibit 11-3 shows the recorded 24-hour measurement (location 19, April 12, 2013) for each hour of the day and the calculated L_{dn}. A 24-hour measurement records the ambient sound level over an extended period of time and records various sound level measurements.

Noise level measurements were conducted in accordance with American National Standards Institute standards using a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter. The sound level meter was calibrated before and after use with an LDL Model CAL200 acoustical calibrator. Meteorological conditions during the measurement period were adequate for reliable noise measurements, with partly cloudy skies, temperatures ranging from 24 degrees Fahrenheit (°F) to 62°F, and light winds averaging 0 to 3 miles per hour (mph), and no precipitation.

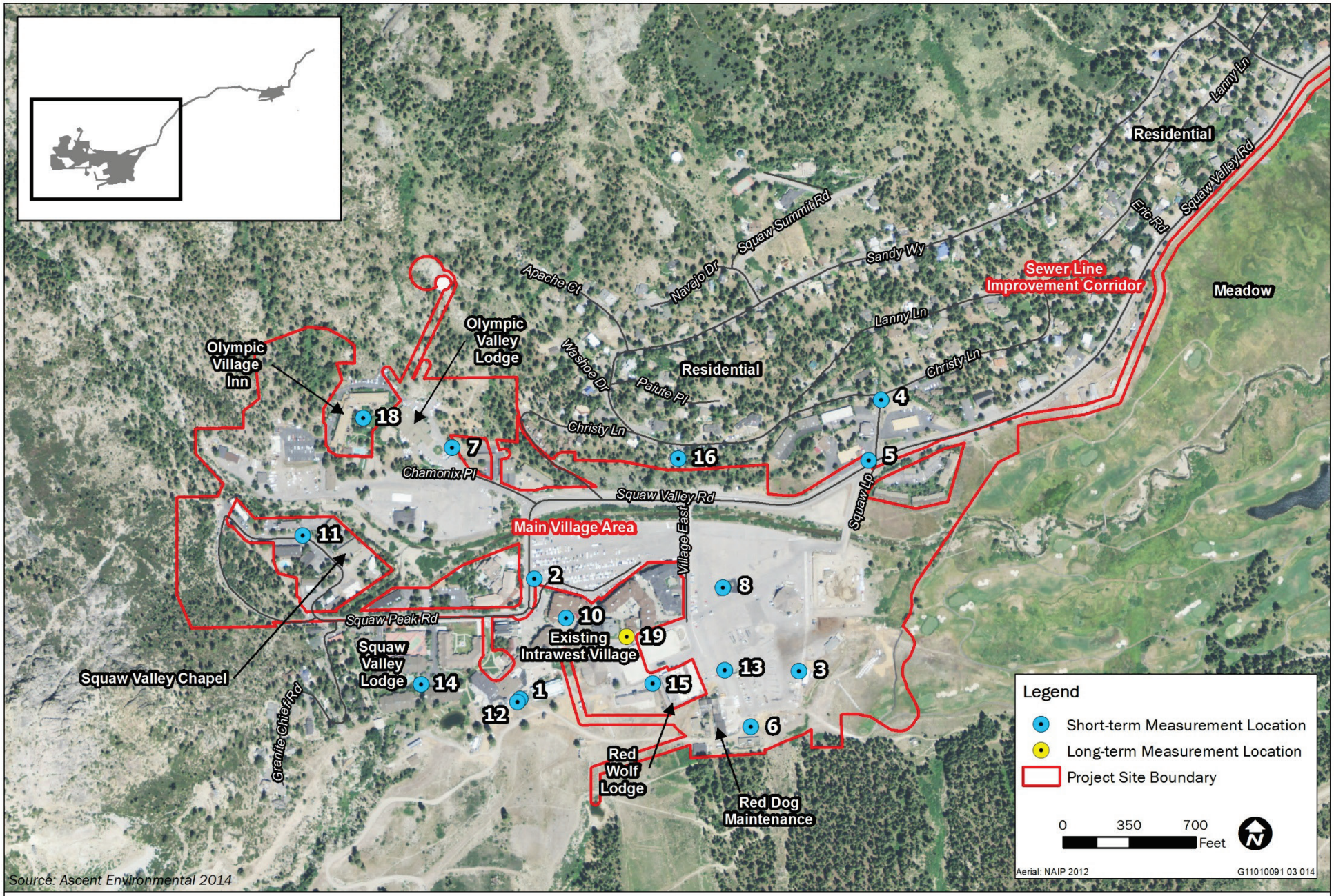

Exhibit 11-1

Noise Sensitive Land Uses and Noise Measurement Location

ASCENT ENVIRONMENTAL

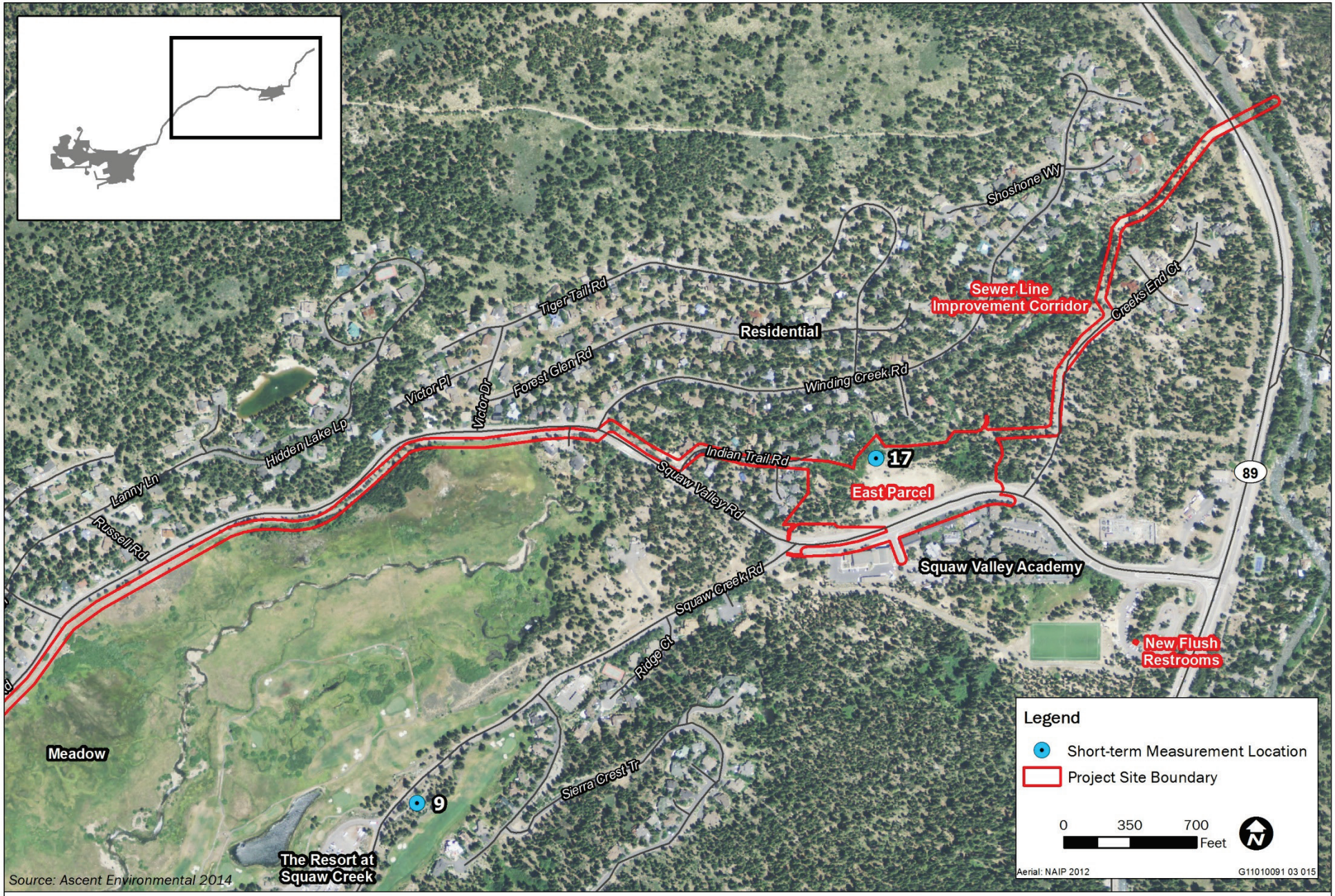

Exhibit 11-2

Noise Sensitive Land Uses and Noise Measurement Location

Table 11-3 Summary of Sound Level Noise Measurements

Measurement Location	Date	Time/Duration	Primary Noise Source	L_{eq}	L_{min}	L_{max}
1	3/30/2012	9:40 a.m./15min	Funitel Ski Lift	69.2	66.6	80.8
2	3/30/2012	11:40 a.m./15min	Road Traffic	61.3	48.9	65.0
	3/30/2012	10:30 p.m./15min	Road Traffic	53.9	45.2	72.3
3	3/30/2012	3:30 p.m./15min	Far East Express Lift	69.6	66.8	73.5
4	3/30/2012	4:00 p.m./15min	Road Traffic	53.4	44.5	63.7
	4/1/2012	8:00 p.m./15min	Road Traffic	46.5	37.1	60.0
5	3/30/2012	4:30 p.m./15min	Road Traffic	67.9	49.6	80.1
	4/1/2012	2:20 p.m./15min	Road Traffic	65.5	46.1	78.8
6	4/1/2012	9:00 a.m./15min	Red Dog Snowmaking	63.7	61.9	75.8
7	4/1/2012	10:30 a.m./15min	Road Traffic	59.8	40.5	78.1
8	4/1/2012	11:45 a.m./25min	Road Traffic	54.6	44.8	73.0
9	4/1/2012	2:00 p.m./15min	Road Traffic	57.9	39.9	72.7
10	4/1/2012	5:00 p.m./15min	People Talking/Music/Children Playing	67.8	61.5	80.6
11	4/2/2012	9:30 a.m./15min	Road Traffic	53.4	42.3	71.3
12	4/11/2013	10:50 a.m./10min	Snow Cat on Slopes (1,000 feet away)	48.3	40.6	58.4
13	4/12/2013	10:00 a.m./5min	Scraper/Dozer (27 feet away)	82.4	65.1	91.5
	4/12/2013	10:05 a.m./5min	Snow Plow (18 feet away)	82.0	65.1	93.0
14	4/12/2013	11:10 a.m./15min	Ski Lift	55.5	53.7	64.2
15	4/12/2012	11:50 a.m./15min	People Skiing	53.0	51.2	62.6
16	4/12/2013	1:45 p.m./15min	Road Traffic	59.5	39.2	71.5
17	4/12/2013	2:25 p.m./15min	Road Traffic	44.3	40.7	63.0
18	4/12/2013	3:00 p.m./15min	Road Traffic	42.1	38.1	55.8
19	4/12/2013	9:00 a.m./24-Hour	Village Activity/Snow Grooming on Slopes	52.2	40.4	89.7

Notes: Data presented in this table for the Long-term 24-hour measurement are average values recorded over the entire 24-hour period.

