



## 5.5 NOISE

The purpose of this Section is to analyze Project-related noise source impacts on-site and to surrounding land uses. This Section evaluates short-term construction related impacts as well as future buildout conditions. Information in this Section was obtained from the *Madera County General Plan Policy Document*, *Madera County General Plan Background Report* (October 24, 1995), *Madera County General Plan Final Environmental Impact Report* (October 1995), *Madera County Zoning Ordinance* and the *Ahwahnee/Nipinnawasee Area Plan* (October 19, 1999). For purposes of mobile source noise modeling and contour distribution, traffic information from the *Sierra Meadows Estates Traffic Impact Analysis* (June 2004) (refer to Section 5.3, *Traffic and Circulation*, and Appendix 15.3, *Traffic Data*) was utilized. Refer to Appendix 15.5, *Noise Data*, for the assumptions used in this analysis.

### EXISTING CONDITIONS

#### NOISE SCALES AND DEFINITIONS

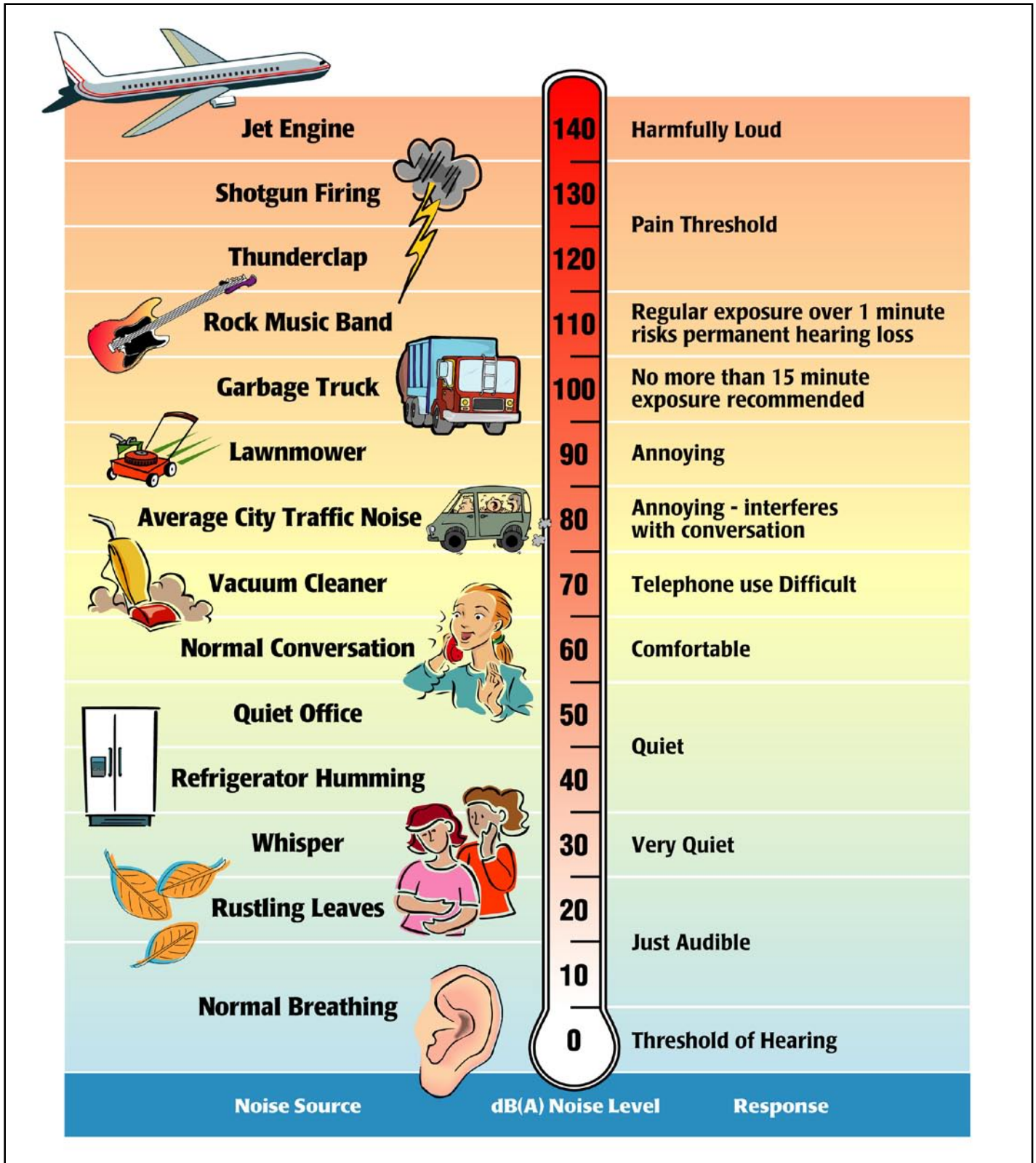
Sound is technically described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the Decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been revised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud, and 20 dBA higher four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples, of various sound levels in different environments are shown in Exhibit 5.5-1, *Sound Levels and Human Response*.

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Numerous methods have been developed to measure sound over a period of time. These methods include: 1) the Community Noise Equivalent Level (CNEL); 2) the Equivalent Sound Level (Leq); and 3) Day/Night Average Sound Level (Ldn). These methods are described below:



Sources: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.  
 Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004)*, March 1974.

# Sound Levels and Human Response



### **Community Noise Equivalent Level (CNEL)**

The predominant community noise rating scale used in California for land use compatibility assessment is the Community Noise Equivalent Level (CNEL). The CNEL reading represents the average of 24 hourly readings of equivalent levels, known as Leq's, based on an A-weighted decibel with upward adjustments added to account for increased noise sensitivity in the evening and night periods. These adjustments are +5 dBA for the evening, 7:00 p.m. to 10:00 p.m., and +10 dBA for the night, 10:00 p.m. to 7:00 a.m. CNEL may be indicated by "dBA CNEL" or just "CNEL".

