3.11 Noise

This section evaluates the potential for noise and ground-borne vibration impacts to result from implementation of the proposed project. The analysis provides an overview of the fundamental principles of noise and vibration, describes the existing noise environment in the project vicinity, presents a summary of applicable regulations, estimates future noise levels at surrounding land uses resulting from construction and operation of the proposed project, identifies the potential for significant impacts, and, where necessary, provides mitigation measures to address significant impacts.

Data used to prepare this analysis were obtained from the City of Perris General Plan Noise Element, the City of Perris Municipal Code, the County of Riverside General Plan Noise Element, and the County of Riverside Municipal Code as well as noise measurements conducted in the project area.

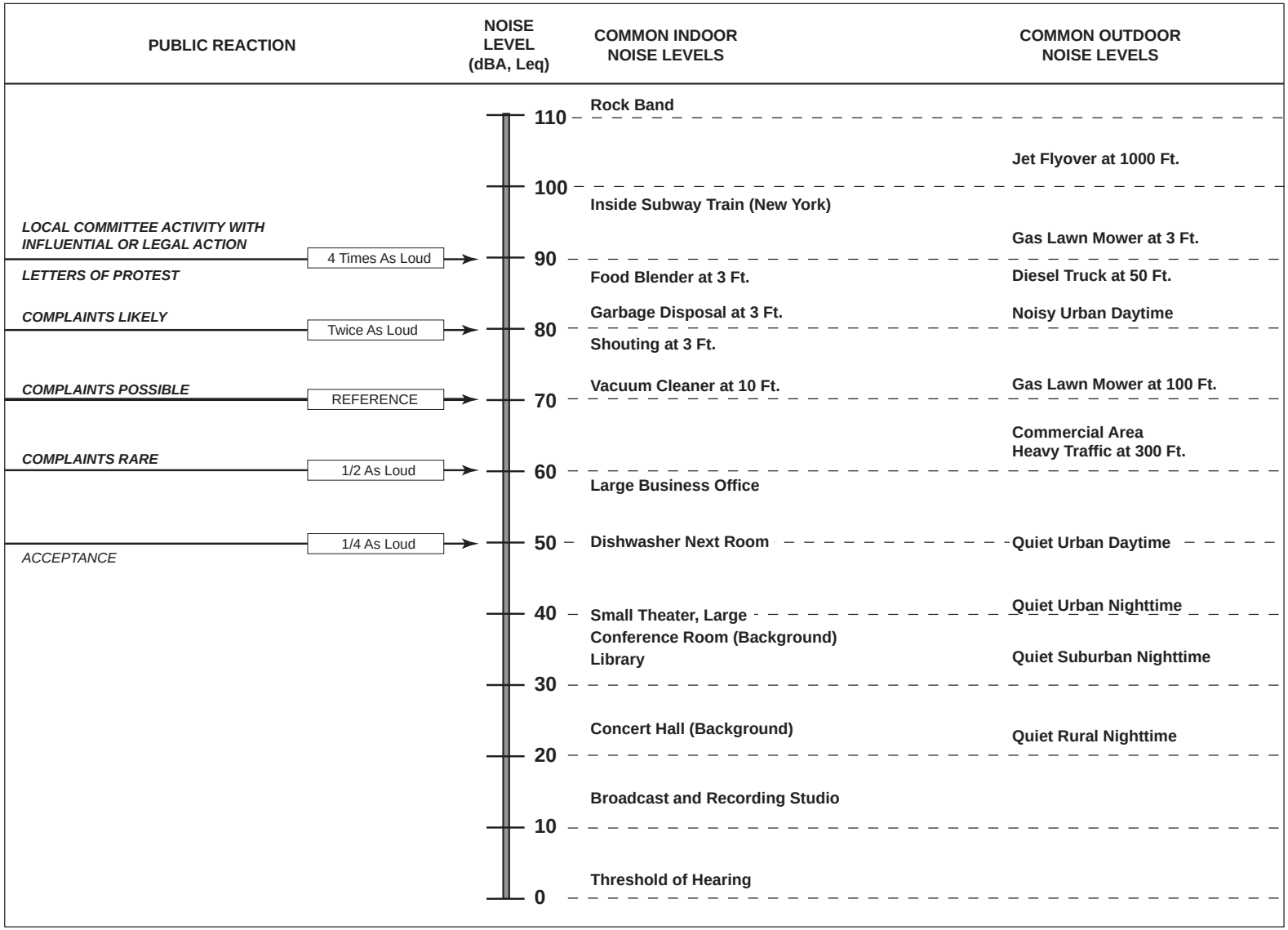
3.11.1 Environmental Setting

Noise Principles and Descriptors

Noise is generally defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning from 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 3.11-1**. All noise levels presented below are A-weighted unless otherwise stated.