Source: Measurements conducted by Ascent Environmental in 2012 and 2013

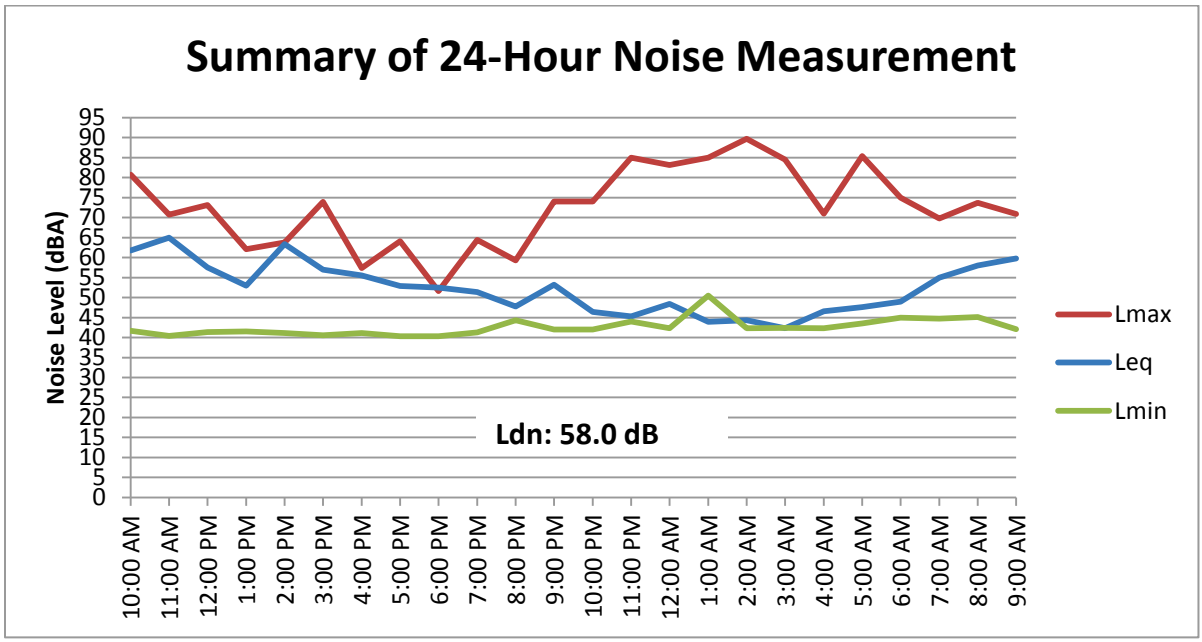

Exhibit 11-3 Summary of Long-term (24-hour) Noise Measurement

Table 11-4 summarizes the modeled existing traffic noise levels at 100 feet from the centerline of each major roadway in the project vicinity and lists distances from each roadway centerline to the 65-dB, 60-dB, and 55-dB CNEL/L_{dn} traffic noise contours. Traffic noise modeling results are based on existing "peak" average daily traffic (ADT) volumes. The peak is defined as the 7th busiest winter day and, for the summer, a Friday in August (see Chapter 9, Transportation and Circulation for details). Roadway speeds and modeling parameters were obtained from the project-specific traffic analysis (see Chapter 9, "Transportation and Circulation," and Appendix I for assumptions and inputs) and assumes no natural or human-made shielding (e.g., vegetation, berms, walls, buildings). As shown in Table 11-4, the location of the 60-dB CNEL/L_{dn} traffic noise contours along segments in the project vicinity range from 85 to 103 feet from the centerline for Squaw Valley Road and 168 to 374 feet from the centerline for State Route (SR) 89 under existing conditions. The extent to which existing land uses in the project vicinity are affected by existing traffic noise depends on their respective proximity to the roadways and their individual sensitivity to noise.

Table 11-4 Summary of Modeled Existing Traffic Noise Levels

Roadway Segment/Segment Description	CNEL/L_{dn} (dB) at 100 feet from Roadway Centerline	Distance (feet) from Roadway Centerline to CNEL/L_{dn}(dB)		
		65	60	55
Winter Peak Saturday[1]				
Squaw Valley Road, between SR 89 and Squaw Creek Road	60.1	47	102	219
Squaw Valley Road, between Squaw Creek Road and the existing Village	60.2	48	103	223
SR 89, north of Squaw Valley Road	66.3	121	262	564
SR 89, south of Squaw Valley Road	63.4	78	168	361
Summer Peak Friday[2]				
Squaw Valley Road, between SR 89 and Squaw Creek Road	59.0	40	85	184
Squaw Valley Road, between Squaw Cree k Road and the existing Village	59.7	44	96	206
SR 89, north of Squaw Valley Road	68.6	174	374	806
SR 89, south of Squaw Valley Road	66.4	123	265	571

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level

[1] Winter Peak Saturday – existing traffic conditions for the winter season were based on the average daily traffic for the 7th busiest travel day during the 2011-2012 ski season.

[2] Summer Peak Friday – existing traffic conditions for the summer season were based on peak hour traffic data for a peak summer Friday afternoon in August (which has been determined to be the busiest month of the summer season). Counts at intersections along study roadways for all turn directions were available. Traffic counts at each intersection were summed over the length of the study segment to determine average daily traffic numbers for the Peak Summer Friday.

Refer to Chapter 9, "Transportation and Circulation," and Appendix I for detailed traffic data, and traffic-noise modeling input data and output results.

Source: Data modeled by Ascent Environmental, Inc. in 2014

In considering the existing noise environment and, later in this chapter, the impacts of the project, it is important to recognize the unique nature of both the traffic data and the seasonal/peak nature of the noise analysis. The CNEL metric is generally intended to reflect average year-round conditions, and translates various noise events into a singular number. It can also reflect noise over a single day, but this is not its typical use. However, year-round traffic data is not available for the project area. By focusing on the peak traffic days in the winter and summer, the noise levels represent the busiest days of the winter and summer seasons, rather than average traffic throughout the year. Thus, while the CNEL data reflect expected noise levels in the project area that would be experienced a number of days in the year, these noise levels are higher than what would be experienced on the majority of days in the project area, when traffic volumes are much lower than the peak days.

11.6 REGULATORY SETTING

11.6.1 Federal

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate Federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies where relevant.

OCCUPATIONAL HEALTH AND SAFETY ACT OF 1970

This act covers all employers and their employees in the United States and US territories. Administered by the Occupational Safety and Health Administration (OSHA), the act assigns OSHA two regulatory functions—setting standards and conducting inspections to ensure that employers are providing safe and healthful workplaces. Employers must become familiar with the standards applicable to their establishments and eliminate hazards. Included in this act is a regulation for worker noise exposure at 90 dBA over an 8-hour work shift. Areas where exposure exceeds 85 dBA must be designated and labeled as high-noise-level areas and hearing protection is required.

FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration establishes 65 dBA CNEL as the maximum noise exposure limit associated with aircraft noise measured at exterior locations in noise-sensitive land uses (e.g., land uses where quiet environments are essential such as residential areas, churches, and hotels). This standard is also generally applied to railroad noise.

U.S. DEPARTMENT OF TRANSPORTATION

To address the human response to groundborne vibration, FTA has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses. Among these guidelines are the following maximum-acceptable vibration limits:

- 65 VdB, referenced to 1 microinch per second 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).

11.6.2 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.

Though not adopted by law, the *State of California General Plan Guidelines 2003*, published by the California Governor's Office of Planning and Research (2003), provide guidance for the compatibility of projects within areas of specific noise exposure. Acceptable and unacceptable community noise exposure limits for various land use categories have been determined to help guide new land use decisions in California communities. In many local jurisdictions, these guidelines are used to derive local noise standards and guidance.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

In 2013, Caltrans published the Transportation-and Construction 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 11-5 below presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

Table 11-5 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 2013

11.6.3 Local

PLACER COUNTY GENERAL PLAN

The *Placer County General Plan* Noise Element (Placer County 2013) 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 [Table 11-6], and maximum allowable noise exposure levels for transportation noise sources [Table 11-7]) and the Placer County Noise Ordinance (Article 9.36 of the Placer County Code) contains noise limits for sensitive receptors (Placer County 2014). The applicable policies and standards contained in the General Plan and Ordinance are summarized 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 of Table 11-6 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 the performance standards of Table 11-6 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.

- **Policy 9.A.9:** Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so as not to exceed the levels specified in Table 11-7 at outdoor activity areas or interior spaces of existing noise-sensitive land uses.