### **Equivalent Noise Level (LEQ)**

The Leq is the sound level containing the same total energy over a given sample time period. The Leq can be thought of as the steady sound level, which, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period. Leq is typically computed over 1, 8 and 24-hour sample periods.

### **Day/Night Average (LDN)**

Another commonly used method is the day/night average level or Ldn. The Ldn is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the Leq. The Ldn is calculated by averaging the Leq's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 p.m. to 7:00 a.m.), by 10 dBA to account for the increased sensitivity of people to noises that occur at night. The maximum noise level recorded during a noise event is typically expressed as Lmax. The sound level exceeded over a specified time frame can be expressed as Ln (i.e., L90, L50, L10, etc.). L50 equals the level exceeded 50 percent of the time, L10 ten percent of the time, etc.

## **NOISE MODELING**

### **Federal Highway Administration Traffic Noise Model**

The existing and future roadway noise levels within the vicinity of the proposed Project were projected using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108) together with several roadway and site parameters. These parameters determine the projected impact of vehicular traffic noise and include the roadway cross-section (e.g., number of lanes), the roadway width, the average daily traffic (ADT), the vehicle travel speed, the percentages of auto and truck traffic, the roadway grade, the angle-of-view and the site conditions ("hard" or "soft"). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses.



A 30 to 45 mile per hour (mph) average vehicle speed was assumed for existing conditions (varies depending on roadway) based on empirical observations and posted maximum speeds along the adjacent roadways. ADT estimates were obtained from the Project Traffic Study (refer to Appendix 15.3, *Traffic Data*).

### Existing Traffic Noise Levels

The Project site is in a relatively undisturbed foothill woodland vegetation and wildlife community. Adjoining and proximate land uses include rural residences and the Sierra Meadows Golf Course. These types of land uses generate little noise except where immediately adjacent to major roadways. Vehicles using local roadways generate most noise in the Project area. To assess the potential for Project-generated impact, it is necessary to quantify the existing traffic-generated noise. The Federal Highway Administration (FHWA-RD-77-108) traffic noise model was used to evaluate existing noise conditions in the study area.

Table 5.5-1, *Existing Exterior Noise Exposure*, estimates the current noise levels adjacent to major roadways in the Project area, assuming a standard sound attenuation of 4.5 dBA with each doubling of distance. Noise levels at 100 feet from the centerline of roadways in the Project area range from 40.8 dBA Ldn along Miami Highlands Drive to 61.2 dBA Ldn along SR-49 south of Opah Drive.

**Table 5.5-1  
Existing Exterior Noise Exposure**

Roadway Segment	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 Ldn	65 Ldn	70 Ldn
<b>State Route 49</b>					
North of County Road 628	4,225	58.7	93	43	20
Between County Road 628 and County Road 621	4,843	59.3	102	47	22
Between County Road 621 and Opah Drive	6,198	60.3	120	56	26
South of Opah Drive	7,645	61.2	138	64	30
<b>Opah Drive</b>					
Between State Route 49 and Harmony Lane	508	46.0	13	6	3
Between Harmony Lane and Miami Highlands Dr.	465	45.6	12	6	3
Between Miami Highlands Dr. and County Road 621	235	42.6	8	4	2
<b>Pine River Road</b>					
Between County Road 621 and County Road 628	770	47.8	17	8	4
<b>Miami Highlands Drive</b>					
East of Opah Road	155	40.8	6	3	1
<b>County Road 621</b>					
Between State Route 49 and Opah Road	325	44.1	10	5	2

Note: Traffic modeling based upon data contained within the Project Traffic Report prepared by RBF Consulting on June 2004.



## NOISE SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Table 5.5-2, *Sensitive Receptors*, lists the sensitive receptors within one mile of the Project site.

**Table 5.5-2  
Sensitive Receptors**

Sensitive Receptors	Name	Distance (miles)	Direction
Residential	Single Family Residential	0.25-2	various
Schools	Wasuma Elementary School	1.0	north
Hospitals	Not Applicable	Not applicable	Not applicable
State Park	Wassama Roundhouse State Historical Park	0.25	northwest
Religious Centers	Ahwahnee Chapel	0.75	north

Sources: <http://yp.yahoo.com> and site survey conducted by RBF Consulting on September 5, 2002. Sensitive Receptor populations utilized in this analysis are those within a two-mile radius of the Project site.

