4.8 NOISE AND VIBRATION

This section addresses the potential for noise and vibration impacts that could result from the increase in intensity that could occur in the Town of Mammoth Lakes commercial districts as a result of the Land Use Element/Zoning Code Amendments relative to FAR, and the changes that could result from the Mobility Element Update, particularly along Main Street. The analysis describes the existing noise environment within the Project Areas, estimates future noise and vibration levels at surrounding land uses resulting from construction and operation of the Project, identifies the potential for significant impacts, and provides, where feasible, mitigation measures to address significant impacts. Noise calculation and data sheets for the Project are included in Appendix D of this EIR.

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perceptibility of sound is subjective and a person's physical response to sound complicates the analysis of its impact as they judge sound in terms of "noisiness" or "loudness." Noise, sound pressure magnitude, is measured and quantified using a logarithmic ratio of pressures, the scale of which gives the level of sound in decibels (dB). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate the human, frequency-dependent response, the A-weighted filter system is used to adjust measured sound levels (dBA). The A-weighted sound level (dBA) de-emphasizes low frequencies to which human hearing is less sensitive and focuses on mid- to high-range frequencies. Humans can hear in the range of approximately 3 to 140 dBA, with 110 dBA considered intolerable or painful. Although the A-weighted scale accounts for the range of people's response, and is therefore commonly used to quantify individual event or general community sound levels, the degree of annoyance or other response effects also depends on several other factors. These factors include:

- Ambient (background) sound level;
- Magnitude of sound event with respect to the background noise level;
- Duration of the sound event;
- Number of event occurrences and their repetitiveness; and
- Time of day that the event occurs.

In an outdoor environment, sound levels attenuate through the air as a function of distance. Such attenuation is called "distance loss" or "geometric spreading" and is based on the source configuration, point source or line source. For a point source such as construction equipment, the rate of sound attenuation is 6 dB per doubling of distance from the noise source. For example a noise level of 85 dBA at a reference distance of 50 feet from the equipment would attenuate to 79 dBA at 100 feet, and 73 dBA at 200 feet.

A change in sound level of 3 dB is considered "just perceptible," a change in sound level of 5 dB is considered "clearly noticeable," and a change in 10 dB is recognized as "twice as loud".[1] A comparison of types of commonly experienced environmental noise is provided in **Figure 4.8-1**, *Common Noise Levels*.

Community noise levels usually change continuously throughout the day. The equivalent sound level (Leq) is normally used to describe community noise. The Leq is the equivalent steady-state A-weighted sound level that would contain the same acoustical energy as the time-varying A-weighted sound level during the same time interval. For intermittent noise sources, the maximum noise level (Lmax) is normally used to represent the maximum noise level measured during the measurement.

To assess noise levels over a given 24-hour time period, the Community Noise Equivalent Level (CNEL) descriptor is used. CNEL is the time average of all A-weighted sound levels for a 24-hour period with a 10 dBA adjustment (upward) added to the sound levels which occur in the night (10 p.m. to 7 a.m.) and a 5 dBA adjustment (upward) added to the sound levels which occur in the evening (7 p.m. to 10 p.m.). These penalties attempt to account for increased human sensitivity to noise during the quieter nighttime periods, particularly where sleep is the most probable activity. CNEL has been adopted by the State of California for development of the community noise element of general plans.[2]

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.[3] Vibration amplitudes are usually described as either peak particle velocity (PPV) or root-mean-square (RMS). PPV represents the maximum instantaneous peak of the vibration signal and the RMS represents the average of the squared amplitude of the vibration signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response. In addition, vibrations can be measured in the vertical, horizontal longitudinal, or horizontal transverse directions. Ground vibrations are most often greatest in the vertical direction.[4] Therefore, the analysis of ground-borne vibration associated with the Project is addressed in the vertical direction. Typically, groundborne vibration, generated by man-made activities, attenuates rapidly with distance from the source of vibration. Man-made vibration issues are therefore usually confined to short distances (500 feet or less) from the source.

1. ENVIRONMENTAL SETTING

a. Regulatory Framework

Many government agencies have established noise regulations and policies to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise and ground-borne vibration. The Town has adopted a number of policies, which are based in part on federal and State regulations and are intended to control, minimize or mitigate environmental noise effects. The policies and regulations that are relevant to Project construction and operation noise are discussed below.

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1 *Engineering Noise Control, Bies & Hansen, 1988.*

2 *State of California, General Plan Guidelines, 2002.*

3 *Federal Transit Authority, Transit Noise and Vibration Impact Assessment, Final Report, page 7-3, April 1995.*

4 *California Department of Transportation (Caltrans), Transportation Related Earthborne Vibrations, page 4, February 2002.*

Noise Level (dBA)	Common Indoor Noise Levels	Common Outdoor Noise Levels
110	Rock Band	
100	Inside Subway Train	Jet Flyover @ 1,000 feet Gas Lawn Mower @ 3 feet
90	Food Blender @ 3 feet	Diesel Truck @ 50 feet Noisy Urban Daytime
80	Garbage Disposal @ 3 feet Shouting @ 3 feet	
70	Vacuum Cleaner @ 10 feet	Gas Lawn Mower @ 100 feet Commercial Area
60	Normal Speech @ 3 feet Large Business Office	Heavy Traffic @ 300 feet
50	Dishwasher next room	Quiet Urban Daytime
40	Small Theater/Conference Room (background)	Quiet Urban Nightime Quiet Suburban Nightime
30	Library Bedroom at Night	
20	Concert Hall (background) Broadcast & Recording Studio	Quiet Rural Nightime
10		
0	Threshold of Hearing	

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Common Noise Levels

Land Use Element/Zoning Code Amendment and Mobility Element Update

Source: Caltrans Noise Manual, California Department of Transportation, 1980.

FIGURE

4.8-1

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(1) Town of Mammoth Lakes General Plan

The goals and policies in the Community Design Element describe the relationship between people and the man-made and natural environment. The Community Design Element of the 2007 General Plan contains a section entitled Quiet Community, which addresses importance of the noise environment to the character of the Town.

(2) Town of Mammoth Lakes Noise Ordinance

Title 8.0 (Health and Safety) of the Mammoth Lakes Municipal Code covers all noise standards. Chapter 8.16 (Noise Regulation) of the Municipal Code (Town Noise Ordinance) sets forth all noise regulations controlling unnecessary, excessive and annoying noise and vibration in the Town. However, this chapter does not control noise sources that are preempted by other jurisdictions including in-flight aircraft and motor vehicles operating on public rights-of-way.

(a) Exterior Noise

As outlined in Section 8.16.070 of the Town Noise Ordinance and presented in **Table 4.8-1**, *Town Exterior Noise Ordinance Standards*, the Town has established maximum exterior noise levels based on land use zones. Noise levels in excess of the levels indicated in Table 4.8-1 are conditionally permitted, depending on the intensity of the noise and the duration of exposure.[5]

If the existing exterior ambient noise level exceeds the level permissible within the noise limit categories, the allowable noise exposure standard is increased in five dBA increments in each category as appropriate to encompass or reflect the ambient noise level.[6]

(b) Interior Noise

The Town Noise Ordinance, Section 8.16.080, states that interior noise levels resulting from outside sources within residential units shall not exceed:

- 45 dBA between 7 a.m. and 10 p.m., and
- 35 dBA between 10 p.m. and 7 a.m.[7]

If the existing interior ambient noise level exceeds the level permissible within the noise limit categories, the allowable noise exposure standard is increased in five dBA increments in each category as appropriate to encompass or reflect the ambient noise level.[8]

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[5] *Noise levels may not exceed the exterior noise standard for a cumulative period of more than thirty minutes in any hour; or plus five decibels for a combined period of more than fifteen minutes in any hour; or plus ten decibels for a combined period of more than five minutes in any hour; or plus fifteen decibels for a combined period of more than one minute in any hour; or plus twenty decibels for any period of time (maximum noise level).*