Table 11-6 Placer County Allowable L_{dn} Noise Levels Within Specified Zone Districts[1] Applicable to New Projects Affected by or Including Non-Transportation Noise Sources

Zone District of Receptor	L_{dn} (dBA) at Property Line of Receiving Use	Interior Spaces (dBA)[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: 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 dBA.

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 art[5] 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 dBA 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 be 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.

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 off-site 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 dBA will be considered acceptable outdoor exposure at a residence.

Source: Placer County 2013

Table 11-7 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}, dBA[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 dBA 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 2013

PLACER COUNTY NOISE ORDINANCE

The Placer County Noise Ordinance (Article 9.36.060 Sound limits for sensitive receptors of the Placer County Code) defines sound level performance standards for sensitive receptors (Table 11-8). 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 dBA or exceed the sound level standards as set forth in Table 11-8, whichever is greater.

Each of the sound level standards specified in Table 11-8 shall be reduced by 5 dBA 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 dBA.

Table 11-8 Placer County Noise Ordinance Noise Level Standards for Sensitive Receptors

Sound Level Descriptor (dBA)	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

Source: Placer County 2014

According to Article 9.36.030, "Exemptions," some noise-generating activities are exempt from the above noise ordinance standards, including 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.

Other noise sources applicable to the project that are exempt from the Placer County Noise Ordinance include:

- sound sources typically associated with residential uses (e.g., children at play, air conditioners in good working order, etc.); and
- 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.

11.6.4 Vibration Criteria

CEQA states that the potential for any excessive ground noise and vibration levels must be analyzed; however, it does not define the term "excessive" vibration. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of ground noise and vibration; however, the Federal, state, and local governments have yet to establish specific ground noise and vibration requirements. The following publications of the FTA and Caltrans are two of the seminal works for the analysis of ground noise and vibration relating to transportation and construction-induced vibration.

With respect to structural damage, Caltrans recommends that a level of 0.2 in/sec PPV not be exceeded for the protection of normal residential buildings, and that 0.1 in/sec PPV not be exceeded for the protection of old or historically significant structures (Caltrans 2013).

To address the human response to groundborne vibration, FTA has guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines recommend 65 VdB referenced to 1 µin/sec and based on the 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).

With respect to human response within residential uses (i.e., annoyance), FTA recommends a maximum acceptable vibration level of 80 VdB (FTA 2006).

11.7 IMPACTS

11.7.1 Significance Criteria

Based on the Placer County CEQA checklist, Appendix G of the State CEQA Guidelines, noise policies and standards in the *Placer County General Plan* and Placer County Noise Ordinance, and Caltrans and FTA vibration standards, the proposed project would result in a significant impact related to noise or vibration if it would:

- expose persons to or generate stationary (non-transportation) noise levels in excess of applicable allowable levels (e.g., long-term exposure of sensitive receptors [existing or proposed] to stationary noise [existing or project-generated] that exceed 65 dB L_{dn} [exterior], 45 dB L_{dn} [interior], 55 dB L_{eq} [during the daytime hours of 7 a.m. to 10 p.m.], or 45 dB L_{eq} [during the nighttime hours of 10 p.m. to 7 a.m.]);
- expose persons to or generate transportation noise levels in excess of applicable allowable levels (i.e., long-term exposure of sensitive receptors [existing or proposed] to transportation noise [existing or project-generated] that exceed 60 dB L_{dn} [exterior] or 45 dB L_{dn} [interior]);

- expose persons to or generation of excessive ground vibration or ground noise levels (i.e., exceed 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 human response for residential uses [i.e., annoyance] at nearby existing vibration-sensitive land uses);

- result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (e.g., long-term exposure of existing sensitive receptors to increased project-generated noise levels of 5 dB or more or that exceed applicable allowable levels);

- result in a substantial temporary (or periodic) increase (i.e., 5 dB) in ambient noise levels in the project vicinity above levels existing without the project;

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

- for a project within the vicinity of an active private airstrip, expose people residing or working in the project area to excessive noise levels.

11.7.2 Methods and Assumptions

POLICIES PROPOSED IN THE SPECIFIC PLAN THAT COULD AFFECT PROJECT IMPACTS

Chapter 8, "Implementation," of the *Village at Squaw Valley Specific Plan* (Squaw Valley Real Estate, LLC 2015) includes the following requirement that is applicable to the evaluation of noise effects:

> The Draft EIR analyzed a project buildout scenario which assumed that no more than 20 percent of the project would be developed in any single year. Each application for project entitlements shall include a projected timeline for project construction activities, including demolition, site preparation, grading, paving, building construction and architectural coatings. This inventory shall include the projections for construction of any other VSVSP projects that would involve construction activities that are foreseeable to occur concurrent with the project for which the application is submitted, including approved Tentative Small-Lot Subdivision Maps that have not recorded but remain within the valid exercise period and any approved projects not requiring a Small-Lot Tentative Map that are within the valid exercise period. If the total amount of construction in any construction year would exceed 20 percent of the total VSVSP buildout, then the application shall be accompanied by air quality and greenhouse gas analyses to determine if emissions would exceed applicable thresholds in any of the construction years of the project application. If the thresholds are exceeded, additional CEQA review may be required.

IMPACT ANALYSIS METHODOLOGY

To assess potential short-term (construction-related) noise and vibration impacts, sensitive receptors and their relative exposure were identified. Project-generated construction source noise and vibration levels were determined based on methodologies, reference emission levels, and usage factors from FTA's *Guide on Transit Noise and Vibration Impact Assessment* methodology (FTA 2006) and FHWA's *Roadway Construction Noise Model User's Guide* (FHWA 2006). Reference levels are noise and vibration emissions for specific equipment or activity types that are well documented and the usage thereof common practice in the field of acoustics.

With respect to non-transportation noise sources (e.g., stationary) associated with project implementation, the assessment of long-term (operational-related) impacts was based on reconnaissance data, reference noise emission levels and measured noise levels for activities and equipment associated with project operation (e.g., HVAC units, delivery docks), and standard attenuation rates and modeling techniques.

To assess potential long-term (operation-related) noise impacts due to project-generated increases in traffic, modeling was conducted for affected roadway segments based on Caltrans' traffic noise analysis protocol and the technical noise supplement (Caltrans 2006, 2009) and project-specific traffic data (Appendix I). The analysis is based on the reference noise emission levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on study area roadways were estimated from field observations and the project-specific traffic report. Note that the modeling conducted does not account for any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings) and; consequently, represents worst-case noise levels.

11.7.3 Issues or Potential Impacts Not Discussed Further

A dedicated helipad for emergency use (e.g., patient evacuation to regional emergency care providers) would be established within the main Village area as part of the proposed project. It would be located to assure timely access by ambulances and other emergency vehicles while reducing noise exposure and rotor wash to nearby buildings, residents, and guests. In addition to the new helipad, a new fire station would be constructed in the west end of the valley to provide more rapid emergency response in this area.

According to the Squaw Valley Fire Department, the frequency of helicopter use in medical emergencies at Squaw Valley approximates one to two trips per week with approximately 50 percent of these evacuations occurring at the base area of the ski resort. The balance of evacuations occurs on the upper mountain at Squaw Valley (Bansen, pers. comm., 2015). In addition, the use of fire engines during emergency response activities would generate noise that could disturb or otherwise effect residents and visitors at Squaw Valley. However, both the use of the helipad and noise from fire engines would only occur during emergency response situations and would be temporary when they do occur. Further, noise generated from emergency vehicles, including helicopters and fire engines providing emergency services, is exempt from the Placer County Noise Ordinance per Section 9.36.030. Because of this and the infrequency of expected use, this issue is not discussed further in this DEIR.

The project site is not located within two miles of an active private airstrip. The Truckee Tahoe Airport is the closest public airport and is located approximately 9 miles from Squaw Valley. Thus, the project would not result in noise impacts related to the exposure of people residing or working in the project area to excessive aircraft-related noise levels. This issue is not discussed further in this DEIR.

11.7.4 Impact Analysis

Impact 11-1: Construction noise impacts.

Existing noise-sensitive receptors are located in close proximity to proposed construction areas and, as the Specific Plan is developed, newly constructed sensitive receptors may be located adjacent to, or in close proximity to, ongoing construction. Most construction activities are proposed during the daytime hours, when construction noise is exempt by the Placer County Municipal Code. Although construction noise occurring during the exempted hours of the day would comply with the Placer County noise ordinance, the relatively large scale of construction occurring over a long period of time, and in close proximity to existing and future sensitive receptors, may result in excessive noise levels that disturb nearby sensitive receptors. Further, construction activity may be required during the night for actions such as large continuous concrete pours and to protect the construction site and buildings from anticipated storms. Proposed nighttime construction activities would exceed Placer County nighttime standards for sensitive receptors and could potentially result in a temporary increase in ambient noise levels of 5 dB above current levels. This impact would be **significant**.

Construction noise levels in the vicinity of the project site would fluctuate depending on the particular type, number, and duration of usage for the varying equipment. The effects of construction noise largely depend on the type of construction activities occurring on any given day; noise levels generated by those activities; distances to noise sensitive receptors; potential noise attenuating features such as topography, vegetation, and existing structures; and the existing ambient noise environment in the receptor's vicinity. Construction generally occurs in several discrete stages, each phase requiring a specific complement of equipment with varying equipment type, quantity, and intensity. These variations in the operational characteristics of the equipment change the effect they have on the noise environment of the project site and in the surrounding area for the duration of the construction process.

To assess noise levels associated with the various equipment types and operations, construction equipment can be considered to operate in two modes, mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., loaders, graders, dozers). Stationary equipment operates in a given location for an extended period of time to perform continuous or periodic operations (e.g., stationary crane, generator). Operational characteristics of heavy construction equipment are additionally typified by short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

Additionally, when construction-related noise levels are being evaluated, activities that occur during the more noise-sensitive evening and nighttime hours are of increased concern. Because exterior ambient noise levels typically decrease during the late evening and nighttime hours as traffic volumes and commercial activities decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residences.