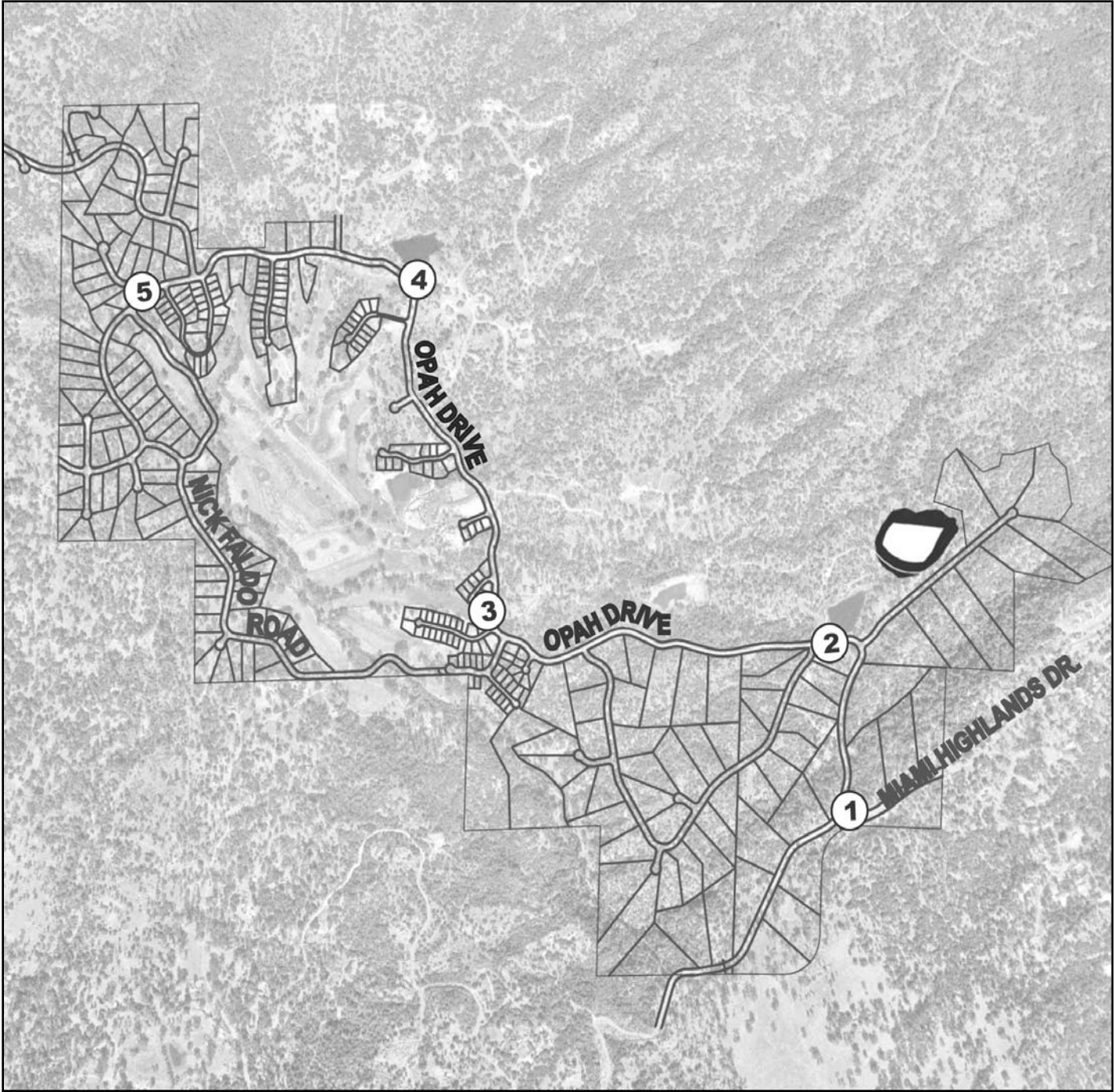
## AMBIENT NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the Project area, RBF Consulting conducted noise measurements in September 5, 2002 (refer to Exhibit 5.5-3, *Noise Monitoring Locations*). The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site (refer to Exhibit 5.5-2, *Noise Measurement Locations*). Noise monitoring equipment used for the ambient noise survey consisted of a Larson Davis Laboratories Model LDL 820 sound level analyzer equipped with a Larson Davis Type 2561" microphone. The instrumentation was calibrated prior to use with a Larson Davis CAL 250 acoustical calibrator to ensure the accuracy of the measurements. The accuracy of the calibrator is maintained through a program established by the manufacturer, and is traceable to the National Bureau of Standards. All instrumentation meets the requirements of the American National Standards Institute (ANSI) S1.4-1971. The results of the field measurements are indicated in Table 5.5-3, *Noise Measurements*.

**Table 5.5-3  
Noise Measurements**

Site	Location	Leq	Time	Comments
1	Opah Drive/Miami Highlands Drive	53.4	10:25 a.m.	15 feet from right-of way
2	Opah Drive (0.5 miles north of Miami Highlands Drive)	53.7	10:55 a.m.	none
3	Opah Drive (adjacent to the Sierra Meadows Golf Course 2nd hole green)	42.6	11:20 a.m.	Construction activity
4	Opah Drive (adjacent to the Sierra Meadows Golf Course 18 <sup>th</sup> hole green)	44.6	11:45 a.m.	none
5	Opah Drive (adjacent to the Sierra Meadows Golf Course 8 <sup>th</sup> hole green)	37.5	12:10 p.m.	none

Source: Noise Monitoring Survey conducted by RBF Consulting, January 22, 2004.



Not to Scale



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ENVIRONMENTAL IMPACT REPORT  
SIERRA MEADOWS ESTATES SUBDIVISION

## Noise Measurement Locations



## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

This section summarizes the laws, ordinances, regulations and standards that are applicable to mixed land use developments and the Project. Regulatory requirements related to environmental noise are typically promulgated at the local level. However, federal and state agencies provide standards and guidelines to the local jurisdictions.

### **State of California Guidelines**

#### ***California Environmental Quality Act***

CEQA was enacted in 1970 and requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of standards established in the local general plan or noise ordinance. Additionally, under CEQA, a project has a potentially significant impact if the project creates a substantial increase in the ambient noise levels in the project vicinity above levels existing without the project. If a project has a potentially significant impact, mitigation measures must be considered. If mitigation measures to reduce the impact to less than significant are not feasible due to economic, social, environmental, legal, or other conditions, the most feasible mitigation measures must be considered.

#### ***California Government Code***

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of their comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services as shown in Table 5.5-4, *Land Use Compatibility for Community Noise Environments*.

The guidelines rank noise land use compatibility in terms of “normally acceptable”, “conditionally acceptable” and “clearly unacceptable” noise levels for various land use types. Single-family homes are “normally acceptable” in exterior noise environments up to 60 Ldn and “conditionally acceptable” up to 70 Ldn. Multiple-family residential uses are “normally acceptable” up to 65 Ldn and “conditionally acceptable” up to 70 Ldn. Schools, libraries and churches are “normally acceptable” up to 70 Ldn, as are office buildings and business, commercial and professional uses.