[6] *Town of Mammoth Lakes Noise Ordinance Section 8.16.070.*

[7] *Noise levels may not exceed the interior noise standard for a cumulative period of more than five minutes in any hour; or plus five decibels for a combined period of more than one minute in any hour; or plus ten decibels for any period of time (maximum noise level).*

[8] *Town of Mammoth Lakes Noise Ordinance Section 8.16.080.*

Table 4.8-1

Town Exterior Noise Ordinance Standards

Receiving Land Use	Time Period	Noise Zone Classifications Maximum Noise Levels (dBA) L_{50} Rural/ Suburban	Suburban	Urban
One and Two Family Residential	10 p.m. to 7 a.m.	40	45	50
	7 a.m. to 10 p.m.	50	55	60
Multiple Dwelling Residential/Public Space	10 p.m. to 7 a.m.	45	50	55
	7 a.m. to 10 p.m.	50	55	60
Limited Commercial/Some Multiple Dwellings	10 p.m. to 7 a.m.		55	
	7 a.m. to 10 p.m.		60	
Commercial	10 p.m. to 7 a.m.		60	
	7 a.m. to 10 p.m.		65	
Light Industrial	Anytime		70	
Industrial	Anytime		75	

[a] *The classification of different areas of the community in terms of environmental* noise *zones shall be determined by the noise control officer, based upon assessment of community* noise *survey data. Additional area classifications should be used as appropriate to reflect both lower and higher existing ambient levels than those shown. Industrial* noise *limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction within the zone.*

[b] *Noise levels may not exceed the interior noise standard for a cumulative period of more than five minutes in any hour; or plus five decibels for a combined period of more than one minute in any hour; or plus ten decibels for any period of time (maximum noise level).*

[c] *If the existing interior or exterior ambient noise level exceeds that permissible within the noise limit categories above, the allowable noise exposure standard is increased in five dBA increments in each category as appropriate to encompass or reflect the ambient noise level.*

Source: Town Municipal Code Section 8.16.070

(c) Construction Noise

The Town Noise Ordinance identifies specific restrictions regarding construction noise. As outlined in Section 8.16.090, Prohibited Acts, of the Town Noise Ordinance and presented in Error! Reference source not found., *Town Construction Noise Standards*, the Town has established maximum exterior noise levels from the operation of equipment used in construction, drilling, repair, alteration or demolition work. All mobile and stationary internal-combustion-powered equipment and machinery is also required to be equipped with suitable exhaust and air-intake silencers in proper working order. Chapter 15.08 of the Municipal Code sets limits on construction hours. Operations permitted under a building permit shall be limited to the hours between 7 a.m. and 8 p.m., Monday through Saturday. Work hours on Sundays and Town recognized holidays shall be limited to the hours between 9 a.m. and 5 p.m. and permitted only with the approval of the building official or designee.

Table 4.8-2

Town Construction Noise Standards

Construction Equipment [a]	Type I Areas Single-Family Residential	Type II Areas Multi-Family Residential	Type III Areas Semi-Residential Commercial [a]	Business Properties
Mobile Equipment –Short-term Noise [b]				
Daily, except Sundays and legal holidays; 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA	----
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	65 dBA	70 dBA	----
Daily, including Sunday and legal holidays, all hours	----	----	----	85 dBA
Stationary Equipment –Long-term Noise [c]				
Daily, except Sundays and legal holidays; 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA	----
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA	----
Daily, including Sunday and legal holidays, all hours	----	----	----	75 dBA

[a] *All mobile or stationary internal combustion engine-powered equipment or machinery shall be equipped with suitable exhaust and air intake silencers in proper working order.*

[b] *Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment (e.g., excavator, backhoe, dozer, etc.).*

[c] *Maximum noise levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment (e.g., generators, compressors, etc.).*

Source: Town Municipal Code Section 8.16.090.

(d) Snow Removal Activities

Section 8.16.100 of the Town Noise Ordinance provides an exemption for the performance of emergency work such as may be required to prevent or alleviate personal property damage caused by an emergency. Although not specifically cited as such in the Noise Ordinance, the Town considers snow removal activities for purposes of public safety and emergency work when it occurs on public roadways, in parking lots, or around places of business.

(e) Groundborne Vibration

According to Section 8.16.020 of the Town Noise Ordinance, “vibration perception threshold" means the minimum groundborne or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. At a motion velocity of 0.01 inches per second RMS over the range of one to one hundred Hz

a person would feel a vibration. Therefore, as established in the Town Noise Ordinance, the vibration perception threshold of 0.01 inches per second RMS would be 0.04 inches per second PPV. Section 8.16.090 of the Ordinance prohibits operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at 150 feet (forty-six meters) from the source if on a public space or public right-of-way. The Town's vibration perception threshold is 0.01 inches per second RMS over the range of one to one hundred Hz, or 0.04 inches per second PPV.