The Specific Plan would be developed over an estimated 25-year buildout period, with some construction proposed to begin as early as spring of 2016. The sequence and pace for constructing various land uses and facilities would be market driven; therefore, a specific construction schedule has not been developed. During some years there may be several Specific Plan elements under construction simultaneously and during other years there may be very little construction activity. However, it is anticipated that during the single most active possible construction year, no more than 20 percent of the total Specific Plan construction could occur (see Section 3.4.6, "Project Construction," as well as Section 11.3.2, above). It is anticipated that this peak year, if it were to occur, would only happen once during the Specific Plan's estimated 25-year buildout period.

Typical construction activities would include demolition and removal of existing pavement and structures, grubbing/clearing of on-site areas, excavation and relocation of soil/rock on the site, backfilling and compaction of soils, construction of utilities (i.e., potable water conveyance, wastewater conveyance, storm water drainage facilities, underground electrical and propane facilities), and construction of proposed buildings. Construction staging areas would be located on existing and future surface lots in the main Village Area and a staging area would be established on the East Parcel. Once the parking structure is complete on the East Parcel, it would be available for staging for construction of other project elements in the East Parcel. Staging areas would be placed in parking lots because during the construction season (spring, summer, fall) there is reduced demand for parking and portions of parking lots could be used for staging without disrupting resort operations.

Construction equipment would vary day-to-day depending on the project phase and the activities occurring, but would involve operation of all-terrain heavy-duty diesel equipment. Typical noise levels generated by various types of construction equipment likely to be used are identified in Table 11-9.

The site preparation phase typically generates the most substantial noise levels because the on-site equipment associated with grading, compacting, and excavation are the noisiest. Because construction of the various project components may overlap, it is likely that site preparation activities would occur simultaneously with building construction and/or demolition activities at any given location on the site. Therefore, as a conservative approach to this analysis, it was assumed that noise from site preparation and building construction activities

could combine, representing a worst case scenario, and affect the same sensitive receptor at some point during the construction phase.

In addition, some periodic night time construction work is anticipated to occur during some parts of project development, such as large continuous concrete pours (for some larger concrete elements once a "pour" starts it must continue without interruption to ensure proper setting and cohesion of the concrete), rapidly covering or otherwise protecting partially constructed buildings/structures in anticipation of oncoming storms, and delivery of materials and supplies during some nighttime operations. Aside from these few instances, construction would not occur during the night time hours on a regular basis.

Based on the information provided in Table 11-9, and accounting for typical usage factors of individual pieces of equipment and activity types, worst-case construction-related activities (daytime) could result in noise levels of up to 94 dBA L_{eq} and 98 dBA L_{max} at 50 feet from the acoustical center of the construction site. Nighttime construction activities could result in noise levels of up to 79 dB L_{eq} and 84 dB L_{max} at 50 feet from the construction site and could result in a temporary increase (i.e., during construction periods) in excess of 5 dB above current levels.

Table 11-9 Noise Emission Levels from Construction Equipment

Equipment Type	Typical Noise Level (dBA) @ 50 feet
Pile Driving	95
Backhoe	80
Concrete Mixer	85
Concrete Pump	82
Crane	85
Dozer	85
Fork lift	85
Generator	81
Loader	85
Paver	89
Pneumatic Tools	85
Scraper	89
Trucks	74–88

Notes: Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of heavy construction equipment.

Source: FTA 2006

Existing sensitive receptors that would be exposed to construction-noise include lodging units at the Intrawest Village and Red Wolf Lodge, The Olympic Village Inn, Squaw Valley Chapel, Squaw Valley Lodge, and other scattered residences located around the project site, such as the residences on Indian Trail Court adjacent to the East Parcel. Construction activity (e.g., demolition, site preparation, grading, and building construction) could potentially occur at or within 50 feet of these existing sensitive receptors. In addition, as the Specific Plan is developed over the years, new sensitive land uses would be constructed and potentially occupied while construction continues and; therefore, exposing these new on-site receptors to the same noise levels. Thus, anticipated daytime construction activities could result in noise levels that exceed Placer County's daytime (i.e., 7:00 a.m. to 10:00 p.m.) exterior noise standards of 55 dBA L_{eq} / 70 dBA L_{max} and nighttime (i.e., 10:00 p.m. to 7:00 a.m.) interior standards of 45 dBA L_{eq} /65 dBA L_{max} and could result in a temporary increase in noise levels in excess of 5 dB.

As described above, most construction activities and use of heavy-duty construction equipment would occur during the daytime. Placer County exempts construction noise from noise standards provided that construction occurs during the daytime hours (i.e., 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). Although daytime construction noise is exempt by the Placer County municipal code and a majority of the construction would take place during the exempt hours, construction activities would occur for an extended period of time, would be located in close proximity to existing and future planned sensitive receptors, and would result in relatively high noise levels, with temporary increases over ambient noise levels in excess of 5 db. For these reasons, construction-related noise during the daytime (Placer County exempted hours) may result in excessive noise levels that disturb nearby sensitive receptors.

Further, nighttime construction work is anticipated to be required on occasion for activities such as large continuous concrete pours, which could result in a temporary increase in noise in excess of 5 dB and would exceed Placer County's nighttime noise standards of 45 dBA L_{eq} /65 dBA L_{max} at the nearest existing sensitive off-site receptors or future on-site sensitive receptors that are completed and occupied while further construction continues in the plan area. Although it is expected that nighttime construction activities would be infrequent, they would be disruptive. This would be a **significant** impact.

Mitigation Measure 11-1a: Implement construction-noise reduction measures.

To minimize noise levels during construction activities, construction contractors shall comply with the following measures during all proposed construction work:

- All construction equipment and equipment staging areas shall be located as far as possible from nearby noise-sensitive land uses.
- All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
- All construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. The self-adjusting backup alarms shall automatically adjust to 5 dBA over the surrounding background levels. All non self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels. In addition to the use of backup alarms, the construction contractor shall consider other techniques such as observers and the scheduling of construction activities such that alarm noise is minimized.
- Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site) where feasible and consistent with building codes and other applicable laws and regulations.
- When future noise sensitive uses are within close proximity to prolonged construction noise, noise attenuating buffers such as structures, truck trailers, temporary noise curtains or sound walls, or soil piles shall be located between noise sources and the receptor to shield sensitive receptors from construction noise.
- The project applicant shall sponsor and create a website that includes information on construction activities and includes when, where, and for how long noise generating construction activities would occur. In addition, prior to the beginning of each construction season written notification of construction activities shall be provided to all noise-sensitive receptors located within 2,500 feet of construction activities. Additional notifications may be provided if there are substantive changes in construction operations or noise generating activities (e.g., need for nighttime construction, special notice for blasting). Notification shall include anticipated dates and hours during which construction activities are anticipated to occur and contact information, including a daytime telephone number, for the project representative to be contacted in the event that noise levels are deemed excessive.

Mitigation Measure 11-1b: Implement construction-noise reduction measures during noise-sensitive time periods.

For all construction activity that is to take place outside of the Placer County construction noise exception timeframes (i.e., 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), and that is anticipated to generate more than 45 dBA L_{eq} / 65 dBA L_{max} at 50 feet, the construction contractor shall comply with the following measures:

- Consistent with Section 9.36.080 Exceptions, of the Placer County Code, obtain an exception to Article 9.36 Noise standards for nighttime construction. Implement noticing to adjacent landowners called for in Section 9.36.080 and implement conditions included in the exception, if approved.
- Install temporary noise curtains that meet the following parameters:
  - Install temporary noise curtains as close as possible to the boundary of the construction site within the direct line of sight path of the nearby sensitive receptor(s).
  - Temporary noise curtains shall consist of durable, flexible composite material featuring a noise barrier layer bounded to sound-absorptive material on one side. The noise barrier layer shall consist of rugged, impervious, material with a surface weight of at least one pound per square foot.
- Noise-reducing enclosures and techniques shall be used around stationary noise-generating equipment (e.g., concrete mixers, generators, compressors).
- Operate heavy-duty construction equipment at the lowest operating power possible.

Significance after Mitigation

Implementation of Mitigation Measures 11-1a and 11-1b would provide substantial reductions in day and nighttime construction noise levels by ensuring proper equipment use; locating equipment away from sensitive land uses; and requiring the use of enclosures, shields, and noise curtains (noise curtains typically can reduce noise by up to 10 dB [EPA 1971]). Although, noise reduction would be achieved with implementation of these measures, reductions of up to 34 dB would be required during some of the more intensive night time construction (e.g., during continuous concrete pours that would occur intermittently and only during the most intense construction periods, typically during the summer months), to comply with Placer County's nighttime standard of 45 dBA L_{eq}. Reductions of this magnitude are not expected to be achieved under all circumstances with implementation of Mitigation Measures 11-1a and 11-2b. Further, construction activities would continue to produce disruptive daytime noise over an extended period. Thus, this impact would remain **significant and unavoidable**.

Impact 11-2: Construction vibration impacts.

Pile driving could be considered as a construction method for some structures in the project area. Sensitive receptors and existing structures are located in close proximity to potential pile driving locations and could be exposed to excessive levels of vibration noise. Potential pile driving could possibly expose existing or future structures or occupied buildings to vibration in excess of 0.2 in/sec PPV with respect to structural damage and 80 VdB with respect to human disturbance. This impact would be **potentially significant**.

Construction activities generate varying degrees of temporary ground vibration, depending on the specific construction equipment used and activities involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. Blasting activities also generate relatively high levels of ground vibration and vibration noise. The effects of ground vibration may be imperceptible at the lowest levels, result in low rumbling sounds and detectable vibrations at moderate

levels, and high levels of vibration can cause sleep disturbance in places where people normally sleep or annoyance in buildings that are primarily used for daytime functions.