**Table 5.5-4  
California Land Use Compatibility Noise Guidelines**

Land Use Category	Community Noise Exposure (Ldn, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 - 70	70-75	75-85
Residential - Multiple Family	50 - 65	60 - 70	70 - 75	70 - 85
Transient Lodging - Motel, Hotels	50 - 65	60 - 70	70 - 80	80 - 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	80 - 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 - 85
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 - 85
Playgrounds, Neighborhood Parks	50 - 70	NA	67.5 - 75	72.5 - 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 70	NA	70 - 80	80 - 85
Office Buildings, Business Commercial and Professional	50 - 70	67.5 - 77.5	75 - 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	75 - 85	NA

Source: Office of Planning and Research, *General Plan Guidelines*, California, October 2003.

Notes:  
Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.  
Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.  
Normally Unacceptable - New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.  
Clearly Unacceptable - New construction or development should generally not be undertaken.  
 NA: Not Applicable

## LOCAL JURISDICTIONS

### Madera County

As mandated by Section 65302(f) of the California Government Code, Madera County has adopted a noise element as a component of the Madera County General Plan. The scope of the element includes the unincorporated areas of County. The Noise Element establishes noise criteria to ensure high noise levels do not adversely affect that county resident's quality of life. As the County Municipal Code and General Plan do not have specific goals and criteria, the analysis is formulated on the policies outlined in the General Plan:

#### **Transportation Noise Source Policies**

- 7-A.1 Development of new noise-sensitive land uses, including residential uses, schools, hospitals and convalescent homes, shall not be permitted in areas exposed to existing or projected future noise levels from transportation noise sources which exceed 60 dB Ldn in outdoor activity areas and 45 dB Ldn in interior spaces with the exception that in areas adjacent to State Route 99 and the mainlines of the Southern Pacific Railroad and the Santa Fe Railway an exterior noise level standard of 65 dB Ldn will be applied. Transportation





noise sources include vehicular traffic on public roadways, aircraft in flight, and railroad line operations.

- 7-A.2 Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so as not to exceed 60 dB Ldn within the outdoor activity areas of existing or planned noise-sensitive land uses and 45 dB Ldn in interior spaces of existing or planned noise-sensitive land uses.
- 7-A.3 The County shall request the California Highway Patrol, the Sheriff's office, and local police departments to actively enforce the California Vehicle Code sections relating to adequate vehicle mufflers and modified exhaust systems.

**Non-Transportation Noise Source Policies**

- 7-A.4 Development of new noise-sensitive land uses shall not be permitted where the noise level from existing non-transportation noise sources exceeds the noise level standards of Table 7.A.4 (refer to Table 5.5-5, *Maximum Allowable Noise Exposure for Non-Transportation Noise Sources*).

**Table 5.5-5  
Maximum Allowable Noise Exposure For  
Non-Transportation Noise Sources<sup>1</sup>**

Period	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L <sub>eq</sub> , dB	50	45
Maximum level, dB	70	65
Note: Each of the noise levels specified above shall be lowered by 5 dB for pure tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings). <sup>1</sup> As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers at the property line.		

- 7.A.5 Noise which will be created by new non-transportation noise sources, or existing non-transportation noise sources which undergo modifications that may increase noise levels, shall be mitigated so as not to exceed the noise level standards of Table 7.A.4 (Table 5.5-5) on lands designated for noise-sensitive uses. This policy does not apply to noise levels associated with agricultural operations.
- 7.A.6 The County shall enforce the *State Noise Insulation Standards* (California Code of Regulations, Title 24) and Chapter 35 of the *Uniform Building Code* (UBC) concerning interior noise exposure for multi-family housing, hotels and motels.



- 7.A.7 Where the development of a project may result in land uses being exposed to existing or projected future noise levels exceeding the levels specified by the policies of the noise section of the General Plan, the County shall require an acoustical analysis early in the review process so that noise mitigation may be included in the project design. For development not subject to environmental review, the requirements for an acoustical analysis shall be implemented prior to the issuance of a building permit.

## IMPACTS

### SIGNIFICANCE CRITERIA

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains the Initial Study Environmental Checklist form which includes questions relating to noise. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, a Project may create a significant environmental impact if it causes one or more of the following to occur:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to *Impact Statements* 5.5-1 through 5.5-3);
- Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels (refer to *Impact Statement* 5.5-1);
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to *Impact Statements* 5.5-2 through 5.5-3);
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to *Impact Statements* 5.5-1 through 5.5-3);
- 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, would the project expose people residing or working in the project area to excessive noise levels (refer to Section 10.0, *Effects Found Not To Be Significant*); and
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels (refer to Section 10.0, *Effects Found Not To Be Significant*).

Based on these standards, the effects of the proposed project have been categorized as either a “less than significant impact” or a “potentially significant impact.” Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant and unavoidable impact. The standards used to evaluate the significance of impacts are often qualitative rather than quantitative because appropriate quantitative standards



are either not available for many types of impacts or are not applicable for some types of projects.