b. Existing Conditions

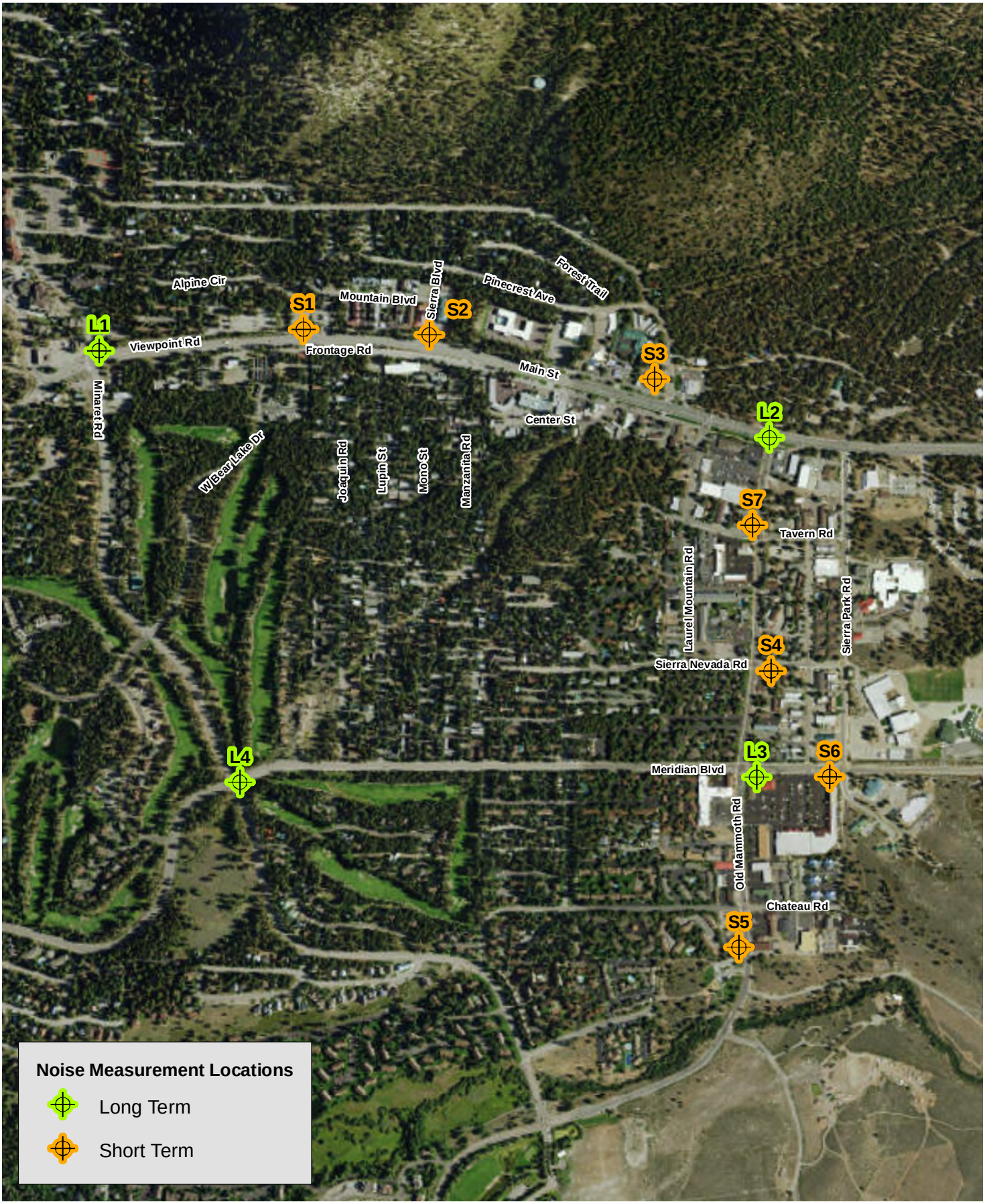
(1) Noise-Sensitive Receptors

Human response to noise varies widely depending on the type of noise, time of day, and sensitivity of the receptor. The effects of noise on humans can range from temporary or permanent hearing loss to mild stress and annoyance resulting in speech interference and sleep deprivation. Some land uses are considered more sensitive to intrusive noise than others due to the amount of noise exposure and the types of activities typically involved at the receptor location. Specifically, residences, schools, libraries, religious institutions, hotels, hospitals and nursing homes and parks and recreation areas are generally more sensitive to noise than are commercial and industrial land uses. Several sensitive land uses exist within the commercially designated areas and within the Project Area of the Land Use Element/Zoning Code Amendments and Mobility Element Update.

(2) Ambient Noise Levels

In order to quantify existing ambient noise levels in the Land Use Element/Zoning Code Amendments and Mobility Element Update areas, ESA PCR staff conducted noise measurements from Friday, August 20, to Friday, August 28, 2015 at eleven locations. The noise measurement sites were representative of typical existing noise exposure within the project areas. The noise measurement locations are described below, and as shown in **Figure 4.8-2**, *Noise Measurement Locations*, both long-term and short-term measurements were conducted. Long-term measurements were conducted at locations L1 through L4, and short-term (15-minute) measurements were recorded at locations S1 through S7. A description of the measurement locations are provided below:

- Measurement Location L1: This measurement was taken at approximately 140 feet east from the northeast corner of Main Street and Minaret Road. The measurement is reflective of the noise environment along Main Street, between Minaret Road and Mountain Boulevard.
- Measurement Location L2: This measurement was taken on Main Street across from the southeast corner of Main Street and Old Mammoth Road. The measurement is reflective of the noise environment along Main Street between Sierra Park Road and Forest Trail.
- Measurement Location L3: This measurement was taken at the southwest corner of Old Mammoth Road and Meridian Boulevard. The measurement is reflective of the noise environment along Old Mammoth Road, between Sierra Nevada Road and Meridian Boulevard and along Meridian Boulevard, west of Sierra Park Road.



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N

0 1,200 2,400 Feet

Noise Measurement Locations

Land Use Element/Zoning Code Amendment and Mobility Element Update

Source: Microsoft, 2010 (Aerial); PCR Services Corporation, 2016.

FIGURE

4.8-2

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- Measurement Location L4: This measurement was taken at the northwest corner of Meridian Boulevard and Minaret Road. The measurement is reflective of the noise environment along Meridian Boulevard, between Sierra Star Parkway and Joaquin Road and along Minaret Road, between Bear Lake Drive and Evening Star Drive.
  - Measurement Location S1: This measurement was taken at the northwest corner of Main Street and Mountain Boulevard. The measurement is reflective of the noise environment along Main Street, between Mountain Boulevard and Sierra Boulevard and along Mountain Boulevard, north of Main Street.
  - Measurement Location S2: This measurement was taken at the northwest corner of Main Street and Sierra Boulevard. The measurement is reflective of the noise environment along Main Street, between Sierra Boulevard and Pinecrest Avenue and along Pinecrest Avenue, north of Main Street.
  - Measurement Location S3: This measurement was taken at the northwest corner of Main Street and Pinecrest Avenue. The measurement is reflective of the noise environment along Main Street, between Pinecrest and Old Mammoth Road and along Pinecrest Avenue, north of Main Street.
  - Measurement Location S4: This measurement was taken at the southeastern corner of Old Mammoth Road and Sierra Nevada Road. The measurement is reflective of the noise environment along Old Mammoth Road, between Sierra Nevada Road and Tavern Road and along Sierra Nevada Road, east of Old Mammoth Road.
  - Measurement Location S5: This measurement was taken at the southeastern corner of Old Mammoth Road and Chateau Road. The measurement is reflective of the noise environment along Old Mammoth Road, south of Chateau Road and along Chateau Road, east of Old Mammoth Road.
  - Measurement Location S6: This measurement was taken at the northwestern corner of Meridian Boulevard and Sierra Park Road. The measurement is reflective of the noise environment along Meridian Boulevard, between Old Mammoth Road and Sierra Park Road and along Sierra Park Road, north of Meridian Boulevard.
  - Measurement Location S7: This measurement was taken at the southeastern corner of Old Mammoth Road and Tavern Road. The measurement is reflective of the noise environment along Old Mammoth Road, between Main Street and Tavern Road and along Tavern Road, east of Old Mammoth Road.

A summary of the noise measurements is provided in Error! Reference source not found., *Summary of Ambient Noise Measurements*. As shown in **Error! Reference source not found.**, the existing ambient noise levels at measurement locations exceed the Town's exterior noise limits presented above in the Table 4.8-1 during the daytime.

Aircraft Noise

According to the General Plan Update EIR, the Mammoth Yosemite Airport would have 400 flights per month, primarily by single-engine private aircraft.[9] A commercial turbo-prop provides limited service.

[9] *Town of Mammoth Lakes, General Plan Update EIR, October 2005.*

Existing airport noise does not contribute substantially to the ambient noise level in the Town according to

Table 4.8-3

Summary of Ambient Noise Measurements

Location, Duration, Existing Land Uses and, Date of Measurements	Measured Ambient Noise Levels,[a] (dBA) Day time (7 a.m. to 10 p.m.) Hourly L_{50}	Night time (10 p.m. to 7 a.m.) Hourly L_{50}	24-Hour Average, CNEL
L1			
8/20/15 (partial 12 hours)/ Thursday	56 – 64	48 – 54	N/A
8/21/15 (full 24 hours)/ Friday	59 – 63	35 – 57	62
8/22/15 (full 24 hours)/ Saturday	58 – 63	35 – 56	62
8/23/15 (full 24 hours)/ Sunday	54 – 62	34 – 53	60
8/24/15 (full 24 hours)/ Monday	61 – 62	35 – 55	N/A
Average:	**61**	**50**	
L2			
8/20/15 (partial 11 hours)/ Thursday	58 – 63	50 – 53	N/A
8/21/15 (full 24 hours)/ Friday	56 – 63	45 – 57	62
8/22/15 (full 24 hours)/ Saturday	56 – 62	44 – 58	61
8/23/15 (partial 15 hours)/ Sunday	59 – 61	41 – 54	N/A
Average	**61**	**52**	
L3			
8/26/15 (partial 12 hours)/ Wednesday	54 – 61	43 – 53	N/A
8/27/15 (full 24 hours)/ Thursday	55 – 61	36 – 53	60
8/28/15 (partial 9 hours)/ Friday	59 – 61	44 – 55	N/A
Average	**60**	**48**	
L4			
8/24/15 (partial 8 hours)/ Monday	46 – 56	42 – 44	N/A
8/25/15 (partial 19 hours)/ Tuesday	53 – 57	25 – 49	N/A
Average	**42**	**54**	
S1			
8/26/15 (1 p.m. to 2 p.m.)/ Wednesday	69	N/A	N/A
S2			
8/26/15 (11 a.m. to 12 p.m.)/ Wednesday	68	N/A	N/A
S3			
8/25/15 (2 p.m. to 3 p.m.)/ Tuesday	68	N/A	N/A
S4			
8/28/15 (10 a.m. to 11 a.m.)/ Friday	66	N/A	N/A
S5			
8/28/15 (9 a.m. to 10 a.m.)/ Friday	65	N/A	N/A
S6			
8/27/15 (11 a.m. to 12 p.m.)/ Thursday	67	N/A	N/A
S7			
8/27/15 (2 p.m. to 3 p.m.)/ Thursday	64	N/A	N/A