The project would not include the development of any new major sources of ground vibration (e.g., no new highways or railroads). As described above (see Impact 11-1), development of the proposed project would include construction activities that require the use of various types of equipment. Construction of the project may result in varying degrees of temporary ground vibration and noise, depending on the specific construction equipment used and activities involved. As shown in Table 11-10, pile driving and blasting are the typical construction activities that generate the greatest ground vibration. Based on the types of construction activities associated with the proposed project (e.g., bridge, parking structure, and building construction) it is possible that pile driving would be required for new structure erection. No blasting would be required; therefore, maximum ground vibration and noise levels would be associated with the potential use of pile driving during construction activities.

Table 11-10 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]
Impact Pile Driver	1.518	112
Blasting	1.13	109
Sonic Pile Driver	0.734	104
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

Source: FTA 2006

According to FTA, vibration levels associated with pile driving are 1.518 in/sec PPV and 112 VdB at 25 feet. Based on FTA's recommended procedure for applying a propagation adjustment to these reference levels (Table 11-10), vibration levels from pile driving could exceed Caltrans recommended level of 0.2 in/sec PPV with respect to the structural damage within 100 feet of pile driving activities and could exceed FTA's maximum acceptable level of 80 VdB with respect to human response within 300 feet of pile driving activities.

As described above (see Impact 11-1), construction activities would be located in close proximity to existing off-site sensitive receptors (i.e., within 50 feet) and to future on-site sensitive land uses as the Specific Plan is developed. Further, it is unknown at this time if and where pile driving may be required. Therefore, considering the relatively dense land use development and intensive construction activities proposed, it is possible that pile driving may occur within these distances, exceeding the Caltrans recommended level of 0.2 in/sac PPV with respect to the structural damage and FTA's maximum acceptable level of 80 VdB with respect to human response for residential uses (i.e., annoyance).

Thus, potential pile driving during project construction activities could result in the exposure of existing off-site and future planned on-site sensitive receptors to excessive ground vibration and vibration noise levels. This impact would be **potentially significant**.

Mitigation Measure 11-2a: Implement vibration noise reduction measures.

To reduce vibration and noise impacts from construction activities, the construction contractor shall comply with the following measures:

- Pile driving activities shall be limited to the daytime hours 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.
- If pile driving is used, pile holes shall be predrilled to the maximum feasible depth to reduce the number of blows required to seat a pile.
- All construction equipment on construction sites shall be operated as far away from vibration-sensitive sites as reasonably possible.
- Earthmoving and ground-impacting operations shall be phased so as not to occur simultaneously in areas close to sensitive receptors, to the extent feasible. The total vibration level produced could be significantly less when each vibration source is operated at separate times.

Mitigation Measure 11-2b: Develop and implement a vibration control plan.

This mitigation measure would be applicable to pile driving activities located within 100 feet of any building or within 300 feet of an occupied residence/building.

A vibration control plan shall be developed by the project applicant and his/her construction contractors to be submitted to and approved by Placer County prior to issuance of any Improvement Plans or Grading Permits for the project. The plan shall consider all potential vibration-inducing activities that would occur within the distance parameters described above and include various measures, setback distances, precautions, monitoring programs, and alternative methods to traditional pile driving activities with the potential to result in structural damage or excessive noise. Items that shall be addressed in the plan include, but are not limited to, the following:

- Minimum setback requirements for different types of ground vibration-producing activities (e.g., pile driving) for the purpose of preventing damage to nearby structures shall be established based on the proposed pile driving activities and locations, once determined. Factors to be considered include the specific nature of the vibration producing activity (e.g., type and duration of pile driving), local soil conditions, and the fragility/resiliency of the nearby structures. Established setback requirements (i.e., 100 feet) can be breached if a project-specific, site specific analysis is conducted by a qualified geotechnical engineer or ground vibration specialist that indicates that no structural damage would occur at nearby buildings or structures.
- Minimum setback requirements for different types of ground vibration producing activities (e.g., pile driving) for the purpose of preventing negative human response shall be established based on the proposed pile driving activities and locations, once determined. Established setback requirements (i.e., 300 feet) can be breached only if a project-specific, site-specific, technically adequate ground vibration study indicates that the buildings would not be exposed to ground vibration levels in excess of 80 VdB, and ground vibration measurements performed during the construction activity confirm that the buildings are not being exposed to levels in excess of 80 VdB.
- All vibration-inducing activity within the distance parameters described above shall be monitored and documented for ground vibration noise and vibration noise levels at the nearest sensitive land use and associated recorded data submitted to Placer County so as not to exceed the recommended FTA and Caltrans levels.
- Alternatives to traditional pile driving (e.g., sonic pile driving, jetting, cast-in-place or auger cast piles, non-displacement piles, pile cushioning, torque or hydraulic piles) shall be considered and implemented where feasible to reduce vibration levels.

Significance after Mitigation

Implementation of Mitigation Measures 11-2a and 11-2b would ensure that pile driving would not occur during the more sensitive times of the day (i.e., late evening through early morning). Additional measures would require the construction contractor to minimize vibration exposure to nearby receptors by locating equipment far from receptors, phasing operations, and predrilling holes for potential piles. Further, if pile driving would be required in close proximity to existing structures or sensitive receptors, a vibration control plan would be required to further refine appropriate setback distances and identify and implement alternative methods to pile driving if required. These measures would ensure compliance with recommended levels to prevent structural damage and human annoyance and this impact would be reduced to a **less-than-significant** level.

Impact 11-3: Exposure of existing sensitive receptors to new or additional operational project-generated stationary noise sources.

The project would result in the development of various land uses (e.g., residential, lodging, commercial, and retail). Noise sources associated with these land uses include Heating Ventilation and Air Conditioning (HVAC) units, back-up emergency generators, vehicular and human activity in parking lots, loading dock and delivery activities at commercial/retail land uses, and activities at outdoor recreational land uses. Exact locations, building foot prints, and building orientation have not been finalized; it is unknown specifically where future stationary noise sources may be located. Therefore, considering the relatively large-scale of development and the close proximity to existing off-site sensitive receptors of proposed land use development, it is possible that new stationary noise sources would result in excessive noise levels at existing sensitive receptors and exceed applicable Placer County noise standards. This impact would be **potentially significant**.

This impact assesses the long-term exposure of existing sensitive receptors to increased operational-source noise levels from proposed land use development. This impact analysis evaluates non-transportation noise sources that would occur as a result of project operation. Transportation generated noise is addressed separately below in the discussion of Impact 11-5. For purposes of this analysis, all noise sources considered here are evaluated against the Placer County Noise Ordinance for noise exposure to sensitive receptors as defined in Table 11-8 and summarized below.

- Daytime (i.e., 7:00 a.m. to 10:00 p.m.) noise standards of 55 dBA L_{eq} / 70 dBA L_{max}.
- Nighttime (i.e., 10:00 p.m. to 7:00 a.m.) noise standards of 45 dBA L_{eq} / 65 dBA L_{max}.

In addition, the exterior and interior noise standards for non-transportation noise sources affecting a transient lodging land use (i.e., 65 dBA L_{dn} exterior and 45 dBA L_{dn} interior as shown in Table 11-6) are considered. To assess whether or not a permanent substantial increase in noise would occur, a 5 dB increase threshold was used, per the Placer County Noise Ordinance.

The project would result in the development of various land uses (e.g., residential, lodging, commercial, and retail). Noise sources associated with these land uses include Heating Ventilation and Air Conditioning (HVAC) units, back-up emergency generators, vehicular and human activity in parking lots, loading dock and delivery activities at commercial/retail land uses, and activities at outdoor recreational land uses. Noise from each of these sources is discussed separately. For details on noise propagation calculations and noise level estimates for this impact discussion, refer to Appendix I.

MECHANICAL HVAC EQUIPMENT

HVAC equipment could be a primary noise source associated with new resort residential, lodging, commercial, and retail land uses. The noise sources could take the form of fans, pumps, air compressors, chillers, or cooling towers. Noise levels from HVAC equipment vary substantially depending on unit efficiency, size, and location, but generally range from 45 to 70 dB L_{eq} at a distance of 50 feet (EPA 1971).

The specific location of new HVAC units on newly constructed structures is not known at this time. However, due to the close proximity of existing sensitive receptors to the project site (e.g., the Intrawest Village and the Olympic Village Inn), and the amount of proposed new construction, it is possible that HVAC units in the Main Village area could be located in close proximity (i.e., within 50 feet) to existing sensitive receptors such that the Placer County's daytime and night time noise standards for sensitive receptors could be exceeded. This would not be the case for the East Parcel, where all facilities would be farther than 50 feet from existing receptors.

EMERGENCY ELECTRICAL GENERATORS

Emergency generators may be used to supply necessary power requirements to vital systems within facilities constructed on the commercial and mixed-use land uses. Emergency generators are typically operated under two conditions: loss of main electrical supply or preventive maintenance/testing. The operation of mechanical equipment associated with emergency operations is exempt from the noise standards outlined in the Placer County Noise Ordinance; thus, this analysis focuses on routine preventive maintenance and testing operations, which would be conducted on a periodic basis.

Reference noise-level measurements of emergency generators with rated power outputs from 50 to 125 kilowatts (kw) result in noise levels ranging from 61 to 73 dB L_{eq} and 63–84 dB L_{max} at a distance of 45 feet (EPA 1971, FHWA 2006). Assuming the higher, more conservative value of these reference noise levels, emergency electrical generators located within 150 feet of noise-sensitive land uses could exceed the County's noise standard for daytime noise. In addition, generators located within 230 feet of noise-sensitive land uses could exceed the County's noise standard for nighttime noise.