### **Significance of Changes in Ambient Noise Levels**

A project is considered to have a significant noise impact where it causes an adopted noise standard to be exceeded for the project site or for adjacent sensitive receptors. In addition to being concerned about the absolute noise level that might occur when a new source is introduced into an area, it is also important to consider the existing noise environment. If the existing noise environment is quiet and the new noise source greatly increases the noise exposure, even though a criterion level might not be exceeded, an impact may occur. Lacking adopted standards for evaluating such impacts, general considerations for community noise environments are that a change of over 5 dBA is readily noticeable and, therefore, is considered a significant impact (refer to Table 5.5-6, *Significance of Changes in Cumulative Noise Exposure*).<sup>1</sup> Changes from 3 to 5 dBA may be noticed by some individuals and are, therefore considered an adverse environmental impact, since under these conditions sporadic complaints may occur. Changes in community noise levels of less than 3 dBA are normally not noticeable and are therefore considered less than significant.<sup>2</sup> Adverse impacts would result if increases in noise levels are audible (increases equal to, or greater than 3 dBA), although the noise level may not exceed the significant impact criteria specified above.

**Table 5.5-6  
Significance of Changes in Cumulative Noise Exposure**

Ambient Noise Level Without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels by:
< 60 Dba	+ 5.0 dBA or more
60-65 dBA	+3.0 dBA or more
> 65 dBA	+1.0 dBA or more

Sources: FICON, FHWA, and Caltrans as applied by Brown-Buntin Associates, Inc., 1997.

Potential impacts are grouped below according to topic. The numbered mitigation measures at the end of this Section directly correspond with the numbered impact statements.

<sup>1</sup> Source: *Assessment of Noise with Respect to Community Response*, prepared by International Standardization Switzerland, 1996.

<sup>2</sup> Source: *Fundamentals and Abatement of Highway Traffic Noise*, prepared by Bolt, Beranek and Newman, 1973.



## **SHORT-TERM CONSTRUCTION NOISE IMPACTS**

- 5.5-1 *Grading and construction within the Project area would result in temporary noise and/or vibration impacts to nearby noise sensitive receptors. Analysis has concluded that construction noise and vibration impacts would be less than significant following compliance with the County regulations and implementation of the recommended mitigation measures.*

Short-term noise impacts would be associated with grading and site construction. Construction related short-term noise levels, in particular those that will occur during grading and infrastructure construction, will be higher than the existing ambient noise levels in the area immediately adjacent to the Project site.

Two types of short-term noise impacts could occur during the construction of the proposed Project. First, the transport of workers and construction equipment/materials to the Project site would incrementally increase noise levels on access roads leading to the site (SR-49 and Opah Drive). Although there would be a relatively high single event noise exposure potential associated with the passing trucks (up to 87 dBA at 50 feet from the passing truck), the effect on long-term ambient noise levels would be small and less than significant (average over a longer time period). Therefore, short-term construction noise levels associated with worker and equipment/material transport to the proposed Project site would result in less than significant impacts.

The second type of short-term noise impact is related to excavation, grading and construction of the Project site. Existing residences adjacent to the Project site may be subject to short-term high intermittent noise generated by construction activities near the Project boundary. Depending on where active construction occurs, the exterior areas of adjacent residences may be affected by construction noise exceeding 90 dBA intermittently during construction.<sup>3</sup>

Construction is performed in steps, each of which has its own mix of equipment and consequently, its own characteristics. These various sequential phases would change the character of the noise generated on the Project site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction equipment noise ranges to be categorized by work phase. Table 5.5-7, *Typical Construction Noise Levels*, lists typically construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. At the Project site, the loudest piece of equipment that might be used would be a dozer or front-end loader (88 dBA (L<sub>max</sub>)). Additionally, as noted in Table 5.5-7, rock blasting could potentially have a noise level of 113 dBA at 50 feet. Further information regarding noise and vibration from blasting is discussed below.

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<sup>3</sup> This excludes blasting, which could have a potential single event noise level (SEL) of 113 dBA at 50 feet from the blasting site.



**Table 5.5-7  
Typical Construction Noise Levels**

Type of Equipment	Range of Sound Levels (dBA at 50 feet)	Suggested Sound Level (dBA at 50 feet)
Dozer	85-90	88
Front End Loader	86-90	88
Hydraulic Backhoe	81-90	86
Hydraulic Excavator	81-90	86
Grader	79-89	86
Air Compressor	76-86	86
Truck	81-87	86
Pneumatic Tool	78-88	85
Jack Hammer	75-85	82
Tractor	77-82	80
Pump	68-80	77
Rock Blasting	111 to 115	113 <sup>1</sup>

Source: *Noise Control for Buildings and Manufacturing Plants*, prepared by Bolt, Beranek & Newman, 1987. Rock Blasting data provided by the national park Service (Rothell 2000).

1 Adjusted to a distance of 50 feet; original data of 107 to 111 dBA corresponds to a distance of 75 feet. Measurement of rock blasting reflects the use of non-glycerin dynamite.

A reasonable worst-case assumption is that the three loudest pieces of equipment would operate simultaneously and continuously over at least one hour within a focused area of 15 yards of each other.<sup>4</sup> The combined sound level of three of the loudest pieces of equipment (scraper, bulldozer and heavy truck) is 92 dBA measured at 50 feet from the noise source. Table 5.5-8, *Estimated Construction Noise in the Project Area*, which assumes this combined source level, summarizes predicted noise levels at various distances from an active construction site. These estimations of noise levels take into account distance to receptor attenuation, attenuation from molecular absorption and anomalous excess attenuation.<sup>5</sup> Construction noise would be most noticeable during the initial months of site-intensive grading. The primary sources of acoustical disturbance would be random incidents, which would last less than one minute, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts.

Typically, the site preparation phase, which includes demolition, excavation, and grading of the site and infrastructure construction, tends to generate the highest noise levels, because the noisiest construction equipment is earth-moving equipment. Earth-moving and demolition equipment includes excavating machinery such as back fillers, bulldozers, excavators and front loaders, and earth-moving and compacting equipment, which includes compactors, scrapers and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels at 50 feet from earth-moving equipment range from 68 to 88 dBA.

