

## 3.8 Noise

### 3.8.1 Introduction

This section analyzes the proposed project's potential impacts related to noise. It describes existing conditions in the project area and summarizes the overall Federal, state, and local regulatory framework for noise effects, and it analyzes the potential for the proposed project to affect these resources.

Relevant background information on noise and vibration is included below.

#### 3.8.1.1 Noise Terminology

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water, and noise is generally defined as unwanted sound that annoys or disturbs people. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting," written as "dBA" and referred to as "A-weighted decibels." Table 3.8-1 provides definitions of sound measurements and other terminology used in this chapter, and Table 3.8-2 summarizes typical A-weighted sound levels for different noise sources.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level ( $L_{eq}$ ), the minimum and maximum sound levels ( $L_{min}$  and  $L_{max}$ ), percentile-exceeded sound levels (such as  $L_{10}$ ,  $L_{20}$ ), the day-night sound level ( $L_{dn}$ ), and the community noise equivalent level (CNEL).  $L_{dn}$  and CNEL values differ by less than 1 dB. As a matter of practice,  $L_{dn}$  and CNEL values are considered to be equivalent and are treated as such in this assessment.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at rate of 6 dB per doubling of distance. For a line source such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (California Department of Transportation 2013a). Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical

energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

**Table 3.8-1. Definition of Sound Measurements**

Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Maximum Sound Level ( $L_{max}$ )	The maximum sound level measured during the measurement period.
Minimum Sound Level ( $L_{min}$ )	The minimum sound level measured during the measurement period.
Equivalent Sound Level ( $L_{eq}$ )	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level ( $L_{xx}$ )	The sound level exceeded “x” percent of a specific time period. $L_{10}$ is the sound level exceeded 10 percent of the time.
Day-Night Level ( $L_{dn}$ )	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Peak Particle Velocity (Peak Velocity or PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/sec.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

**Table 3.8-2. Typical A-weighted Sound Levels**

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation 2013a

### 3.8.1.2 Vibration Terminology

Operation of heavy construction equipment, particularly the types used for pile driving and pavement breaking, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance.

Perceptible ground-borne vibration is generally limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (PPV).

Table 3.8-3 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006).

**Table 3.8-3. Vibration Source Levels for Construction Equipment**

Equipment	PPV at 25 feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic/vibratory)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Transit Administration 2006

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2006).  $PPV_{ref}$  is the reference PPV from Table 3.8-3:

$$PPV = PPV_{ref} \times (25/Distance)^{1.5}$$

Tables 3.8-4 and 3.8-5 summarize guidelines developed by California Department of Transportation (Caltrans) for damage and annoyance potential from transient and continuous vibration that is usually associated with construction activity. Equipment or activities typical of continuous vibration include: excavation equipment, static compaction equipment, tracked vehicles, traffic on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment. Equipment or activities typical of single-impact (transient) or low-rate repeated impact vibration include: impact pile drivers, blasting, drop balls, “pogo stick” compactors, and crack-and-seat equipment (California Department of Transportation 2013b).

**Table 3.8-4. Guideline Vibration Damage Potential Threshold Criteria**

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

**Table 3.8-5. Guideline Vibration Annoyance Potential Criteria**

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2013b  
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls.  
Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

## 3.8.2 Existing Conditions

This section discusses the existing conditions related to noise in the study area.

### 3.8.2.1 Noise Sensitive Land Uses

Nearby land uses include a vineyard located on Pacific Heights Road at Vineyard Lane to the east of the project area, Dingerville USA Golf Club and RV Resort and associated residences located northeast of the vineyard. Other noise sensitive land uses east of the project area consist of residences along Pacific Heights Road; there are also farms and residences west of the project area.

### 3.8.2.2 Existing Noise Conditions

The existing noise environment is consistent with a rural area. Contributors to the noise environment primarily consist of the continuous sound of traffic on highways and nearby roadways, but also include intermittent noise from other sources such as trains on railroad tracks in the vicinity, agricultural equipment, and crop dusters.

Ambient noise levels in rural or quiet suburban residential areas are in the range of 40 to 50 dBA  $L_{eq}$ ; noise levels in normal suburban residential areas are generally around 55 dBA  $L_{eq}$  (Hoover & Keith 2000). The proposed project is in a mostly rural area, with some nearby pockets of quiet suburban residential areas. Ambient noise levels would generally be 40–50 dBA  $L_{eq}$ , with the possibility for slightly higher noise levels in the suburban pockets.