[a] *Detailed measured noise data, including hourly L_{eq} levels, are included in Appendix D of this EIR*

Source: ESA PCR, 2016.

the County of Mono Noise Element. In addition to aircraft operation at the airport, the community is occasionally exposed to noise from helicopters using the helipad at the Town hospital. The Final Supplement to the Subsequent EIR for the Mammoth Yosemite Airport Expansion project states that the Federal Aviation Administration accepted the noise exposure criterion levels as required by the California Department of Transportation, Division of Aeronautics of CNEL 60, 65, 70, and 75. The Mammoth Yosemite Airport has a relatively small size of CNEL 70 and 75 noise exposure areas. The area exposed to aircraft noise of CNEL 65 and higher remains within the airfield boundary of the Airport on either Airport property or vacant land controlled by the Airport through leases or use permits. There are no noise sensitive land uses and no people living within the CNEL 65 noise exposure area. Therefore, neither the Land Use Element/Zoning Code Amendments nor the Mobility Element Update areas would expose people to any of the airport CNEL 65 noise exposure areas.

2. METHODOLOGY AND THRESHOLDS

a. Methodology

The Land Use Element/Zoning Code Amendments would change the allowable intensity of development within commercially designated areas to require a minimum 0.75 FAR and allow up to 2.0 FAR with no room or unit cap. The placement of mixed-use infill adjacent to non-residential land uses could result in noise impacts on residential land uses because of the differences in noise generated as well as in acceptable noise levels between residential and commercial land uses. The Mobility Element Update would result in the construction of street extension/connections, trails, bike lanes, sidewalks and would provide for the reconfiguration of Main Street from an auto-dominated state highway into a pedestrian-first area. As this is a Program EIR, the noise analysis focuses on the noise anticipated from projected development, but not actual projects. Subsequent focused environmental review would be conducted, as necessary, for individual projects.

(1) Construction Noise

Estimated construction noise impacts were evaluated by determining the noise levels generated by the different types of construction activity estimated to occur, calculating the construction-related noise level at varying distances. More specifically, the following steps were undertaken to determine construction-period noise impacts.

1. The ambient noise measurements were conducted using a Larson-Davis 820 Precision Integrated Sound Level Meter (SLM). The Larson-Davis 820 SLM is a Type 1 standard instrument as defined in the American National Standard Institute (ANSI) S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. In accordance with the Town Noise Ordinance (Section 8.16.060) and with industry practice, the microphone was placed at a height of 5 feet above the local grade.

2. Typical noise levels for each type of construction equipment were obtained from the Federal Highway Administration (FHWA) roadway construction noise model (RCNM); and

3. Construction noise levels were then estimated in terms of hourly L_{eq}, at varying distances based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance.

(2) Off-Site Roadway Noise

Estimated roadway noise impacts have been evaluated using the Caltrans Technical Noise Supplement (TeNS) methodology based on the roadway traffic volume data provided in the Traffic Impact Study prepared for the Project. This methodology allows for the definition of roadway configurations, barrier information (if any), and receiver locations. Estimated roadway noise attributable to projected project development was calculated and compared to baseline noise levels that would occur under the "no project" condition.

(3) Stationary Point-Source Noise (Operation)

Estimated stationary point-source noise impacts have been evaluated by identifying the noise levels generated by outdoor stationary noise sources such as rooftop mechanical equipment and loading dock activities, calculating the hourly L_{eq} noise level from each noise source at surrounding sensitive receiver property line locations, and comparing such noise levels to existing ambient noise levels. More specifically, presumed ambient noise levels were applied to the analysis (see Table 4.8-1) to estimate outdoor stationary point-source noise impacts. It is assumed that outdoor mechanical equipment would be designed not to exceed the maximum allowable noise emissions required by the Chapter 8.16 of the Town Noise Ordinance.

(4) Groundborne Vibration (Construction and Operation)

Projected groundborne vibration impacts were evaluated by identifying potential vibration sources, the distance between vibration sources and surrounding structure locations, estimating the maximum vibration level at vibration sensitive receptor locations, and making a significance determination based on the significance thresholds described below.

b. Thresholds of Significance

For purposes of this EIR, the Town has utilized the checklist questions in Appendix G of the *CEQA Guidelines* as thresholds of significance to determine whether a project would have a significant environmental impact regarding noise. Based on the potential for noise impacts, the thresholds identified below are included for evaluation in this EIR. The Project would result in a significant impact with regard to noise if the Project would:

NOISE-1 Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance (i.e., create noise levels in excess of 75 dBA L_{eq} during construction between the hours of 7:00 a.m. to 8:00 p.m. daily, except Sundays and legal holidays, for single-family residential uses; or create noise levels in excess of 80 dBA L_{eq} during construction between the hours of 7:00 a.m. to 8:00 p.m. daily, except Sundays and legal holidays, for multi-family residential uses).

NOISE-2 Create a substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the project.

NOISE-3 Create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project.

NOISE-4 Expose persons to or generate excessive groundborne vibration or groundborne noise levels (i.e., generate groundborne vibration levels equivalent to or exceeding the perception threshold of 0.04 inches per second PPV at any off-site sensitive uses).

The Town of Mammoth Lakes Noise Ordinance is used to quantitatively evaluate the estimated noise impacts from construction and operation of the Project. The Project would have a significant impact on noise levels and/or sensitive receptors with regards to operational noise under NOISE-2 if the following would occur:

- Cause ambient noise levels from traffic to increase by 5 dBA CNEL or more in areas that would exceed the Town Exterior Noise Ordinance Standards.[10]

- Result in noise levels at off-site sensitive receptors to exceed the presumed ambient noise levels indicated in Table 4.8-1 (if the exterior ambient noise level exceeds the permissible level within the noise limit category, the allowable noise exposure standard is increased in five (5) dBA increments in each category as appropriate to encompass or reflect the ambient noise level).

The Project would have a significant impact on noise levels and/or sensitive receptors with regards to construction noise under NOISE-3 if the following would occur:

- Result in noise levels at off-site sensitive receptors to exceed the presumed ambient noise levels indicated in Table 4.8-2 as codified June 2016 (if the exterior ambient noise level exceeds the permissible level within the noise limit category, the allowable noise exposure standard is increased in five (5) dBA increments in each category as appropriate to encompass or reflect the ambient noise level).

As indicated in Chapter 6.0, *Other Mandatory CEQA Considerations*, of this EIR, airport noise is not evaluated since the proposed Land Use Element/Zoning Code Amendments would not be located within the vicinity of the airport. In addition, airport noise impacts would not be pertinent to the proposed Mobility Element Update because the latter does not affect the location of occupied structures, such as residences or businesses. In addition, the proposed amendments regarding People At One Time (PAOT), Community Business Incentives Zoning (CBIZ) and Transfer Development Rights (TDRs) do not result in changes in the noise environment and therefore, are not evaluated in this analysis.

c. Applicable General Plan Goals/Policies and Adopted Mitigation Measures

This section provides the applicable General Plan goals and policies as well as measures from the adopted Mitigation Monitoring and Reporting Program (MMRP) from the Trails System Master Plan.

Community Design Element

The Community Design Element of the 2007 General Plan contains a section entitled Quiet Community. Applicable goals/policies include the following:

[10] *The Town does not have a noise threshold for traffic noise impacts. Thus, a threshold of an increase in 5 dBA CNEL or more is utilized as a threshold, as this increase would represent a perceivable increase to humans over the existing ambient noise level.*

Goal C.6: Enhance community character by minimizing noise.