As discussed above, proposed development includes high density mixed-use land uses that could be in close proximity (i.e., as close as 50 feet) to existing sensitive receptors (i.e., the Intrawest Village). Although specific building footprint locations, building orientations, and specific location of stationary equipment such as emergency electrical generators is not known at this time, considering the density of development and proximity to existing sensitive receptors, it is possible that new emergency electrical generators could be located within 150 feet of existing sensitive receptors and the Placer County daytime and night time noise standards for sensitive receptors. This would apply to both the main Village area and the East Parcel.

PARKING LOT ACTIVITIES

The project would result in new below-grade and podium parking beneath the lodging and resort-residential buildings (similar to the existing Intrawest Village), continued use of portions of existing surface parking lots, new parking structures on the existing surface lots as demand increases in the future, a new parking structure on the East Parcel (primarily for employee parking), and additional use of areas for overflow surface parking on an as-needed basis during peak activity days.

Noise levels from parking lots can vary depending on the number of vehicles at any given time in the parking lot, the speed at which vehicles are traveling, and the types of vehicles present. Typical noise sources include car engines running/idling, doors slamming, car alarms going off, cars honking, and people talking.

Reference noise levels for parking lot noise were obtained during the noise measurements conducted for this project. Measurements that represent typical parking lot noises are shown in Table 11-3, measurement locations 7 and 8. Measured values at these two locations differ based on the distance to the noise source and the particular activities occurring during the measurement time. Therefore, for a more conservative analysis, the higher of the two is assumed for this analysis. Based on measurements conducted, typical noise levels from parking lot activities could reach 59.8 L_{eq} and 78.1 L_{max} at 15 feet from the noise source (i.e., car slamming door). This reference noise level would be applicable to the proposed parking lots because it represents similar parking lot type, activities, and vehicle types that would result from construction of the project.

With regards to the proposed beneath-grade and podium parking, noise exposure to off-site sensitive receptors would be essentially nonexistent as these parking facilities would be located entirely underground or enclosed as part of a building podium. This topic is not addressed further in this analysis, which focusses on new surface lots and parking structures.

The various parking facilities included with the proposed project are identified above. Some of these parking facilities would be located in areas currently used for parking, such as the Lot 11 and 12 parking structures that would be built on land currently used for surface parking. However, converting existing surface lots to parking structures would concentrate more vehicle activity into a smaller area. In addition, the upper deck of the parking structure would place parking noise generation at a higher vantage point, which could reduce noise attenuation relative to ground level noise as the noise travels from the generation point. In addition, the East Parcel parking structure would be built in an area that is now only occasionally used for overflow parking, but is not used for parking on a regular basis. Therefore, based on this information and the reference noise level for a parking lot at the existing Village, noise from parking facilities could exceed the Placer County daytime noise standard within 30 feet of proposed parking lots/structures and the nighttime noise standards within 45 feet of proposed parking lots/structures.

Exact locations, orientation, and capacities of proposed parking lots have not been finalized at this time and therefore distances to existing off-site sensitive receptors from future parking lots are unknown. Thus, it is possible that new parking lots/structures could be located within 45 feet of off-site sensitive receptors, and expose off-site sensitive receptors to excessive noise levels.

LOADING DOCK AND DELIVERY ACTIVITY

Noise sources associated with loading dock and delivery activities can include trucks idling, on-site truck circulation, trailer-mounted refrigeration units, pallets dropping, and the operation of forklifts. Based on reference noise values and accounting for typical usage factors of individual pieces of equipment, such activities could result in noise levels of approximately 82 dB L_{eq} and 86 dB L_{max} at a distance of 50 feet. Based on these reference noise levels, the County's daytime noise standards would be exceeded within approximately 200 feet from the acoustic center of the loading dock and the nighttime noise standards would be exceeded within approximately 300 feet from the acoustic center of a loading dock.

The proposed shipping and receiving dock located on the East Parcel could be located within approximately 200 feet to the east of the existing residences located on Indian Trail Court and therefore loading activities at this location could exceed Placer County's daytime and nighttime noise standards. However, under the anticipated configuration for the East Parcel (see Exhibit 3-6 in Chapter 3, "Project Description"), the Shipping and Receiving building would be located between the loading dock and the nearby residences, providing a barrier to loading dock noise. Under this configuration, it is far less likely that Placer County's noise standards would be exceeded at the residences located on Indian Trail Court.

In addition to the shipping and receiving dock located at the East Parcel, the project includes the development of mixed-density commercial land uses in the main Village area that may require additional loading docks and/or delivery activity. However, at this time, it is unknown specifically where delivery activity may take place and where (if any) loading docks would be located within the plan area, especially with many deliveries initially taking place at the East Parcel shipping and receiving facility. Therefore, considering that proposed commercial land uses are proposed in close proximity to existing adjacent noise sensitive land uses (i.e., the Intrawest Village), and given the high density and variety of proposed land use development that would occur, it is possible that additional loading docks and delivery activities would take place within 200 feet of existing off-site sensitive receptors, thus resulting in noise levels that could exceed Placer County's daytime and nighttime noise standards.

OUTDOOR ACTIVITY AREAS

The project proposes to enhance and protect the existing slope-side "beach" (snow beach) along the southeastern side of the existing Village (see Exhibit 3-5 in Chapter 3, "Project Description"). The snow beach would be the main gathering spot where multiple recreational, entertainment, and cultural activities would occur. This is a continuation of the existing use at the snow beach area. The proposed improvements and enhancements at the existing snow beach would not result in any additional or new noise sources such that noise generation would increase. Because the uses in this area would remain unchanged from existing conditions, the anticipated slope and drainage improvements would not affect the ambient noise environment or any off-site sensitive receptors.

The Specific Plan includes a proposal for an outdoor winter ice skating rink in the Village Core adjacent to the Funitel Plaza and surrounded by a pedestrian plaza/commercial level. In the summer, the area could be used as an outdoor concert/performance area. Typical noise sources from this type of land use include people talking and congregating, music, and children playing. These activities currently take place at the existing Village and based on the noise monitoring conducted for the project, noise levels for these activities can reach up to 67.8 L_{eq} and 80.6 L_{max} at 36 feet from the source (see measurement location 10 in Table 11-3 and Appendix I for measurement field notes and data).

This land use would be located in a central focal point, surrounded by ground-level commercial and residential/lodging land uses and thus, noise generated at the outdoor activity area would be shielded/contained by the proposed buildings. All buildings provide some exterior-to-interior noise reduction. A building constructed with a wood frame and a stucco or wood sheathing exterior typically provides a minimum exterior-to-interior noise reduction of 25 dB with its windows closed (Caltrans 2002). Thus, assuming a minimum attenuation of 25 dB from new buildings that would surround the proposed outdoor winter ice skating rink/summer performance area, the maximum combined noise level would be reduced to approximately 43 dBA L_{eq} and 55 dBA L_{max} at the property line of the proposed Village Core (i.e., on the opposite side of the buildings surrounding the ice skating rink). These noise levels would comply with the Placer County day and nighttime standards and thus would not expose any off-site existing sensitive receptors to excessive noise levels.

SUMMARY

As discussed above, development of the project would result in the operation of various new stationary noise sources (e.g., mechanical HVAC equipment, emergency electrical generators, parking lots, loading dock and delivery activity, and noise from outdoor activity areas). Specific locations for these noise sources are not known at this time and final building orientations, footprints, and locations have not been finalized. Thus, considering the proposed high density of land development in close proximity to existing sensitive receptors (e.g., the existing Intrawest Village, the Olympic Village Inn, and single family residences surrounding the Specific Plan area), it is possible that new proposed HVAC units, electrical generators, commercial loading docks, or new parking lots/structures could exceed Placer County's hourly daytime and nighttime allowable noise levels. Consequently, exceedance of the daily allowable level of 65 dB L_{dn} exterior noise standard for transient lodging and a substantial permanent increase in ambient noise levels (i.e., 5 dB) could occur. This would be a **potentially significant** impact.

Mitigation Measure 11-3: Reduce noise exposure to existing sensitive receptors from proposed stationary noise sources.

The project applicant shall implement the following measures to reduce the effect of noise levels generated by on-site stationary noise sources:

- Routine testing and preventive maintenance of emergency electrical generators shall be conducted during the less sensitive daytime hours (i.e., 7:00 a.m. to 10:00 p.m.), per the Placer County Noise Ordinance. All electrical generators shall be equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications.

- External mechanical equipment, including HVAC units, associated with buildings shall incorporate features designed to reduce noise emissions below the stationary noise source criteria. These features may include, but are not limited to, locating equipment within equipment rooms or enclosures that incorporate noise reduction features, such as acoustical louvers, and exhaust and intake silencers. Equipment enclosures shall be oriented so that major openings (i.e., intake louvers, exhaust) are directed away from nearby noise-sensitive receptors.

- Loading docks shall be located and designed so that noise emissions do not exceed the stationary noise source criteria established in this analysis (i.e., exterior daytime [7:00 a.m. to 10:00 p.m.] standards of 55 dB L_{eq}/ 70 dB L_{max} and the exterior nighttime [10:00 p.m. to 7:00 a.m.] standards of 45 dB L_{eq} / 65 dB L_{max}) at any existing or planned sensitive receptor. At the time of conformity review application submittal for discretionary entitlement, the project applicant shall provide to the County a specialized noise study to evaluate specific design and ensure compliance with Placer County noise standards. Reduction of loading dock noise can be achieved by locating loading docks as far away as possible from noise sensitive land uses, constructing noise barriers between loading docks and noise-sensitive land uses, or using buildings and topographic features to provide acoustic shielding for noise-sensitive land uses. Final design, location, and orientation shall be dictated by findings in the noise study, if applicable.