## 3.8.3 Regulatory Setting

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the Federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce. These sources include aircraft, locomotives, and trucks. No Federal noise standards are directly applicable to the proposed project. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles that are intended to guide and influence development plans. The state and local noise policies and regulations that are applicable to the proposed project are described below.

### 3.8.3.1 Federal

No Federal noise standards are directly applicable to the proposed project.

### 3.8.3.2 State

Title 24 of the California Code of Regulations, Part 2, California Noise Insulation Standards, establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels that are attributable to exterior noise sources cannot exceed the 45 day-night level ( $L_{dn}$ ) in any habitable room. Where such residences are located in an environment in which exterior noise is 60  $L_{dn}$  or greater, an acoustical analysis is required to ensure that interior levels do not exceed the 45  $L_{dn}$  interior standard.

### 3.8.3.3 Local

#### Butte County

The project area is on the east side of the Feather River in Butte County, California. Chapter 41A of the Butte County Code of Ordinances pertains to noise control. The following noise standards (Table 3.8-6) apply to all noise-sensitive exterior areas within Butte County. Construction is exempt from the code requirements under the conditions described below.

**Table 3.8-6. Summary of Butte County Exterior Noise Standards**

Noise Level Descriptor	Daytime (7:00 a.m. to 7:00 p.m.)		Evening (7:00 p.m. to 10:00 p.m.)		Nighttime (10:00 p.m. to 7:00 a.m.)	
	Urban	Non- Urban	Urban	Non- Urban	Urban	Non- Urban
Hourly Average ( $L_{eq}$ )	55	50	50	45	45	40
Maximum ( $L_{max}$ )	70	60	60	55	55	50

The ordinance specifies the following exemption related to construction noise:

Noise sources associated with construction, repair, remodeling, demolition, paving or grading of any real property or public works project located within one thousand (1,000) feet of residential uses, provided said activities do not take place between the following hours:

- Sunset to sunrise on weekdays and non-holidays;
- Friday commencing at 6:00 p.m. through and including 8:00 a.m. on Saturday, as well as not before 8:00 a.m. on holidays;
- Saturday commencing at 6:00 p.m. through and including 10:00 a.m. on Sunday; and,
- Sunday after the hour of 6:00 p.m.

If an unforeseen or unavoidable condition occurs during a construction project and the nature of the project necessitates that work in process be continued until a specific phase is completed, the contractor or owner is allowed to continue work into the hours delineated above and to operate machinery and equipment necessary to complete the specific work in progress until that specific work can be brought to conclusion under conditions which will not jeopardize inspection acceptance or create undue financial hardships for the contractor or owner.

### 3.8.4 Environmental Effects

Potential impacts of the proposed project on noise are discussed in the context of State CEQA Guidelines Appendix G checklist items.

**a. *Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?***

Operational activities for the project would not change as compared to existing conditions, as there is no expected increase in visitors or operations at the facility. Therefore, noise levels in the project area would not increase from existing noise levels as a result of project implementation. There would be no impact related to operational noise from the proposed project; however, construction of the proposed project would result in noise impacts that are discussed below.

**Impact NOI-1: Construction Noise Levels in Excess of Thresholds at Nearby Noise Sensitive Land Uses (less than significant with mitigation for all components)**

The anticipated construction schedule is shown in Table 3.8-7. Typical construction activities are expected to occur up to 14 hours per day, Monday through Saturday, between 6:00 a.m. and 8:00 p.m. Equipment clean up and maintenance would occur on Sundays. Year 2 of construction would be limited to the hand-removal treatment of invasive plant species and the continued planting of native riparian vegetation.

**Table 3.8-7. Construction Schedule**

Construction Year	Construction Start/End Date	Construction Duration (number of work days)
Year 1 - (vegetation management and restoration, construction of all hydraulic improvements and recreation enhancements)	April 15 – November 1, 2017	6 days a week for construction activities with Sunday used for equipment clean up.
Year 2 - (vegetation management and restoration)	April 15 – November 1, 2018	120 total working days

The vegetation management activities, which would occur from 2017 through 2018, would include the use of passenger vehicles, gator or mule vehicles, tractors, trenchers, fork lifts, and delivery trucks.