- Policy C.6.A.: Minimize community exposure to noise by ensuring compatible land uses around noise sources.
- Policy C.6.B: Allow development only if consistent with the Noise Element and the policies of this Element. Measure noise use for establishing compatibility in dBA CNEL and based on worst-case noise levels, either existing or future, with future noise levels to be predicted based on projected 2025 levels.
- Policy C.6.C: Development of noise-sensitive land uses shall not be permitted in areas where the noise level from existing stationary noise sources exceeds the noise level standards described in the Noise Element.
- Policy C.6.D: Require development to mitigate exterior noise to "normally acceptable" levels in outdoor areas.
- Policy C.6.E: Address noise issues through the planning and permitting process.
- Policy C.6.F: Require mitigation of all significant noise impacts as a condition of project approval.
- Policy C.6.G: Require preparation of a noise analysis or acoustical study, which is to include recommendations for mitigation, for all proposed projects that may result in potentially significant noise impacts.

Mitigation Monitoring and Reporting Program

The Mitigation Monitoring and Reporting Program (MMRP) for the Town of Mammoth General Plan does not include mitigation measures applicable to noise. However, the adopted MMRP for the TSMP contains the following mitigation measures that are applicable to noise:

TSMM4.J-1.A: Engine idling from construction equipment such as bulldozers and haul trucks shall be limited, to the extent feasible.

TSMM4.J-1.B: The construction staging areas shall be located as far as feasible from sensitive receptors.

TSMM4.J-1.C: All construction activities shall comply with the Town's Noise Ordinance.

3. ENVIRONMENTAL IMPACTS

The analysis of estimated noise impacts below applies to all future development associated with the Land Use Element/Zoning Code Amendments and/or Mobility Element Update, unless stated otherwise.

Threshold NOISE-1: The project would result in a significant impact if it would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (i.e., create noise levels in excess of 75 dBA L_{eq} during construction between the hours of 7:00 a.m. to 8:00 p.m. daily, except Sundays and legal holidays, for single-family residential uses; or create noise levels in excess of 80 dBA L_{eq} during construction between the hours of 7:00 a.m. to 8:00 p.m. daily, except Sundays and legal holidays, for multi-family residential uses).

Impact Statement NOISE-1: *Construction activities associated with implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update would comply with the daytime hours specified in the Town's Noise Ordinance. However, construction noise levels could temporarily exceed the noise limits in the Town's Noise Ordinance resulting in potentially significant short-term impacts to sensitive receptors. With incorporation of previously adopted mitigation measures and MM AES-1, temporary noise impacts to sensitive receptors would be reduced to less than significant.*

The Land Use Element/Zoning Code Amendments could result in an increase in intensity of development within the commercially designated areas of the Town. The Mobility Element Update would result in complete streets through the construction of street extension/connections, and multi-modal transportation network through the development of tails, bike lanes, and sidewalks. In addition, the Mobility Element Update would allow for the reconfiguration of Main Street from an auto-dominated state highway into a pedestrian-first area. Future development within commercial zones along Main Street and Old Mammoth Road would be infill development. The placement of residential infill adjacent to non-residential land uses could result in noise impacts on residential land uses because of the differences of the allowable maximum exterior noise levels between residential and commercial land uses. The timing of the construction activities of individual projects associated with the Land Use Element/Zoning Code Amendments and/or the Mobility Element Update cannot be determined at this time. Construction of individual projects would occur as property owners decide that development is warranted based in large part on the market. The duration of construction is dependent on individual project types. As this is a Program EIR, the noise analysis is general and individual projects would be required to undergo separate environmental review under CEQA and the Town's review process.

In general, noise from construction activities would be generated by vehicles and equipment involved during various stages of construction operations: demolition, grading, building construction, and paving. The temporary noise levels created by construction equipment would vary depending on factors such as the type of equipment, the specific model, the operation being performed and the condition of the equipment. Construction noise associated with the potential construction activities was analyzed using typical construction equipment (dozers, tractors, loaders, pavers, trenchers, forklifts, etc.), and typical construction phasing. Trucks would also be used to deliver equipment and building materials, and to haul away landscape and construction debris. This equipment would generate both steady-state and episodic noise that could be heard both on and off the construction sites.

Individual pieces of construction equipment that would likely be used for construction produce maximum noise levels of 77 dBA to 85 dBA at a reference distance of 50 feet from the noise source, as shown in **Table 4.8-4**, *Construction Equipment Noise Levels*, below. These maximum noise levels would occur when equipment is operating under full power conditions. However, equipment used on construction sites often

Table 4.8-4

Maximum Noise Levels Generated by Typical Construction Equipment

Type of Equipment	Maximum Sound Levels at Indicated Distance (dBA)[a]			
	25 feet	50 feet	100 feet	200 feet
Air Compressor	84	78	72	66
Backhoe	84	78	72	66
Concrete Mixer	85	79	73	67
Crane, Mobile	87	81	75	69
Dozer	88	82	76	70
Grader	91	85	79	73
Jack Hammer	95	89	83	77
Loader	85	79	73	67
Paver	83	77	71	65
Pneumatic Tool	91	85	79	73
Pump	87	81	75	69
Roller	86	80	74	68
Saw (concrete)	96	90	84	78
Scraper	90	84	78	72
Truck	82	76	70	64
Minimum Sound Level	82	76	70	64
Maximum Sound Level	96	90	84	78

[a] *Sound levels at 25 feet, 100 feet and 200 feet are calculated based on reference noise levels at 50 feet. Calculation assumes a drop-off rate of 6-dB per doubling of distance, which is appropriate for use in characterizing point-source (such as construction equipment) sound attenuation over a hard surface propagation path.*

Source: FHWA Roadway Construction Noise Model User's Guide, Table 1, 2006; and ESA PCR, 2016.

operates under less than full power condition, or partial power. To more accurately characterize construction-period noise levels, the average (L_{eq}) noise level associated with each construction stage is provided in **Table 4.8-5**, *Construction Noise Levels (L_{eq}) by Distance and Construction Stage*, below. These average noise levels are based on the quantity, type, and usage factors for each type of equipment that would likely be used during each construction stage, and is typically attributable to multiple pieces of equipment operating simultaneously.

Table 4.8-5 provides the estimated worst-case construction noise levels at potential nearby noise sensitive receptors from a construction site. The estimated noise levels represent a conservative scenario because construction activities are analyzed as if occurring along the perimeter of the construction area; whereas, construction would typically occur throughout the site, farther away from noise-sensitive receptors. As

Table 4.8-5

Construction Average L_{eq} Noise Levels by Distance and Construction Stage

	Sound Level in dBA (L_{eq}) at Indicated Distance				
Construction Stage	**25 Feet**	**50 Feet**	**100 Feet**	**200 Feet**	**400 Feet**
Site Preparation / Grading	92	86	80	74	68
Foundations	83	77	71	65	59
Structural	89	83	77	71	65
Finishing	92	86	80	74	68

Assumes a hard surface propagation path drop-off rate of 6-dB per doubling of distance (Sound Level at distance X = Sound level at 50 ft - 20LOG (x/50)), which is appropriate for use in characterizing point-source (such as construction equipment) sound attenuation.

Source: EPA, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, PB 206717, 1971; and ESA PCR, 2016.

shown in Table 4.8-5, the average temporary construction-period (i.e., various construction stages) noise is expected to range from 71 dBA to 80 dBA at 100 feet and from 65 dBA to 74 dBA at 200 feet from a construction site. If multi-family residential uses would be located within 100 feet from a proposed construction site, construction noise levels would exceed the significance threshold of 80 dBA, L_{eq}. If single family residential uses would be located within 200 feet from a proposed construction site, construction noise levels would exceed the significance threshold of 75 dBA, L_{eq}.

Construction activities would occur during daytime hours only as described by Section 8.16.090 of the Town Noise Ordinance. However, without incorporation of mitigation measures, the estimated construction-period temporary noise levels could exceed 75 dBA at single-family residential uses located within 200 feet from a construction site and 80 dBA at multi-family residential uses located within 100 feet from a construction site. This is considered a short-term potentially significant impact. However, with implementation of the mitigation measures identified above, under Section c. Applicable General Plan Goals/Policies and Adopted Mitigation Measures, and MM AES-1, temporary construction noise impacts to sensitive receptors would be less than significant.