- Parking lots and structures shall be located and designed so that noise emissions do not exceed the stationary noise source criteria identified in this analysis (i.e., exterior daytime [7:00 a.m. to 10:00 p.m.] standards of 55 dB L_{eq}/ 70 dB L_{max} and the exterior nighttime [10:00 p.m. to 7:00 a.m.] standards of 45 dB L_{eq} / 65 dB L_{max}) at any existing or planned sensitive receptor. At the time of conformity review application submittal for discretionary entitlement, the project applicant shall provide to the County a specialized noise study to evaluate specific design and ensure compliance with Placer County noise standards. Reduction of parking lot noise can be achieved by locating parking lots away from noise sensitive land uses, constructing noise barriers between parking lots/structures and noise-sensitive land uses, incorporating noise barriers into parking structure designs (e.g., providing solid walls around the top levels of parking structures), or using buildings and topographic features to provide acoustic shielding for noise-sensitive land uses. Final design, location, and orientation shall be dictated by findings in the noise study, if applicable.

Significance after Mitigation

Implementation of Mitigation Measure 11-3 would require that all stationary noise sources are oriented, located, and designed in such a way that reduces noise exposure to ensure that stationary noise sources would comply with Placer County noise standards for sensitive receptors, reducing this impact to a **less-than-significant** level.

Impact 11-4: Exposure of new sensitive receptors to existing and new stationary noise sources.

The project would result in the development of mixed-use resort type land uses including new noise-sensitive receptors (e.g., resort residential units, hotels). Existing ambient noise would not exceed Placer County land use noise standards for this type of development and, therefore, new sensitive receptors would not be exposed to excessive noise levels from existing sources. However, new sensitive receptors would be located in close proximity to new stationary noise sources (e.g., HVAC units, electrical generators, outdoor activity areas, parking lots, and commercial loading docks) associated with Specific Plan, which could expose these receptors to noise in excess of allowable noise levels. This impact would be **potentially significant**.

The proposed project would result in the development of approximately 94 acres of mixed-use resort type land uses. The Specific Plan includes a mix of high and medium density residential (e.g., condos, time shares, hotels), outdoor activity areas (e.g., plazas, an ice rink, outdoor patios and fireplaces, a snow beach), commercial (e.g., restaurants, retail shopping, local market and convenience stores), parking areas, transit improvements, and other associated amenities and uses.

Based on the noise monitoring that was conducted in the project area, the existing noise levels were measured to be 58.0 dBA L_{dn} (see measurement location 19 in Table 11-3 and Appendix I for measurement field notes and data). This measurement represents typical noise-generating activities that occur throughout the day at Squaw Valley such as normal commercial deliveries, snow grooming on the slopes, human activity such as children playing and ambient background music, parking lot activity, and ski lift operations. Therefore, the 24-hour measurement is representative of the noise levels that the new sensitive receptors would be exposed to in regards to the existing sources. Thus, based on the existing ambient noise levels at Squaw Valley, future planned sensitive receptors located within the proposed Specific Plan would not be exposed to existing noise levels that exceed the Placer County noise standard for transient lodging land uses of 65 dBA L_{dn}.

However, as described above (Impact 11-3), the project would include various stationary noise sources such as HVAC units, emergency generators and equipment, noise from parking lots/structures, loading docks and delivery activity at commercial buildings, and noise from outdoor activities. As described in Impact 11-3, noise from HVAC equipment generally ranges from 45 to 70 dB L_{eq} at a distance of 50 feet, emergency generators range from 61 to 73 dB L_{eq} and 63–84 dB L_{max} at a distance of 45 feet, parking lot activities could reach 59.8 L_{eq} and 78.1 L_{max} at 15 feet, loading docks could reach noise levels of approximately 82 dB Leq and 86 dB L_{max} at a distance of 50 feet, and outdoor activities could reach levels up to 67.8 L_{eq} and 80.6 L_{max} at 36 feet from the source.

The project would result in the construction of new noise-sensitive land uses, such as hotels and residential lodging. These new sensitive land uses could potentially be located in close proximity to the noise sources described above. Due to the nature of mixed-use, high density development that is proposed, new sensitive land uses may be located adjacent to these sources. For example, the proposed ice rink would likely be located in a central location surrounded by mixed-used commercial and residential land uses, thus exposing new residential units to a potential noise source that could exceed the Placer County daytime noise standard of 55 dB L_{eq} / 70 dB L_{max}. In addition, because new sensitive land uses would be developed in close proximity to commercial, retail, and to other residential units, all other new stationary sources (e.g., HVAC units, electrical generators, parking lots, loading docks) could expose the sensitive land uses to noise above the day or night time Placer County noise standards or the daily standard of 65 dB L_{dn} for transient lodging land uses. Further, due to the nature of the proposed mixed-use development, various portions of the Specific Plan with sensitive land uses would be located in close proximity, adjacent to, or directly above first floor commercial or entertainment uses (e.g., bars, restaurants) that could result in various noise levels during the night when these types of uses are typically the busiest. Noise from commercial and entertainment uses would vary depending on the night and if a special event were to occur, such as live music, a sporting event, private party, or the like. Considering that some of these types of events would operate past 10:00 p.m., noise generated at these bottom level uses could exceed Placer County night time noise standards in the nearby lodging uses. This impact would be considered **potentially significant**.

Mitigation Measure 11-4a: Reduce stationary noise exposure to new sensitive receptors.

Implement Mitigation Measure 11-3, which would also reduce noise exposure to new sensitive receptors within the Specific Plan area. In addition, the project applicant shall comply with the following noise rules and regulations:

- For the quiet enjoyment by owners and guests, any onsite activities that could generate outdoor noise levels greater than 45 dB (e.g., outdoor skating rink operations, outdoor entertainment events) should continue no later than 12 a.m./midnight each night.
- No outdoor amplified music that exceeds 65 dB at residential/transient lodging after 10:00 p.m., as measured at the exterior wall of structures.
- No ambient patio music after 11 p.m., unless special occasions warrant such and under no circumstances after 12 midnight.

- Exceptions to these noise standards can be provided on limited days for specific events through issuance of a Temporary Outdoor Event permit, subject to Placer County approval.

- The project applicant shall provide access to Placer County enforcement officers for the assessment and investigation of noise complaints and monitoring of noise generating activities, including the placement and operation of sound measurement equipment consistent with Placer County Code section 9.36.040 Sound measurement methodology.

- Should a noise complaint arise, it would be at the discretion of the individual Placer County enforcement officer at the time of noise violation to issue a fine to the band, business owner, event organizer, or other individual responsible for the noise violation. The process for addressing violations and fines would follow Placer County Code Article 9.36 Noise.

Mitigation Measure 11-4b: Conduct site-specific noise study.

To ensure compliance with Placer County night time interior noise standard and the California Building Code Section 1207, Sound Transmission interior noise standards of 45 dBA L_{dn}, the project applicant shall comply with the following:

- At the time of conformity review application submittal for discretionary entitlement for a structure containing residential units, the project applicant shall provide to the County a site specific noise study prepared by a qualified acoustical engineer addressing interior noise levels in residential units.

- The noise study shall consider the types of land uses being proposed in the same building as the residential units in a mixed use structure and existing noise sources adjacent to the proposed structure.

- The noise study shall confirm, using approved calculation methodologies, that building design and materials are sufficient to maintain a maximum 45 dB L_{dn} interior noise level, with windows closed, in residential units given the reasonably foreseeable noise generation sources within the building, and existing noise sources adjacent to the building.

Significance after Mitigation

Implementation of Mitigation Measure 11-4a would limit noise generation from stationary sources, reduce outdoor ambient noise levels, and limit activities to the less sensitive times of the day such that people would be less likely to be disturbed while sleeping. Implementation of Mitigation Measure 11-4b would ensure that all new residential units would be constructed in such a way to reduce interior noise and comply with Placer County and California noise standards for interior spaces. These actions would reduce this impact to a **less-than-significant** level.

Impact 11-5: Exposure of new and existing sensitive receptors to operational project-generated transportation noise sources.

Implementation of the project could expose existing and future planned sensitive receptors to transportation noise levels that exceed the Placer County noise standard of 60 dBA L_{dn} at the property line of residential land uses. Therefore, this impact would be **significant**.

Project implementation would result in an increase in ADT volumes on affected roadway segments and, potentially, an increase in traffic source noise levels. Generally, a doubling of a noise source (such as twice as much traffic) is required to result in an increase of 3 dB, which is perceived as barely noticeable by people (Egan 2007:21). The Placer County Noise Ordinance establishes a 5 dB increase in a noise sources as a substantial noise increase. Thus, in regards to traffic noise specifically, an increase in 5 dB or more in traffic noise would be considered substantial. In addition, as indicated in Table 11-7, Placer County has established land use based noise standards from transportation noise for residential/transient lodging land uses as 60 dB L_{dn} at the exterior property line and 45 dB L_{dn} inside the residence. In addition, Placer County allows a 65 dB L_{dn} noise level at the exterior property line for this land use type if all practical best-available

noise reduction measures have been applied and noise levels still cannot meet the 60 dB L_{dn} level (see Table 11-7).

To assess this impact, traffic noise levels associated with the proposed project under existing and existing plus project conditions, during the summer and the winter seasons, were predicted for affected roadway segments. Traffic counts were conducted for peak hours during the summer and winter months to evaluate the different traffic-noise impacts based on the varying activity in Squaw Valley throughout the year. For further details on traffic counts and conditions, see Chapter 9, "Transportation and Circulation."

Table 11-11 summarizes the modeled traffic noise levels at 100 feet from the roadway centerlines under existing and existing plus project conditions, during summer and winter peak traffic conditions, along with the overall net change. As described in Chapter 9, "Transportation and Circulation," these modelled peak traffic conditions, as peaks, represent traffic conditions during a limited number of times each year. The level of traffic expressed by the summer and winter peaks would occur less than a combined 15 times each year (busiest winter days and Fridays in the peak summer period), thus these conditions are relatively infrequent. During other times of the year, existing plus project noise levels would be less because existing noise levels would be less. Project-generated traffic noise impacts were evaluated for existing sensitive receptors and future planned receptors that would be developed as a part of the project. Each impact is discussed separately below.