<sup>4</sup> *Ibid.*

<sup>5</sup> Source: *Noise Control for Buildings, Manufacturing Plants, Equipment and Products*, prepared by Hoover, R. M., and R. H. Keith, 1996.



**Table 5.5-8  
Estimated Construction Noise in the Project Area**

Distance Attenuation	
Distance to Receptor (Feet)	Sound Level at Receptor (dBA)
50	92
100	86
200	80
400	73
600	69
800	67
1,000	64
1,500	60
2,000	57
2,500	54
3,000	51
4,000	47
5,280	43

Note:  
The following assumptions were utilized:  
 Basic sound level drop-off rate: 6.0 dB per doubling distance  
 Molecular absorption coefficient: 0.7 dB per 1,000 feet  
 Analogous excess attenuation: 1.0 dB per 1,000 feet  
 Reference sound level: 92 dBA  
 Distance for reference sound level: 50 feet  
 Assumes simultaneous operation of 1 grader, 1 heavy truck and 1 bulldozer

A major source of excavation activity is the construction of the proposed 210-acre foot reservoir. The earthmoving activities would involve excavating approximately 450,000 cubic yards of soil for the reservoir. Long-range soil-hauling truck trips were not quantified since the excavated material will be used to construct the cul-de-sac adjacent to the reservoir and to construct lots 16 through 24.<sup>6</sup> However, it is noted that reservoir may include an under drain and/or chimney drain (pending final design-level engineering). Construction of these reservoir features may require import of earthen materials from the Oakhurst Sand and Gravel operation, located approximately three miles south/southwest of the project site. It is anticipated that the truck trips associated with any import activities would be limited to only several days, at a maximum. However, as previously stated, although there would be a relatively high single event noise exposure potential associated with the passing trucks, these noise impacts would be short-term and would not effect long-term ambient noise levels in the project vicinity.

Based on the current layout of the proposed dam and interior slopes of the reservoir, potentially some amount of drilling and blasting could be necessary in order to achieve the desired reservoir slope configuration. Based on the seismic refraction surveys, exploratory trenching and core, the uppermost 17 to 37 feet of highly to moderately weathered (i.e. decomposed) granite should be readily excavatable with conventional heavy earth moving equipment and should provide suitable material for

<sup>6</sup> Email correspondence with Ron Pisel of Nolte Engineering, August 5, 2004.



embankment fill when placed and compacted. By contrast, the excavability of the fresh to little weathered granitic bedrock is considered non-rippable using conventional types of grading equipment and would require blasting in order to excavate. There are several areas within the proposed reservoir where it appears that blasting would be required to create portions of the internal slopes. Blasting is typically performed using sequential detonation of multiple, relatively small, charges of explosives involving micro-second delays between the detonations so that the shock wave moves gradually across the surface. As a result, the levels of noise and vibration are relatively low. Through proper design of the blasting sequence, as well as the incorporation of a monitoring program during blasting activities, the resulting noise and vibration can be kept within acceptable levels consistent with standard industry practices.

Standard residential construction in California provides a 20 dBA reduction of interior noise levels with windows closed and 12 dBA with windows open. Interior noise levels at existing dwelling units closest to the Project site with direct line of sight to on-site construction activity (i.e., those that would be exposed to intermittent maximum noise levels of 90 dBA  $L_{max}$ ) would potentially reach 65 dBA  $L_{max}$ , with windows closed and up to 78 dBA  $L_{max}$ , with windows open, at such times as the equipment is at the property line. As indicated above, these noise levels will drop off at a rate of six decibels per each doubling of distance (e.g., 100 feet, 200 feet, and 400 feet). Existing residences farther away from the Project site and those blocked by other existing structures would experience lower construction noise levels emanating from the Project site. It should be noted that the projected construction noise levels are in terms of  $L_{max}$ , and the County regulates noise in terms of Ldn. Construction noise typically occurs during the daytime, and is not the type of activity that occurs throughout the entire day.

Madera County requires that all construction vehicles or equipment, fixed or mobile, be equipped with properly operating and maintained mufflers. All operations shall comply with the noise ordinance standards, and stockpiling and/or vehicle staging areas shall be located as far as practicable from dwellings. However, there is not a specific limit to restrict the hours of construction activities. Per standard practice, this analysis assumes that construction activities shall be limited to the hours of 7:00 a.m. and 8:00 p.m. from Monday through Saturday. No construction activity shall be permitted on Sundays and Federal holidays. Construction noise during the allowed construction time periods shall be exempted from specific noise level thresholds.

As noted above, construction-related activities would result in short-term noise impacts. Implementation of the recommended mitigation (i.e., muffling of construction equipment, stockpiling/staging of construction vehicles and hour limitations, and monitoring during blasting) and compliance with Code requirements as outlined above, would ensure that short-term noise impacts to sensitive receptors are less than significant.



## **LONG-TERM NOISE IMPACTS**

- 5.5-2 *Project implementation would generate additional vehicular travel on the surrounding roadway network, thereby resulting in noise level increases. Analysis has concluded that long-term noise impacts would be less than significant for all analyzed roadway segments in the Year 2025 traffic scenario.*

Project implementation would result in additional traffic on adjacent roadways, thereby increasing vehicular generated noise in the vicinity of existing and proposed residential uses. As discussed in Section 5.3, *Traffic and Circulation*, traffic conditions were analyzed utilizing existing and Year 2025 traffic volumes. For the purposes of analyzing noise impacts associated with Project-related traffic volumes, this section compares the “2025 Without Project” and “2025 With Project” conditions. As previously discussed, an increase of five dBA or greater in noise levels occurring from Project-related activities would be significant when the “No Project” noise level is below 60 dBA Ldn. An increase of three dBA or greater in noise levels occurring from Project-related activities would be significant when the “No Project” noise level is between 60 to 65 dBA CNEL, and an increase of one dBA or greater would be significant if the “No Project” noise level is above 65 dBA Ldn.