The anticipated phases of construction, the type of equipment needed for each sub-phase of the Hydraulic Improvement and Recreation Features construction work, the count for each piece of equipment, and the duration of each phase are listed in Table 3.8-8 below. Most equipment would stay on-site for the duration of the sub-phase. The exceptions are the personal vehicles of the crew and the haul trucks.

**Table 3.8-8. Construction Phases, Equipment, and Anticipated Work Durations for Hydraulic Improvements and Recreation Features**

Construction Phase	Anticipated Number and Type of Equipment That May Be Utilized By the Contractor	Anticipated Number and Daily Usage	Anticipated Duration of Use	Total Phase Duration
Phase 1 – Clearing, Grubbing and Stripping	(2) Water Trucks	2 at 80%	45 Days	45 Days
	(2) Front-End Loaders	2 at 50%	45 Days	
	(2) Pickup Trucks	2 at 80%	45 Days	
	(2) Haul Trucks	2 at 25%	45 Days	
Phase 2 – Construction Activities (Lags behind Phase 1 by approximately 1 week or more)	(4) Motor Graders	4 at 100%	45 Days	80 Days
	(2) Pickup Trucks	2 at 80%	80 Days	
	(1) Concrete Truck	1 at 100%	15 Days	
	(1) Crane	1 at 50%	15 Days	
	(4) Tractors with Discing Equipment	4 at 50%	35 Days	
	(4) Vibratory Rollers	4 at 50%	45 Days	
	(2) Water Trucks	2 at 80%	45 Days	
	(10) Haul Trucks	10 at 50%	20 Days	
Phase 3 – Hydroseeding (Begins after Phase 2)	(2) Hydroseeding Trucks	2 at 50%	10 Days	10 Days
	(2) Pickup Trucks	2 at 50%	10 Days	
Phase 4 – Demobilization & Site Cleanup (Begins after Phase 3)	(2) Extended Boom Pallet Loader	2 at 25%	20 Days	20 Day
	(2) Pickup Trucks	2 at 50%	20 Days	
	(2) Haul Trucks	2 at 50%	Days	

Note that as described in Section 3.8.3.3 above, noise sources associated with construction, repair, remodeling, demolition, paving or grading of any real property or public works project located within one thousand (1,000) feet of residential uses are exempt from the Butte County noise ordinance, provided that those activities do not take place between the following hours:

- Sunset to sunrise on weekdays and non-holidays;
- Friday commencing at 6:00 p.m. through and including 8:00 a.m. on Saturday, as well as not before 8:00 a.m. on holidays;
- Saturday commencing at 6:00 p.m. through and including 10:00 a.m. on Sunday; and,
- Sunday after the hour of 6:00 p.m.

Therefore, construction noise is exempt from the Butte County noise ordinance if it occurs between sunrise and sunset on a non-holiday weekday, between 8:00 a.m. and 6:00 p.m. on Saturdays, and between 10:00 a.m. and 6:00 p.m. on Sundays. Table 3.8-9 provides a detailed summary.

**Table 3.8-9. Applicable Butte County Noise Standards by Time of Day**

Project Construction Hours			
<i>Monday – Saturday: 6:00 a.m. to 8:00 p.m.</i>			
Weekday or Saturday?		Daytime, Evening, Nighttime Standards Apply?	dBa L <sub>EQ</sub> Limit
Applicable Noise Limits during Project Construction			
Weekday	6:00 a.m. to 7:00 a.m.	Nighttime	40
Weekday	After sunrise, before sunset	<i>Not Applicable</i>	<i>Exempt</i>
Weekday	After sunset between 7:00 p.m. and 8:00 a.m.	Daytime	50
Weekday	After sunset and after 7:00 p.m.	Evening	45
Saturday	6:00 a.m. to 7:00 a.m.	Nighttime	40
Saturday	7:00 a.m. to 8:00 a.m.	Daytime	50
Saturday	8:00 a.m. to 6:00 p.m.	<i>Not Applicable</i>	<i>Exempt</i>
Saturday	6:00 p.m. to 7:00 p.m.	Daytime	50
Saturday	7:00 p.m. to 8:00 p.m.	Evening	45

## Vegetation Management

Project construction activities for the vegetation management component would mostly involve the mechanical removal of invasive plant species and the planting of native riparian vegetation; these construction activities, however, would not use much mechanical construction equipment. As discussed above, this work would take place throughout 2017 and 2018, and would include the use of hand tools, passenger vehicles, gator or mule vehicles, tractors, trenchers, fork lifts, and delivery trucks. The nearest residential land uses are located more than 800 feet from the project area boundary.