Table 11-11 Summary of Modeled Traffic Noise Levels under Existing and Existing Plus Project Conditions

		CNEL/L_{dn} (dB) at 100 feet from Roadway Centerline		Net Change (dB)
		Existing Conditions	Existing (Plus Project) Conditions	
	Winter Peak Saturday[1]			
1	Squaw Valley Road, between SR 89 and Squaw Creek Road	60.1	60.7	+0.9
2	Squaw Valley Road, between Squaw Creek Road and the existing Village	60.2	61.0	+0.7
3	SR 89, north of Squaw Valley Road	66.3	66.7	+0.4
4	SR 89, south of Squaw Valley Road	63.4	63.8	+0.4
	Summer Peak Friday[2]			
1	Squaw Valley Road, between SR 89 and Squaw Creek Road	59.0	63.4	+4.4
2	Squaw Valley Road, between Squaw Cree k Road and the existing Village	59.7	62.8	+3.1
3	SR 89, north of Squaw Valley Road	68.6	69.7	+1.1
4	SR 89, south of Squaw Valley Road	66.4	67.2	+0.8

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level

The net change may not be the exact difference between existing and existing plus project conditions due to rounding.

[1] Winter Peak Saturday – existing traffic conditions for the winter season were based on the average daily traffic for the 7th busiest travel day during the 2011-2012 ski season.

[2] Summer Peak Friday – existing traffic conditions for the summer season were based on peak hour traffic data for a peak summer Friday afternoon in August (which has been determined to be the busiest month of the summer season). Counts at intersections along study roadways for all turn directions were available. Traffic counts at each intersection were summed over the length of the study segment to determine average daily traffic numbers for the Peak Summer Friday.

Refer to Chapter 9, "Transportation and Circulation," and Appendix I for detailed traffic data, and traffic-noise modeling input data and output results.

Source: Data modeled by Ascent Environmental, Inc. in 2014

Squaw Valley Road would experience the greatest increase in traffic volume, and thus traffic noise, because all visitor and employee trips associated with the project would enter and leave Squaw Valley through Squaw Valley Road. As shown in Table 11-11, project implementation would result in a maximum increase of 0.9 dB during the winter peak days and a 4.4 dB increase during the summer peak days, relative to existing

conditions, on Squaw Valley Road. Although project-generated traffic noise levels would not result in increases in excess of 5 dB, project-generated traffic noise levels during the summer peak would cause noise levels to exceed the Placer County exterior noise standard of 60 dBA L_{dn} for transportation noise sources along a segment of roadway that is currently not exceeding this standard. Thus, during peak days in the summer, Squaw Valley Road, between SR 89 and Squaw Creek Road, would experience a perceptible noise increase that exceeds the Placer County exterior noise standard for transportation noise (i.e., 60 dBA L_{dn}). This is expected to affect outdoor areas; because of the climate, residences in this area likely already have dual pane windows and insulation that effectively attenuates noise to below the 45 dBA L_{dn} noise standard for interior spaces.

The greater increase in noise in the summer from existing to existing plus project conditions in comparison to the winter can be explained by lower existing traffic in the project area during the summer time. Squaw Valley currently provides more winter-time activities (e.g., skiing, snowboarding, sledding) that attract more people in comparison to the summer and, therefore, the existing traffic during the winter is higher in comparison to the existing traffic in the summer. With implementation of the project, additional trips would be added to the project area year-round, as intended by the project, and therefore, a greater increase in traffic relative to existing conditions would occur in the summer.

EXISTING SENSITIVE RECEPTORS

With regards to existing sensitive receptors, several residences are located within 100 feet of the study road segments and are currently exposed to noise levels that exceed the 60 dBA L_{dn} noise standard for transportation noise sources (Table 11-11). This occurs along all study road segments during the winter and only along SR 89 during the summer. Specific sensitive receptors include residences located at Eric Road and Squaw Valley Road and Squaw Valley Academy, as well as a relatively few residences located along SR 89, north and south of Squaw Valley Road.

Project-generated traffic during the winter peak would increase noise by as high as 0.9 dB, and this increase would not be perceptible to the human ear. Therefore, although sensitive receptors are currently being exposed to noise levels that exceed the Placer County noise standard for transportation noise, they would not experience noticeable increases in noise as a result of the project. With regards to the summer, the only segment that would result in a perceptible increase in noise is Squaw Valley Road, between SR 89 and Squaw Creek Road, thus exposing nearby sensitive receptors (i.e., Squaw Valley Academy) to a perceptible increase in noise as well as resulting in an exceedance of the Placer County noise ordinance for transportation noise (i.e., 60 dBA L_{dn}), as described above. As determined by the traffic-noise modeling conducted (Appendix I), all existing receptors within 450 feet of the centerline of SR 89 and within 170 feet of the centerline of Squaw Valley Road would be exposed to noise levels in excess of 60 dBA L_{dn} during the summer peak days. As a result, existing sensitive receptors could potentially be exposed to noise levels that exceed applicable Placer County noise standards. This impact would be **potentially significant**.

FUTURE PLANNED SENSITIVE RECEPTORS

With regards to future land development as a result of the project, new sensitive receptors (e.g., condominiums, hotels, time shares) would be located throughout the Specific Plan area. Locations that would be closest to Squaw Valley Road would experience the highest transportation noise; these areas include the Village Commercial – Neighborhood (VC-N) and Village Commercial – Core (VC-C) land use types (see Exhibit 3-4 in Chapter 3, "Project Description"). Although exact locations of future sensitive receptors within these land uses are unknown at this time, new sensitive receptors within the VC-N land use could potentially be located as close as 100 feet to the intersection of Squaw Valley Road and Squaw Peak Road. Therefore, new sensitive receptors could also be exposed to noise levels that exceed the 60 dBA L_{dn} exterior noise standard for transportation noise sources. As determined by the traffic-noise modeling conducted (Appendix I), all new receptors within 170 feet of the centerline of Squaw Valley Road would be exposed to noise levels in excess of 60 dBA L_{dn} during the summer peak days. As a result, new sensitive receptors could

potentially be exposed to noise levels that exceed applicable Placer County noise standards. This impact would be **potentially significant**.

Mitigation Measure 11-5: Reduce transportation noise exposure to sensitive receptors.

For new sensitive receptors developed as part of the proposed project and that would be located within 170 feet of the centerline of Squaw Valley Road (i.e., the distance from the centerline that is estimated, based on the noise modelling, to result in exceedance of the Placer County transportation-related exterior noise standard of 60 dBA L_{dn}), the following design criteria shall be adhered to:

- Building materials and design shall be used that achieve, at a minimum, 25 dBA of exterior-to-interior noise attenuation. In all cases, interior noise levels comply with the Placer County interior noise standard of 45 dBA L_{dn}.

Significance after Mitigation

Implementation of Mitigation Measure 11-5 would reduce exposure of traffic-generated noise at new sensitive receptors. However, as described below, no feasible mitigation is available for existing sensitive receptors.

Existing sensitive receptors are located within the 60 dBA L_{dn} noise contour of Squaw Valley Road and would continue to be exposed to noise levels that exceed Placer County noise standards (i.e., 60 dBA L_{dn}). Further, during the summer, noise along Squaw Valley Road would increase such that in some locations where modelling indicates existing conditions are in compliance with Placer County exterior noise levels, the addition of project-generated transportation noise would result in exceedance of the 60 dBA L_{dn} standard for transportation noise. Exterior noise levels at existing noise-sensitive residences could only be remediated by relocating roadways, building sound walls, relocating sensitive receptors, etc., but in the case of the project, this would not be feasible. Homes are located adjacent to the roadway edge and relocating the road would require removal of homes, or if moved in the other direction, would result in loss of habitat and other potential impacts. In most locations the homes are too close to the roadway to add sound walls without affecting safe access to the road (line of sight would be compromised) or views. Further, it is likely that interior noise is within standards of 45 dBA L_{dn}, given the colder climate and likelihood that most (or all) homes already have dual pane windows and insulation. Typical construction of this type provides at least 25 dB exterior-to-interior attenuation. Therefore, exterior noise levels would need to be at least 71 dBA for the interior noise standards to be exceeded, which would mean that an existing residence would need to be located 20 feet from the centerline of Squaw Valley Road, and this does not currently occur. Nonetheless, existing sensitive land uses (i.e., residences located within the 60 dBA L_{dn} noise contour of Squaw Valley Road) would be exposed to exterior noise levels during days with peak traffic conditions that exceed applicable Placer County noise standards. This impact would remain **significant and unavoidable.**

Implementation of Mitigation Measure 11-5 would reduce interior noise exposure from Squaw Valley Road at new sensitive receptors by designing buildings such that interior noise levels would comply with Placer County noise standards. As described in the *Placer County General Plan*, if all available noise-reducing measures have been implemented, the exterior noise level at the outdoor activity area may be 65 dBA $L_{dn,}$ provided that interior noise standards are met (see Table 11-7). The 65 dBA L_{dn} noise contour is located 80 feet from the centerline of Squaw Valley Road. As per the Illustrative Concept Plan included in the VSVSP, no new development is proposed within 80 feet of the centerline of Squaw Valley Road and therefore would not be exposed to exterior noise levels that exceed 65 dBA L_{dn}. Further, an exterior-to-interior reduction of 25 dBA would ensure that any new sensitive receptors located within the 60 dBA (170 feet), the 65 dBA (80 feet) or the 70 dBA (40 feet) noise contour from the centerline of Squaw Valley Road would not exceed the interior noise standard of 45 dBA L_{dn}. Impacts to new sensitive receptors from traffic noise would be reduced to a **less-than-significant** level.

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