## **YEAR 2025 TRAFFIC CONDITIONS**

In Table 5.5-9, *Year 2025 Exterior Noise Exposure Adjacent to Nearby Roadways*, the dBA at 100 feet from centerline depicts the noise level that would be heard 100 feet perpendicular to the roadway centerline. Within the Project area, this is the typical distance to the midpoint of a rear yard for a receptor adjacent to a roadway. According to Table 5.5-9, under the “2025 Without Project” scenario, noise levels at a distance of 100 feet from centerline would range from approximately 43.7 dBA to 63.8 dBA. The highest noise levels would occur along SR-49, south of Opah Drive. The lowest noise levels would occur along Miami Highlands Drive.

Under the “2025 With Project” scenario, noise levels at a distance of 100 feet from the centerline would range from approximately 43.7 to 64.3 dBA. Similar to the “2025 Without Project” scenario, the highest noise levels would occur along SR-49, south of Opah Drive, while the lowest noise levels would occur along Miami Highlands Drive. Due to the increased development, compared to existing conditions, the Sierra Meadows Estates Subdivision would result in increased traffic generation along the local roadways. As indicated in Table 5.5-9, traffic noise levels on roadways where the “2025 Without Project” levels are less than 60 dBA Ldn would increase up to 3.8 dBA. However, along the roadways where the “2025 Without Project” noise levels are above 60 dBA Ldn, the maximum increase is 0.5 dBA. Thus, per the significance criteria in Table 5.5-6, impacts in this regard would be less than significant. Additionally, as the Project site is over half a mile east of SR- 49, the residential units planned for the Project would not be subject to exterior noise levels above 60 dBA Ldn. It should also be noted that the proposed Project does not cause a significant increase in noise levels at any of the sensitive receptor sites listed within Table 5.5-2. Therefore, the proposed Project is consistent with Policy 7-A.1 of the Madera County General Plan, which regulates transportation related noise.





**Table 5.5-9  
Year 2025 Exterior Noise Exposure Adjacent to Nearby Roadways**

Roadway Segment	2025 Without Project					2025 with Project					Difference in dBA @100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 Ldn Noise Contour	65 Ldn Noise Contour	70 Ldn Noise Contour			60 Ldn Noise Contour	65 Ldn Noise Contour	70 Ldn Noise Contour	
<b>State Route 49</b>											
North of County Rd 628	7,535	61.2	136	63	29	8,215	61.5	144	67	31	0.3
Between County Rd 628 and County Rd 621	8,535	61.7	148	69	32	8,965	61.9	153	71	33	0.2
Between County Rd 621 and Opah Dr.	11,010	62.8	176	82	38	11,905	63.2	185	86	40	0.4
South of Opah Dr.	13,780	63.8	204	95	44	15,350	64.3	219	102	47	0.5
<b>Opah Drive</b>											
Between State Route 49 and Harmony Lane	1,200	49.7	23	11	5	2,120	52.2	34	16	7	2.5
Between Harmony Lane and Miami Highlands Dr.	850	48.2	19	9	4	1,750	51.4	30	14	6	3.2
Between Miami Highlands Dr. and County Rd 621	620	46.9	15	7	3	1,515	50.7	27	13	6	3.8
<b>Pine River Road</b>											
Between County Rd 621 and County Rd 628	1,445	50.5	26	12	6	1,770	51.4	30	14	6	0.9
<b>Miami Highlands Drive</b>											
East of Opah Rd	300	43.7	9	4	2	300	43.7	9	4	2	0.0
<b>County Road 621</b>											
Between State Route 49 and Opah Rd	975	48.8	20	9	4	2,025	52.0	33	15	7	3.2

Note: Noise level models computed for 2025 scenarios utilized existing 2004 roadway cross-section data.

## **STATIONARY NOISE**

5.5-3 *Project implementation would result in an increase in on-site noise. Analysis has concluded that stationary source impacts would be reduced to less than significant levels with adherence to the Madera County General Plan policies relating to noise level standards and implementation of the recommended mitigation measure.*

Project implementation would result in on-site stationary noise.<sup>7</sup> These sources would include the typical residential noise sources. The potential impact from these sources were analyzed in terms of their proximity to the nearest off-site sensitive receptors.

<sup>7</sup> Stationary noise levels diminish at the rate of 6 dBA per doubling of distance, in comparison to mobile noise sources that diminish at the rate of 4.5 dBA per doubling.



## **RESIDENTIAL AREAS**

Development of the residential lots would create new stationary noise typical of any new residential development. Noise that is typical of residential areas includes such things as children playing, pet noise, amplified music, car repair, pool and spa equipment, woodworking and home repair. Noise typically associated with residential land uses does not produce noise levels greater than 60dBA. Noise from residential stationary sources would primarily occur during the “daytime” activity hours of 7:00 a.m. to 10:00 p.m. Furthermore, the residence would be required to comply with the noise standards set forth in the County General Plan. The County’s General Plan states that exterior noise levels in residential property shall not exceed the basic noise standard of 50 dBA between the hours of 7:00 a.m. and 10:00 p.m. and shall not exceed 45 dBA between the hours of 10:00 p.m. and 7:00 a.m. (refer to Table 5.5-5). Thus, noise impacts from the residential uses are anticipated to be less than significant in this regard.

## **MECHANICAL EQUIPMENT**

Mechanical equipment, such as heating, ventilation and air conditioning (HVAC) units would be included as part of the residential units. Compliance with the Madera County General Plan Policy 7.A.5, would minimize noise impacts from mechanical equipment. Noise levels from mechanical equipment would be further reduced with implementation of mitigation requiring the orientation of equipment away from any sensitive receptors, proper selection of equipment, and installation of equipment with proper acoustical shielding. With implementation of the recommended mitigation and compliance with Madera County provisions, potential impacts from mechanical equipment would be less than significant.