Assuming that a forklift, a trencher, and a tractor were operating simultaneously in proximity to one another at a distance of approximately 800 feet from the nearest residential outdoor use area, the noise levels from construction would be a maximum of 55 dBA L<sub>EQ</sub> at the residential outdoor use area. Note that construction noise would be exempt between sunrise and sunset each day; however, based on this analysis, construction noise would be in excess of the 40, 45 and 50 dBA L<sub>EQ</sub> thresholds that apply during early morning hours (before sunset on weekdays, before 8:00 am on Saturday) and evening hours (after sunset on weekdays, after 6:00 pm on Saturday). At a distance of 1,275 feet, noise levels from these three pieces of equipment would be reduced to less than 50 dBA L<sub>EQ,A</sub>. At a distance of 2,000 feet, the noise levels would be reduced to less than 45 dBA L<sub>EQ</sub>, and at a distance of 3,200 feet the noise levels would be reduced to less than 40 dBA L<sub>EQ</sub>.

The nearby residences and noise sensitive land uses located within 3,200 feet of the project area include the single family residences located north of the vineyard (and some that are north of the project area) on Pacific Heights Road (all of which are at least 800 feet away), residences located at the Dingerville USE Golf Club and RV Resort (which are located between 1,150 and 2,450 feet away), various residences located east of the southern half of the project area (all over 1,150 feet away), and a few residences located to the west of the project area (all more than 2,400 feet from the project boundary).

Project construction activities associated with vegetation management would result in a significant impact related to construction noise if they occur during non-exempted hours and are within 3,200 feet of noise-sensitive land uses. Because vegetation management is proposed to occur between the hours of 6:00 a.m. and 8:00 p.m., and because noise limits during some of those hours would be as low as 40 dBA  $L_{EQ}$ , construction-noise impacts associated with this project component would be potentially significant. Implementation of Mitigation Measure NOI-MM-1 will reduce this impact to a less-than-significant level.

## Hydraulic Improvements

The Hydraulic Improvements component of project construction (which would start and end in 2017) would include the construction and improvement of various hydraulic features, such as:

- Construction of rock gabion inflow weir
- Construction of notch connections to the Feather River
- Improvement of outflow weir flood control
- Construction of southern fish barrier berm
- Construction of interior channel grading improvements
- Improvement of interior road culvert crossings

These activities would require the use of construction equipment listed under Phase 2 (Construction Activities) in Table 3.8-8. Construction activities for these components could require the use of motor graders, tractors with discing equipment, vibratory rollers, and a crane, as well as concrete trucks, water trucks, haul trucks, and pickup trucks. In addition to these equipment, two generators would be used on-site during construction to provide for any electrical needs on site.

The closest noise sensitive land uses to the proposed construction limits (shown in Figure 2-1) are located approximately 1,400 feet east of the Fish Barrier Berm construction area in the southern portion of the Project site. To model worst-case construction noise for the hydraulic improvements construction activities for the proposed Project, three of the loudest pieces of equipment (a grader, a concrete mixer truck and a tractor) were assumed to be operating simultaneously and in close proximity to one another. If this were to occur, noise generated by these equipment would be approximately 51 dBA  $L_{EQ}$  at the exterior use areas of the nearest residences.

Noise levels from construction activities for hydraulic improvements would be reduced to less than 50 dBA  $L_{EQ}$  at a distance of 1,500 feet, to less than 45 dBA  $L_{EQ}$  at a distance of 2,500 feet, and to less than 40 dBA  $L_{EQ}$  at a distance of approximately 3,700 feet.

Construction during the hydraulic improvements construction activities would result in a significant impact related to construction noise if it occurs during non-exempted hours and within 3,700 feet of noise sensitive land uses. As construction work for hydraulic improvements is proposed to occur between the hours of 6:00 a.m. and 8:00 p.m., and because noise limits during some of those hours would be as low as 40 dBA  $L_{EQ}$ , Project construction-noise impacts would be potentially significant. Implementation of Mitigation Measure NOI-MM-1 will reduce this impact to a less-than-significant level.

Note that while haul trucks may travel to and from the project site during this phase, haul truck trips would be relatively minor; an anticipated maximum of 4 round-trip haul trucks occurring on a given

day. The intermittent and very temporary noise associated with haul trucks passing nearby noise sensitive land uses would not result in significant noise impacts.