Mitigation Measures

As discussed above, construction activities associated with implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update could result in temporary significant noise impacts to sensitive receptors that exceed regulatory standards. Therefore, the following mitigation measure from 4.1 Aesthetics is recommended, in addition to TSMM 4.J-1A through 4.J-CC to further reduce temporary construction noise impacts.

MM AES-1: Construction equipment staging areas shall use appropriate screening (i.e., temporary fencing with opaque material) to buffer views of construction equipment and material from public and sensitive viewers (e.g., residents and motorists/bicyclists/pedestrians), when feasible. Staging locations shall be indicated on the project Building Permit and Grading

Plans and shall be subject to review by the Town of Mammoth Lakes Community and Economic Development Director in accordance with the Municipal Code requirements.

Threshold NOISE-2: The project would have a significant impact if the project would create a substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the project.

Impact Statement NOISE-2: *Implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update improvements would not create a substantial permanent increase in traffic noise levels or stationary source noise levels at off-site noise-sensitive uses in excess of the applicable thresholds. Therefore, impacts would be less than significant.*

(a) Roadway Noise

The Mobility Element Update would provide for the increase in traffic that would occur over time as the Town reaches buildout and would alter traffic patterns through the implementation of the complete street network. Estimated future roadway noise levels were calculated along various arterial segments in the Project Area. Roadway noise attributable to potential development was calculated using the traffic noise model previously described and was compared to baseline noise levels that would occur under the "No Project" condition. The following four scenarios were analyzed to determine off-site traffic noise impacts from implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update:

- Scenario 3 – General Plan Buildout with Existing Roadway Network
- Scenario 4 – General Plan Buildout with Mobility Element Update
- Scenario 5 – Land Use Element/Zoning Code Amendments with Existing Roadway Network
- Scenario 6 – Land Use Element/Zoning Code Amendments with Mobility Element Update

Estimated traffic noise impacts are shown in **Table 4.8-6**, *Off-Site Traffic Noise Impacts.* As indicated, the maximum increase in future traffic noise levels over existing traffic noise levels would be up to 7.4 dBA, CNEL, which would occur along Fairway Drive, south of Old Mammoth Road under all four scenarios. This permanent increase in sound level would exceed the threshold of a 5 dBA CNEL. The Snowcreek Golf Course is located on the west side of Fairway Drive south of Old Mammoth Road and vacant land zoned as resort land use is located on the east side of Fairway Drive south of Old Mammoth Road. Noise sensitive uses, such as residential uses, are not located along Fairway Drive, south of Old Mammoth Road. Residential uses are located at the southern end of Fairway Drive south of the intersection with Fairway Circle. Under the Snowcreek VIII, Snowcreek Master Plan Update – 2007 (2007 Snowcreek Master Plan), the vacant land use located on the east side of Fairway Drive is proposed for commercial/retail, hotel, club/office space, residential condominiums (single and multi-family units), and other recreational and commercial uses. The predicted roadway noise along Fairway Drive, south of Old Mammoth Road could potentially result in an increase of 5 dBA or more. However, as shown in Table 4.8-6, the roadway noise level associated with implementation of the Land Use Element/Zoning Code Amendments and Mobility Element Update (Scenario 6) would be approximately 58.8 dBA, CNEL, which is less than 60 dBA. Similarly, the roadway noise level associated with implementation of the Mobility Element Update under 2007 General Plan buildout conditions (Scenario 4) would be approximately 58.9 dBA, CNEL, which is less than 60 dBA. The roadway noise level associated with implementation of the Land Use Element/Zoning Code Amendments under the

Table 4.8-6

Off-Site Traffic Noise Impacts

	Traffic Noise Levels at 100 feet from Roadway Centerline, CNEL (dBA)				
Roadway Segment	Existing [a] (A)	Scenario 3 General Plan Buildout With Existing Roadway Network/ Scenario 3 Increase (B)	Scenario 4 General Plan Buildout With Mobility Element Update/ Scenario 4 Increase (C)	Scenario 5 Land Use Element/ Zoning Code Amendments With Existing Roadway Network/ Scenario 5 Increase (D)	Scenario 6 Use Element/ Zoning Code Amendments With Mobility Element Update/ Scenario 6 Increase (E)
Main Street					
Between Minaret Road and Mountain Boulevard	64.2	65.7/1.5	65.9/1.7	65.9/1.7	66.1/1.9
Between Mountain Boulevard and Post Office	64.8	65.5/0.7	66.6/1.2	65.8/1.0	66.4/1.6
Between Post Office and Center Street	65.0	65.4/0.4	66.0/1.0	65.8/0.8	66.7/1.7
Between Center Street and Forest Trail	64.9	65.3/0.4	65.9/1.0	65.7/0.8	66.5/1.6
Between Forest Trail and Laurel Mountain Road	65.3	65.8/0.5	66.2/0.9	66.2/0.9	66.8/1.5
Between Laurel Mountain Road and Old Mammoth Road	64.7	65.2/0.5	65.6/0.9	65.4/0.7	66.0/1.3
Between Old Mammoth Road and Sierra Park Boulevard	61.7	62.2/0.5	62.2/0.5	62.1/0.4	62.5/0.8
Between Sierra Park Road Boulevard and Thompson Way	61.6	61.9/0.3	61.9/0.3	61.8/0.2	62.2/0.6
Old Mammoth Road					
Between Main Street and Tavern Road	62.3	62.8/0.5	62.9/0.6	63.3/1.0	63.5/1.2

Table 4.8-6 (Continued)

Off-Site Traffic Noise Impacts

	Traffic Noise Levels at 100 feet from Roadway Centerline, CNEL (dBA)				
Roadway Segment	**Existing [a] (A)**	**Scenario 3 General Plan Buildout With Existing Roadway Network/ Scenario 3 Increase (B)**	**Scenario 4 General Plan Buildout With Mobility Element Update/ Scenario 4 Increase (C)**	**Scenario 5 Land Use Element/ Zoning Code Amendments With Existing Roadway Network/ Scenario 5 Increase (D)**	**Scenario 6 Use Element/ Zoning Code Amendments With Mobility Element Update/ Scenario 6 Increase (E)**
Between Tavern Road and Sierra Nevada Road	62.4	63.0/0.6	62.8/0.5	63.8/1.4	63.6/1.2
Between Sierra Nevada Road and Meridian Boulevard	62.1	62.8/0.7	62.4/0.3	63.6/1.5	63.1/1.0
Between Meridian Boulevard and Chateau Road	61.0	62.1/1.1	61.5/0.5	62.9/1.9	62.1/1.1
Between Chateau Road and Minaret Road	58.7	60.8/2.1	60.1/1.4	61.3/2.5	60.5/1.8
Meridian Boulevard					
Between Minaret Road and Old Mammoth Road	63.5	64.3/0.8	64.0/0.5	64.7/1.2	64.1/0.6
Between Old Mammoth Road and Sierra Park Road	63.7	64.1/0.4	63.9/0.2	64.6/0.9	64.0/0.3
Minaret Road					
Between Forest Trail and Lake Mary Road	61.7	62.5/0.8	62.6/0.9	62.6/0.9	62.7/1.0
Between Lake Mary Road and Meridian Boulevard	61.3	63.1/1.8	62.7/1.4	63.2/1.9	62.6/1.3
Between Meridian Boulevard and Old Mammoth Road	58.4	61.2/2.8	60.7/2.3	61.2/2.8	60.5/2.1

Table 4.8-6 (Continued)