SOURCE: ESA

Perris Dam Emergency Release Facility . 120083.02

Figure 3.11-1

Effects of Noise on People

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in Figure 3.11-1 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The L_{eq}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

L_x: The noise level exceeded a percentage of a specified time period. The "x" represents the percentage of time a noise level is exceeded. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: Also termed the DNL, the L_{dn} is the average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dBA to measured noise levels between the hours of 10:00 p.m. and 7:00 a.m. to account nighttime noise sensitivity.

CNEL: CNEL, or Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dBA to measured noise levels between the hours of 7:00 p.m. and 10:00 p.m. and after an addition of 10 dBA to noise levels between the hours of 10:00 p.m. and 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance)
- Interference effects (e.g., communication, sleep, and learning interference)
- Physiological effects (e.g., startle response)
- Physical effects (e.g., hearing loss)

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects of environmental noise refer to those effects that interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, and telephone conversations, as well as interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep. With regard to the subjective effects, the responses of individuals to similar noise events are diverse and are influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived.
- Outside of the laboratory, a 3 dBA change is considered to be a barely perceivable difference.
- A change in level of at least 5 dBA is considered to be a readily perceivable difference.
- A change in noise levels of 10 dBA is subjectively heard as doubling of perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a nonlinear fashion; hence, the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in

a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver, such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such as traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Fundamentals of Vibration

As described in the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* (FTA, 2006), ground-borne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile driving, and the operation of heavy earthmoving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity (FTA, 2006). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, students, the elderly, and the sick), and vibration-sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile driving during construction.

Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV (FTA, 2006).

In residential areas, the background vibration velocity level is usually around 50 VdB (approximately 0.0013 in/sec PPV). This level is well below the vibration velocity level threshold of perception for humans, which is approximately 65 VdB. A vibration velocity level of 75 VdB is considered to be the approximate dividing line between barely perceptible and distinctly perceptible levels for many people (FTA, 2006).

Project Area

Sensitive Receptors

Some land uses are more sensitive to noise levels than others because of the types of activities typically associated with the uses. Noise-sensitive land uses generally include, but are not necessarily limited to, schools, hospitals, rest homes, long-term care facilities, mental care facilities, residential uses, places of worship, libraries, and passive recreation areas. These sensitive land uses, when compared to non-sensitive uses such as commercial and industrial land uses, depend on a low-level noise environment to promote the well-being of their occupants and visitors.

Sensitive receptors in the project vicinity include the residential neighborhoods within the city of Perris located to the west and south of the project site, across the Ramona Expressway. The closest residences to the project site are located approximately 135 feet south of the proposed Western Segment, 215 feet south of the Fairgrounds Segment, and approximately 570 feet south of the proposed Main Levee, across Ramona Expressway. In addition, haul trucks would travel on Lake Perris Drive and would be 115 feet or more from residences to the west on Candelaria Way. Finally, in regard to active recreational uses, the Lake Perris Fairgrounds and the Lake Perris State Recreation Area (SRA) supports recreational visitors that could be considered sensitive receptors, which could be as close as 50 feet and 1,050 feet from proposed project construction, respectively.

Existing Noise Conditions

The proposed project is located approximately 15 miles south of the city of Riverside in an unincorporated portion of western Riverside County and partially within the city of Perris. A majority of the proposed project is located within the boundaries of the Lake Perris SRA and the Lake Perris Fairgrounds.

The noise environment surrounding the project site is influenced primarily by traffic on local roadways and ongoing events and activities that occur year-round at the Lake Perris Fairgrounds. Short-term noise level measurements were conducted at six locations in the project site vicinity on August 20, 2013, from 10:30 a.m. to 1:20 p.m. to establish ambient noise conditions. Measurement sites were chosen based on the location of existing noise-sensitive uses near the project site, which consisted mainly of existing residential uses in the project area. The noise

surveys were conducted using a Metrosonics Model db-3080 sound level meter, which was calibrated prior to use and operated according to the manufacturer's written specifications. At each measurement site, the microphone was placed at a height of approximately 5 feet above the local grade. The measured average noise level (L_{eq}) and maximum noise level (L_{max}), and the sources of noise monitored at the measurement locations are shown in **Table 3.11-1**. The measurement locations are identified in **Figure 3.11-2**.