## Recreation Features

The Recreation Features component of project construction (which would start and end in 2017) would include the construction and improvement of various recreation features associated with the project, such as:

- Improvement of two public parking areas
- Installation of concrete pad for existing portable restroom facilities
- Construction of two recreational footbridges and combined recreational footbridge/new emergency vehicle access bridge
- Grading of terrain to improve Feather River access

These activities, as described above for the Hydraulic Improvements component of construction, would require the use of construction equipment described in Table 3.8-8. As with the Hydraulic Improvements construction phase, construction activities for these components could require the use of generators to provide for the electrical needs on site, motor graders, tractors with discing equipment, vibratory rollers, and a crane, as well as concrete trucks, water trucks, haul trucks, and pickup trucks.

The nearest residential outdoor use area or noise sensitive land use is located approximately 2,200 feet away from proposed areas for recreation feature construction. Specifically, a residence along Pacific Heights Road is located approximately 2,250 feet to the east of the proposed North Area River Access area. As with the construction analysis for the Hydraulic Improvements phase, modeling for worst-case construction noise assumed that three of the loudest pieces of equipment (a grader, a concrete mixer truck and a tractor) would be operating simultaneously and in close proximity to one another.

Based on this assumption, worst-case noise levels from construction activities for the construction of recreation features would be up to approximately 46 dBA  $L_{EQ}$  at the exterior use areas of the nearest residences (2,250 feet east of the northern river access area). These noise levels would be reduced to less than 45 dBA  $L_{EQ}$  at a distance of 2,500 feet, and to less than 40 dBA  $L_{EQ}$  at a distance of approximately 3,700 feet.

Construction during the construction of recreation features associated with the project would result in a significant impact related to construction noise if it occurs during non-exempted hours and within 3,700 feet of noise sensitive land uses. As construction work for recreation activities is proposed to occur between the hours of 6:00 a.m. and 8:00 p.m., and because noise limits during some of those hours would be as low as 40 dBA  $L_{EQ}$ , Project construction-noise impacts would be potentially significant. Implementation of Mitigation Measure NOI-MM-1 will reduce this impact to a less-than-significant level.

Note that while haul trucks may travel to and from the project site during this phase, haul truck trips would be relatively minor; an anticipated maximum of 4 round-trip haul trucks occurring on a given day. The intermittent and very temporary noise associated with haul trucks passing nearby noise sensitive land uses would not result in significant noise impacts.

### **Mitigation Measure NOI-1. Implement Noise Control Measures to Reduce Construction Noise during Project Construction**

- This mitigation measure would reduce construction-related impacts by locating equipment away from sensitive land uses during non-exempt (for construction) hours, requiring sound control devices on equipment, utilizing noise-reducing enclosures and other practices. After implementing these practices, noise from construction activities would be reduced to less than 40 dBA  $L_{EQ}$  during non-exempt nighttime hours, 45 dBA  $L_{EQ}$  during non-exempt evening hours, and 50 dBA  $L_{EQ}$  during non-exempt daytime hours (refer to Table 3.8-9 above for the non-exempt construction hours). SBFCA or its contractors will comply with construction noise limits specified in the Section of 41A of the Butte County municipal code by implementing noise-reducing measures during project construction. These measures may include, but are not limited to, the following:
- When construction must occur during non-exempt hours (refer to Table 3.8-9), noise must be less than the applicable daytime, evening or nighttime noise standard at nearby residential land uses.
- Schedule the noisiest construction activities, such as grading activities, between sunrise and sunset on weekdays or between 8:00 a.m. and 6:00 p.m. on weekdays, when construction noise is exempt.
- Use best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds) on equipment and trucks used for Project construction wherever feasible.
- Use hydraulically or electrically powered impact tools (e.g., pile drivers, jack hammers, pavement breakers, and/or rock drills) used for Project construction wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, use an exhaust muffler on the compressed air exhaust; this muffler can lower noise levels from the exhaust by up to about 10 dBA. Use external jackets on the tools themselves where feasible. This could achieve a reduction of 5 dBA. Use quieter equipment, such as drills rather than impact equipment, whenever feasible.
- Use “quiet” gasoline-powered compressors or other electric-powered compressors, and use electric rather than gasoline or diesel powered forklifts for small lifting, to the extent feasible.
- Locate stationary noise sources, such as temporary generators, as far from nearby receptors as possible, and they shall be muffled and enclosed within temporary enclosures and shielded by barriers, or other measures to the extent feasible.
- Install temporary noise barriers eight feet in height around the construction site to reduce construction noise from equipment
- Prohibit trucks from idling along streets serving the construction site.
- Monitor the effectiveness of noise attenuation measures by taking noise measurements during construction activities to ensure compliance with the 40 dBA LEQ, 45 dBA LEQ and 50 dBA LEQ standards during non-exempted hours.