Off-Site Traffic Noise Impacts

	Traffic Noise Levels at 100 feet from Roadway Centerline, CNEL (dBA)				
Roadway Segment	Existing [a] (A)	Scenario 3 General Plan Buildout With Existing Roadway Network/ Scenario 3 Increase (B)	Scenario 4 General Plan Buildout With Mobility Element Update/ Scenario 4 Increase (C)	Scenario 5 Land Use Element/ Zoning Code Amendments With Existing Roadway Network/ Scenario 5 Increase (D)	Scenario 6 Use Element/ Zoning Code Amendments With Mobility Element Update/ Scenario 6 Increase (E)
Lake Mary Road					
West of Minaret Road	62.5	65.5/3.0	65.3/2.8	65.6/3.1	65.5/3.0
Fairway Drive					
South of Old Mammoth Road	52.7	60.0/7.3	58.9/6.2	60.1/7.4 [b]	58.8/6.1
Mountain Boulevard					
North of Main Street	52.1	57.7/3.6	56.0/3.9	53.8/1.7	53.9/1.8
South of Main Street	50.8	53.6/2.8	53.6/2.8	52.6/1.8	52.8/2.0
Tavern Road					
West of Old Mammoth Road	51.8	53.4/1.6	52.3/0.5	55.0/3.2	54.6/2.8
East of Old Mammoth Road	49.9	49.6/-0.3	50.3/0.4	51.3/1.4	51.1/1.2
Sierra Park Road					
Between Main Street and meridian Boulevard	55.1	56.2/1.1	56.0/0.9	56.5/1.4	56.1/1.0
Sierra Nevada Road					
East of Old Mammoth Road	52.3	53.5/1.2	53.3/1.0	53.5/1.2	53.5/1.2
West of Old Mammoth Road	54.7	55.8/1.1	55.6/0.9	56.0/1.3	56.0/1.3
Chateau Road					
East of Old Mammoth Road	52.3	55.7/3.4	55.5/3.2	55.6/3.3	55.1/2.8

Table 4.8-6 (Continued)

Off-Site Traffic Noise Impacts

	Traffic Noise Levels at 100 feet from Roadway Centerline, CNEL (dBA)				
Roadway Segment	**Existing[a] (A)**	**Scenario 3 General Plan Buildout With Existing Roadway Network/ Scenario 3 Increase (B)**	**Scenario 4 General Plan Buildout With Mobility Element Update/ Scenario 4 Increase (C)**	**Scenario 5 Land Use Element/ Zoning Code Amendments With Existing Roadway Network/ Scenario 5 Increase (D)**	**Scenario 6 Use Element/ Zoning Code Amendments With Mobility Element Update/ Scenario 6 Increase (E)**
West of Old Mammoth Road	53.9	55.3/1.4	54.6/0.7	55.8/1.9	55.1/1.2
Thompson Way					
South of Main Street	43.9	41.9/-2.0	45.8/1.9	41.9/-2.0	45.8/1.9

[a] *Existing 2015 Traffic Conditions and Existing Roadway Network.*

[b] *The traffic noise level and traffic noise level increase for Fairway Drive south of Old Mammoth Road under Scenario 5 is provided for informational purposes. However, Scenario 5 could not realistically occur because the future development of land uses along Fairway Drive south of Old Mammoth Road, as described in the 2007 Snowcreek Master Plan, would necessarily require the development of supporting roadways in the area. The development of these additional roadways would be consistent with the circulation improvements in the Mobility Element Update. Therefore, for the purposes of analyzing the potential for noise impacts along this roadway segment (i.e., Fairway Drive south of Old Mammoth Road), Scenario 5 is not a realistically possible development scenario.*

Source: ESA PCR, 2016.

existing roadway network (Scenario 5) would be approximately 60.1 dBA, CNEL; however, Scenario 5 could not realistically occur because the future development of land uses along Fairway Drive south of Old Mammoth Road, as described in the 2007 Snowcreek Master Plan, would necessarily require the development of supporting roadways in the area. The development of these additional roadways would be consistent with the circulation improvements in the Mobility Element Update. Therefore, for the purposes of analyzing the potential for noise impacts along this roadway segment (i.e., Fairway Drive south of Old Mammoth Road), Scenario 5 is not a realistically possible development scenario since development could not occur absent the new roads. As the predicted roadway noise levels along Fairway Drive south of Old Mammoth Road would not exceed 60 dBA with implementation of the Land Use Element/Zoning Code Amendments and Mobility Element Update (Scenario 6) or the Mobility Element Update under 2007 General Plan buildout conditions, roadway noise impacts would be considered less than significant.

The increase in sound level would be substantially lower (i.e., less than 5 dBA, CNEL) at the remaining roadway segments analyzed. As such, impacts along all other roadway segments analyzed would be less

than significant and no mitigation measures would be required. Scenarios 4 and 6 (General Plan Buildout with Mobility Element Update and Land Use Element/Zoning Code Amendments with Mobility Element Update, respectively) would have 6.2 dBA and 6.1 dBA increases in traffic noise along Fairway Drive, south of Old Mammoth Road, respectively. Scenarios 3 and 5 (General Plan Buildout with Existing Roadway Network and Land Use Element/Zoning Code Amendments with Existing Roadway Network) would have increases in traffic noise of 7.3 dBA and 7.4 dBA along Fairway Drive, south of Old Mammoth Road, respectively. As such, traffic noise with the Mobility Element Update would be approximately 1 dBA less than without the Update when the Land Use Element/Zoning Code Amendments are implemented. Therefore, implementation of the Mobility Element Update would reduce the traffic noise impact to the extent feasible. Traffic noise impacts would be less than significant and no mitigation measures would be required.

Mitigation Measures

Since implementation of the Land Use Element/Zoning Code Amendments and Mobility Element Update would result in a less than significant impact with regard to increased roadway noise levels at adjacent noise sensitive receptors, no mitigation measures are required.

(b) Stationary Noise

Implementation of the Mobility Element Update would not include operational stationary noise sources; therefore, the Mobility Element Update would result in no impacts from stationary sources. As a result of the Land Use Element/Zoning Code Amendments, a particular project would generate noise and expose off-site sensitive receptors to noise sources typical of mixed-use areas including; doors slamming, air conditioning units, property maintenance equipment (including landscape, parking lot sweeping, etc.) radio/stereos systems, domestic animals, etc. These noise sources contribute to the ambient noise levels experienced in all similarly-developed areas and typically do not exceed the noise standards for the types of land uses. In addition, these noise sources are consistent with adjacent uses in the vicinity. Therefore, point-source noise impacts resulting from the implementation of the Land Use Element/Zoning Code Amendments would not exceed ambient noise levels and impacts would be less than significant.

Development under the Land Use Element/Zoning Code Amendments could result in new commercial and residential developments located adjacent to noise sensitive properties such as existing residential areas. Depending on how close these developments are situated to the existing residential areas, the types of mechanical equipment used at the developments, and the activities that would occur at the developments, may increase the ambient noise levels. However, all mechanical equipment would be designed with appropriate noise control devices, such as sound attenuators, acoustic louvers, or sound screens/parapet walls to comply with noise limitation requirements provided in Section 8.16.070 of the Town Noise Ordinance, which prevents the noise from such equipment from exceeding ambient noise levels. To meet this standard, the noise from any equipment would need to be at least 10 dBA below ambient noise levels, as noise levels lower than ambient conditions can contribute to the general ambient sound level. Therefore, operation of mechanical equipment associated with the Land Use Element/Zoning Code Amendments would not exceed the Town's noise thresholds and impacts would be less than significant. As such, no mitigation measures would be required.

Mitigation Measures

Since implementation of the Land Use Element/Zoning Code Amendments and Mobility Element Update would result in a less than significant impact with regard to increased operational noise levels at adjacent noise sensitive receptors, no mitigation measures are required.

Threshold NOISE-3: The project would have a significant impact if the project would create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project.