TABLE 3.11-1
EXISTING NOISE LEVELS AT PROJECT AREA

Location		Date and Time Period	Average Noise Levels[1]	Maximum Noise Levels[2]	Primary Noise Sources
1.	Single-family residential uses located southwest of project site, across Ramona Expressway	8/20/13 10:30–10:45 A.M.	64.3	79.4	Vehicular traffic on Ramona Expressway
2.	Single-family residential uses located west and south of project site, across Ramona Expressway	8/20/13 10:58–11:13 A.M.	59.9	71.8	Vehicular traffic on Ramona Expressway
3.	Single-family residential uses located south of project site, across Ramona Expressway, and east of Avalon Parkway	8/20/13 11:33–11:48 A.M.	61.4	73.0	Vehicular traffic on Ramona Expressway
4.	Single-family residential uses located south of project site, across Ramona Expressway, and south of Center Street	8/20/13 12:10–12:25 P.M.	56.4	73.4	Dog barking, ambient traffic noise from Ramona Expressway, steady wind breeze
5.	Single-family residential uses located south of project site, across Ramona Expressway, and west of Evans Road	8/20/13 12:37–12:52 P.M.	68.6	79.8	Vehicular traffic on Ramona Expressway, steady wind breeze
6.	Single-family residential uses located north of project site and east of Evans Road	8/20/13 1:05–1:20 P.M.	49.8	73.6	Vehicular traffic on Evans Road; light/faint ambient traffic noise from Ramona Expressway, overhead helicopter

1. Leq dBA
2. Lmax dBA

SOURCE: ESA, 2013.

Existing Ground-borne Vibration Conditions

Aside from periodic construction work that may occur throughout Riverside County and the city of Perris, other sources of ground-borne vibration in the project site vicinity include heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks, and transit buses) on local roadways. Trucks and buses typically generate ground-borne vibration velocity levels of around 63 VdB, and these levels could reach 72 VdB where trucks and buses pass over bumps in the road (FTA, 2006). In terms of PPV levels, a heavy-duty vehicle traveling at a distance of 50 feet can result in a vibration level of approximately 0.001 inch per second.

SOURCE: NAIP Imagery.

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Figure 3.11-2

Noise Measurement Locations

3.11.2 Regulatory Framework

Federal

Noise Standards

There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the proposed project. With regard to noise exposure and workers, the Office of Safety and Health Administration (OSHA) regulations safeguard the hearing of workers exposed to occupational noise. Federal regulations also establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

Vibration Standards

The FTA has adopted vibration standards that can be used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 3.11-2**.

TABLE 3.11-2
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	Vibration Levels that May Cause Damage
I. Reinforced-concrete, steel or timber (no plaster)	0.5 PPV (in/sec)
II. Engineered concrete and masonry (no plaster)	0.3 PPV (in/sec)
III. Non-engineered timber and masonry buildings	0.2 PPV (in/sec)
IV. Buildings extremely susceptible to vibration damage	0.12 PPV (in/sec)

SOURCE: FTA, 2006.

In addition, the FTA has also adopted standards associated with human annoyance for ground-borne vibration impacts for the following three land-use categories: (1) Vibration Category 1 – High Sensitivity, (2) Vibration Category 2 – Residential, and (3) Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference.

Under conditions where there are an infrequent number of events per day, the FTA has established thresholds of 65 VdB for Category 1 buildings, 80 VdB for Category 2 buildings, and 83 VdB for Category 3 buildings.[1] Under conditions where there are an occasional number of events per day, the FTA has established thresholds of 65 VdB for Category 1 buildings, 75 VdB for Category 2 buildings, and 78 VdB for Category 3 buildings.[2] No thresholds have been adopted or recommended for commercial and office uses.