## **WATER TREATMENT PLANT**

The proposed Project would include a surface water treatment plant. The preferred treatment method is microfiltration. The system would include a compressed air system, backwash system and a disinfection system (chlorine). As the treatment system requires pressurization of the pre-treated water to pass through the microfiltration membrane, a pump system is typically required. The proposed facility’s long-term operations are not anticipated to generate localized external noise sufficient to exceed established noise ordinances, as operations would occur within an enclosed facility. Additionally, the water treatment plant would be required to comply with the Madera County General Plan Policy 7.A.5, which sets exterior control noise limits (refer to Table 5.5-5). Thus, a less than significant impact would result from operational activities associated with the water treatment plant.

## **WASTEWATER TREATMENT PLANT**

A community sewer system would be provided for 287 residential lots within development Phases 2 to 12, which would include the construction of a wastewater treatment plant (WWTP). The estimated amount of wastewater generated by the proposed project (287 residences) would be approximately 86,000 gallons per day. The construction of the wastewater treatment plant would occur in several phases. The initial phase would include construction of a treatment plant with a capacity to



handle approximately 140 homes. The remaining phases of the treatment plant would be built when additional homes are constructed to maintain adequate capacity for all phases of the development. The WWTP would be located approximately 400 ft. beyond the end of the cul-de-sac on Payne Stewart Court, near the 7<sup>th</sup> fairway on the existing golf course (southern portion of Lot 72). Thus, it would not emit noise levels of a sufficient level to disturb the adjacent residential uses. It should be noted that the sewer treatment plant would be required to comply with the Madera County General Plan Policy 7.A.5, which sets exterior control noise limits (refer to Table 5.5-5). Thus, a less than significant impact would result from operational activities associated with the sewer treatment plant.

### **CUMULATIVE IMPACTS**

5.5-4 *Implementation of the Sierra Meadows Project, combined with development anticipated by the Madera County General Plan, would increase the ambient noise levels in the site vicinity. Analysis has concluded that impacts would be less than significant.*

According to the Madera County General Plan, the potential exists for existing noise-sensitive uses that currently are exposed to acceptable traffic noise levels to experience increased traffic noise levels in excess of General Plan Standards. Thus, the General Plan EIR concludes that noise impacts in this regard are potentially significant.

Table 5.5-9 lists the noise levels along roadway links in the Project vicinity under the cumulative baseline (without Project) conditions and “With Project” conditions for Year 2025. The traffic noise levels over existing levels would increase by a maximum of 3.8 dBA along Opah Drive between Miami Highlands Drive and County Road 621. This increase in noise is barely perceptible since the increase leads to an ultimate noise level of 50.7 dBA. As part of the development process, Madera County reviews new public and private development proposals to determine conformance with the policies of the noise section of the General Plan. During this phase, the County develops procedures to monitor compliance with the policies of the noise section of the General Plan after completion of projects where noise mitigation measures have been required.

The analysis for the construction and operational related activities has followed the guidance of the Madera County General Plan policies and programs. Future development proposals within the Madera County would require separate discretionary approvals and CEQA assessments, which would address potential noise impacts per the policies outlined in the General Plan. In consideration of these requirements, along with the fact that the proposed project includes mitigation that reduces all potentially significant noise impacts to less than significant levels, the project’s contribution to significant cumulative effects is concluded to be a less than significant impact.

### **MITIGATION MEASURES**

This section directly corresponds to the identified Impact Statements in the impacts subsection.



### **SHORT-TERM CONSTRUCTION NOISE AND VIBRATION IMPACTS**

- 5.5-1a Construction activities shall be limited to the hours of 7:00 a.m. and 8:00 p.m. Monday to Saturday and prohibited on Sundays and Federal Holidays.
- 5.5-1b All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, to the satisfaction of the County Engineer.
- 5.5-1c Stationary construction shall be placed such that emitted noise is directed away from sensitive noise receptors, to the satisfaction of the County Engineer.
- 5.5-1d Stockpiling and staging areas shall be located as far as practical from noise sensitive receptors during construction activities, to the satisfaction of the County Engineer.
- 5.5-1e If blasting is required during construction of the reservoir, a qualified geophysical firm, approved by Madera County, shall monitor noise and vibration levels during blasting activities. The geophysical firm shall ensure that vibration due to blasting during reservoir construction is limited to a peak particle velocity of 0.2 inches per second (in/sec) at the nearest sensitive receptor (i.e., residence). If vibration measurements indicate at any time that vibration due to blasting at any sensitive receptor has exceeded a peak particle velocity of 0.2 in/sec, the geophysical firm shall cease blasting and immediately notify Madera County. A mitigation plan shall then be developed by the geophysical firm to achieve compliance with the maximum allowable peak velocity. The plan shall be reviewed and approved by Madera County.

### **LONG-TERM NOISE IMPACTS**

- 5.5-2 No mitigation measures are recommended.

### **STATIONARY NOISE**

- 5.5-3 Noise levels emanating from Heating/Ventilation/Air Conditioning (HVAC) units, the water treatment plant and the sewer treatment plant shall comply with the Madera County General Plan Policy 7.A.5, which sets exterior control noise limits.

### **CUMULATIVE IMPACTS**

- 5.5-4 No mitigation measures are recommended.



## **LEVEL OF SIGNIFICANCE AFTER MITIGATION**

No unavoidable significant impacts related to noise have been identified following implementation of recommended mitigation measures and compliance with applicable requirements set forth by Madera County.