Impact Statement NOISE-3: *Implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update improvements could temporarily exceed the noise limits in the Town's Noise Ordinance resulting in potentially significant short-term impacts to sensitive receptors. With incorporation of previously adopted mitigation measures and MM AES-1, temporary noise impacts to sensitive receptors would be reduced to less than significant.*

As discussed previously, Table 4.8-5 provides the estimated worst-case construction noise levels at potential nearby noise sensitive receptors from a construction site. The estimated noise levels represent a conservative scenario because construction activities are analyzed as if occurring along the perimeter of the construction area; whereas, construction would typically occur throughout the site, farther away from noise-sensitive receptors. As shown in Table 4.8-5, the average temporary construction-period (i.e., various construction stages) noise is expected to range from 71 dBA to 80 dBA at 100 feet and from 65 dBA to 74 dBA at 200 feet from a construction site. Construction activities would occur during daytime hours only as described by Section 8.16.090 of the Town Noise Ordinance. However, without incorporation of mitigation measures, the estimated construction-period temporary noise levels could exceed 75 dBA at single-family residential uses located within 200 feet from a construction site and 80 dBA at multi-family residential uses located within 100 feet from a construction site. This is considered a short-term potentially significant impact. However, with implementation of the mitigation measures identified above, under Section c. Applicable General Plan Goals/Policies and Adopted Mitigation Measures, and MM AES-1, temporary or periodic noise impacts to sensitive receptors would be less than significant.

Threshold NOISE-4: A significant impact would occur if the project would expose persons to or generate groundborne vibration or groundborne noise levels (i.e., generate groundborne vibration levels equivalent to or exceeding the perception threshold of 0.04 inches per second PPV at any off-site sensitive uses).

Impact Statement NOISE-4: *Construction activities associated with implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update projects would result in sporadic, temporary vibration effects within and adjacent to the construction areas, which would exceed established thresholds applicable to the nearest off-site sensitive receptors. Thus, construction vibration impacts would be significant and mitigation is required. With implementation of mitigation measure NOISE-1, construction vibration impacts would be reduced to less than significant. Operation activities associated with implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update would not generate excessive vibration levels to nearby sensitive off-site receptors. Thus, long-term vibration impacts would be less than significant.*

Table 4.8-7

Typical Vibration Velocities for Potential Project Construction Equipment

Equipment	Reference Vibration Source Levels, PPV (inch/second)			
	25 feet	50 feet	100 feet	200 feet
Large bulldozer	0.089	0.031	0.011	0.004
Caisson drilling	0.089	0.031	0.011	0.004
Loaded trucks	0.076	0.027	0.010	0.003
Jackhammer	0.035	0.012	0.004	0.002
Small bulldozer	0.003	0.001	0.0004	0.0001

Source: USDOT Federal Transit Administration, 2006; and ESA PCR, 2016

Groundborne Vibration during Construction

Construction machinery and operations can generate varying degrees of ground vibration, depending on the construction procedures and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of a construction site often varies depending on soil type, ground strata, and construction characteristics of the receptor buildings. The results from vibration impacts can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibration from construction activities rarely reaches the levels that damage structures. The Federal Transit Association (FTA) has published standard vibration velocities, in terms of PPV, for construction equipment operations. The typical vibration PPV and RMS levels for construction equipment pieces anticipated to be used during construction associated with the Land Use Element/Zoning Code Amendments and/or Mobility Element Update projects are listed in **Table 4.8-7**, *Typical Vibration Velocities for Potential Project Construction Equipment*.

With regard to construction activities, high levels of groundborne vibration would be generated primarily during site clearing and grading activities and by off-site haul-trucks traveling on surface streets. As such, groundborne vibration impacts are therefore usually confined to short distances (i.e., 50 feet or less) from the source. As indicated in Table 4.8-7, vibration velocities from the operation of construction equipment would range from approximately 0.003 to 0.089 inches per second PPV at 25 feet from the equipment. Usually, ground-borne vibration decreases rapidly with distance. As indicated in Table 4.8-7, the highest vibration velocity of 0.089 inches per second PPV at a distance of 25 feet from construction equipment would be reduced to 0.031 inches per second PPV at 50 feet distance. At a distance of 100 feet from the source of activity, the vibration velocities from the construction equipment would further reduce to 0.011 inch/second PPV.

Therefore, if a sensitive receptor would be located within 43 feet from a potential construction site, the sensitive receptor would be exposed to vibration velocities of up to 0.04 inches per second PPV resulting in

significant impacts requiring mitigation. Implementation of MM NOISE-1 would ensure that potentially significant construction vibration impacts as a result of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update construction activities are reduced to a less than significant level.

Groundborne Vibration during Operation

The Land Use Element/Zoning Code Amendments would include typical residential and commercial-grade stationary mechanical and electrical equipment such as air handling units, condenser units, exhaust fans, and electrical emergency power generators, which would produce vibration. Groundborne vibration generated by each of the above-mentioned activities would be similar to the existing vibration generated by existing sources (i.e., traffic on adjacent roadways) in the vicinity. The potential vibration impacts from all proposed operation activities at the closest structure locations would be less than the significance threshold 0.04 inches per second PPV for perceptibility. As such, vibration impacts associated with operation of the Land Use Element/Zoning Code Amendments would be below the significance threshold and impacts would be less than significant.

Mitigation Measures

As discussed above, the Land Use Element/Zoning Code Amendments and/or Mobility Element Update construction activities could result in temporary significant groundborne vibration impacts that exceed regulatory standards during construction to off-site sensitive receptors located within 43 feet. Therefore, MM NOISE-1 is recommended to reduce impacts.

MM NOISE-1: Heavy construction equipment such as large dozers shall not operate within 43 feet from sensitive receptor locations. If heavy construction equipment would be required for construction, alternative methods shall be used such as small dozers.

4. CUMULATIVE IMPACTS

Cumulative impacts would be associated with the development of vacant parcels and redevelopment of already developed parcels in the Town's commercial area under the Land Use Element/Zoning Code Amendments and transportation improvements associated with the Mobility Element Update which would occur town wide. Since the timing or sequencing of individual projects cannot be ascertained with any certainty any quantitative analysis to ascertain the daily construction noise levels of multiple, concurrent construction would be speculative.

Construction activities associated with the Land Use Element/Zoning Code Amendments and/or Mobility Element Update and cumulative projects may overlap, resulting in construction noise in the area. However, as analyzed above, construction noise impacts primarily affect the areas immediately adjacent to the construction site and would be mitigated to a less than significant level. Additionally, any construction activities would comply with the Town's Municipal Code limitations on allowable hours of construction and would implement TSMM 4.J-1A through 4.J-1C as well as MM AES-1 and MM NOISE-1 to reduce construction noise and vibration impacts to less than significant levels with mitigation. The construction activities associated with the related projects would also be required to comply with Town's Municipal Code limitations on allowable hours of construction and would incorporate mitigation measures on a project-by-project basis, as applicable, to reduce construction noise and vibration pursuant to CEQA provisions.

Therefore, the Land Use Element/Zoning Code Amendments and/or Mobility Element Update's contribution to cumulative noise impacts would be less than significant.

As described above, traffic noise impacts resulting from implementation of the Land Use Element/Zoning Code Amendments and Mobility Element Update would result in a less than significant impact as a result of traffic noise. Therefore, the increase in traffic noise associated with cumulative projects would also result in a less than significant cumulative traffic noise impact.

Operation of projects associated with the Land Use Element/Zoning Code Amendments and any other cumulative projects would create operational noise generated by stationary equipment on-site which cannot be quantified due to the speculative nature of each development. However, each cumulative project would require separate discretionary approval and CEQA assessment, which would address potential noise impacts and identify necessary attenuation measures, where appropriate. Additionally, as noise dissipates as it travels away from its source, noise impacts from stationary sources would be limited to each of their respective sites and their vicinities. Operation of cumulative projects would not contribute to a cumulative stationary noise impact and impacts would be less than significant.

5. LEVEL OF SIGNIFICANCE AFTER MITIGATION

With the incorporation of MM AES-1 and TSMM 4.J-1A through 4.J-C, temporary construction noise impacts to sensitive receptors from implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update projects would be less than significant.

Operational roadway noise and stationary noise impacts would be less than significant and no mitigation measures would be required.

With implementation of MM NOISE-1, temporary construction groundborne vibration impacts from implementation of the Land Use Element/Zoning Code Amendments and/or Mobility Element Update to sensitive receptors would be reduced to less than significant.