***b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?***

**Impact NOI-2. Exposure of Persons to Excessive Groundborne Vibration or Groundborne Noise Levels (less than significant for all components)**

Land uses in which groundborne vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and university research operations (Federal Transit Administration 2006) are considered “vibration-sensitive.” The degree of sensitivity depends on the specific equipment that would be affected by the groundborne vibration. No vibration-sensitive land uses are located in or within 200 feet of the project area. Because no vibration-sensitive land uses are located within 200 feet of the project area, construction vibration would not affect vibration-sensitive land uses. Although residences do not qualify as vibration-sensitive land uses, excessive levels of ground-borne vibration of either a regular or an intermittent nature can result in annoyance to residential uses.

As shown in Table 3.8-8, no impact equipment would be necessary for project construction and none of the equipment types listed in the table would result in substantial vibration levels. The only equipment pieces that have the potential to cause minor vibration effects are vibratory rollers. A vibratory roller creates approximately 0.210 PPV at 25 feet. Vibration amplitude attenuates over distance. Using the equation shown in Section 3.8.1.2, ( $PPV = PPV_{ref} \times [25/Distance]^{1.5}$ ), the vibration level from a vibratory roller at a distance of 200 feet would be reduced to levels of less than 0.01 PPV. No residences are located within 200 feet of the project area. Therefore, the vibration level from a vibratory roller used during construction would be less than the barely perceptible level according to the Vibration Annoyance Potential Criteria shown in Table 3.5-8 (California Department of Transportation 2013b). Impacts related to excessive ground-borne vibration related to vegetation management, hydraulic improvements, and recreation features would be less than significant.

***c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?***

Temporary construction activities that would be conducted as part of project implementation would result in short-term increases in noise levels in the project area. However, these activities would cease once construction was complete, and would not result in any permanent increase in ambient noise levels. Additionally, operational activities for the project would not change as compared to existing conditions, as there is no expected increase in visitors or operations at the facility. As such, the proposed project would not result in a permanent increase in noise in the project area. There would be no impact.

***d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?***

**Impact NOI-3: Substantial Temporary or Periodic Increase in Ambient Noise Levels in the Project Vicinity above Levels Existing without the Project (less than significant with mitigation)**

As discussed above for checklist item *a*, construction noise is exempt from the Butte County noise standards from sunrise to sunset on weekdays, from 8:00 a.m. to 6:00 p.m. on Saturday, and between 10:00 a.m. and 6:00 p.m. on Sundays. Noise from construction could be in excess of County

standards, however, if it occurs near residential receptors during non-exempted hours. Mitigation Measure NOI-MM-1 (described above) will be implemented to reduce noise impacts from construction activities to less-than-significant-levels. Therefore, the proposed project would not result in a substantial temporary or periodic increase in ambient noise levels and this impact related to vegetation management, hydraulic improvements, and recreation features would be less than significant.

***e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?***

The nearest public airport to the project area is the Oroville Municipal Airport, which is approximately 1.6 miles north of the project area. The next closest public airport is the Richvale Airport that is 7.75 miles to the northwest; at this distance, there would be no noise effects experienced in the project area from this airport. The Oroville Municipal Airport has 2 runways and 70 aircraft use it as a base. According to Compatibility Map included in the Land Use Compatibility Plan for the Oroville Municipal Airport, the 55 dB CNEL airport noise contour extends to the southwest of the runway area at the airport by approximately 1 mile (County of Butte 2000). Because noise levels from aircraft at the closest airport would be less than 55 dB CNEL in the project area, there would be no impact related to noise from public use airports.

***f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?***

The closest private airstrip to the project area is the Jones Ag-vation/Aviation Airport, a small airfield with only 18 aircraft using it as a base, located 3.4 miles to the northwest. At this distance, no effects related to airport noise would occur; there would be no impact related to noise from private airstrips.