State

Noise Standards

The California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. These guidelines for land use and noise exposure compatibility are shown in **Table 3.11-3**. In addition, Section 65302(f) of the California Government Code requires each county and city in the State to prepare and adopt a comprehensive long-range General Plan for its physical development, with Section 65302(g) requiring a Noise chapter to be included in the General Plan. The Noise chapter must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

TABLE 3.11-3
COMMUNITY NOISE EXPOSURE LEVEL (CNEL)[1]

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-family, Duplex, Mobile Homes	50–60	55–70	70–75	above 75
Multi-Family Homes	50–65	60–70	70–75	above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	above 80
Transient Lodging – Motels, Hotels	50–65	60–70	70–80	above 80
Auditoriums, Concert Halls, Amphitheaters	---	50–70	---	above 65
Sports Arena, Outdoor Spectator Sports	---	50–75	---	above 70
Playgrounds, Neighborhood Parks	50–70	---	67 - 75	above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–75	---	70–80	above 80
Office Buildings, Business and Professional Commercial	50–70	67–78	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	above 75	---

1. All CNEL measurements are expressed in dBA.
[a] 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.
[b] 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.
[c] Normally Unacceptable: New construction or development should generally 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.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.

SOURCE: OPR, 2003 (in coordination with the California DHS).

1 "Infrequent events" is defined by the FTA as being fewer than 30 vibration events of the same kind per day.
2 "Occasional events" is defined by the FTA as between 30 and 70 vibration events of the same source per day.

The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dBA. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

The State has also established noise insulation standards for new multifamily residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of 45 dBA L_{dn} in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than 60 dBA L_{dn}. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Vibration Standards

There are no State vibration standards applicable to the proposed project. Moreover, according to the California Department of Transportation's (Caltrans') *Transportation- and Construction-Induced Vibration Guidance Manual* (2013), there are no official Caltrans standards for vibration. However, this manual provides guidelines for assessing vibration damage potential to various types of buildings, ranging from 0.08 to 0.12 in/sec PPV for extremely fragile historic buildings, ruins, and ancient monuments to 0.50 to 2.0 in/sec PPV for modern industrial/commercial buildings.

Local

Local noise issues are addressed through implementation of General Plan policies, including noise and land use compatibility guidelines, and through enforcement of noise ordinance standards. A city or county's noise ordinance will typically include regulations that restrict the amount and duration of noise from various noise sources occurring within its jurisdiction as well as prescribe noise limits for different land use types. Noise regulations and standards of the County of Riverside and the City of Perris are considered with respect to evaluating the proposed project's noise impacts on the surrounding environment.

County of Riverside General Plan Noise Element

The California Government Code Section 65302(g) requires that a noise element be included in the General Plan of each county and city in the State. The Noise Element of the County of Riverside General Plan is intended to provide a systematic approach to identifying and appraising noise problems in the community; quantifying existing and projected noise levels; addressing excessive noise exposure; and community planning for the regulation of noise.

The County's primary goal with regard to community noise is to ensure that noise-producing land uses would be compatible with adjacent land uses. To this end, the Noise Element establishes noise/land use compatibility guidelines based on cumulative noise criteria for outdoor noise.

These guidelines are based, in part, on the community noise compatibility guidelines established by the DHS for use in assessing the compatibility of various land use types with a range of noise levels. The County's noise/land use compatibility guidelines are shown in **Table 3.11-4**.

TABLE 3.11-4
COUNTY OF RIVERSIDE LAND USE COMPATIBILITY
FOR COMMUNITY NOISE EXPOSURE LEVEL (CNEL)

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-family, Duplex, Mobile Homes	50–60	55–70	70–75	above 75
Multi-Family Homes	50–65	60–70	70–75	above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	above 80
Transient Lodging – Motels, Hotels	50–65	60–70	70–80	above 80
Auditoriums, Concert Halls, Amphitheaters	---	50–70	above 65	---
Sports Arena, Outdoor Spectator Sports	---	50–75	above 70	---
Playgrounds, Neighborhood Parks	50–70	---	68–75	above 74
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–75	---	70–80	above 80
Office Buildings, Business, Commercial, and Professional	50–70	68–77	---	above 75
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	---	above 75

. All CNEL (or Ldn) measurements are expressed in dBA.
[a] 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.
[b] 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. Outdoor environment will seem noisy.
[c] Normally Unacceptable: New construction or development should generally 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. Outdoor areas must be shielded.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.

SOURCE: County of Riverside, 2013.

The County of Riverside General Plan Noise Element contains various policies to address countywide noise issues. The following are relevant to the proposed project:

Policy N 1.1 Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or blockwalls shall be used.

Policy N 1.5 Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

Policy N 12.1 Minimize the impacts of construction noise on adjacent uses within acceptable practices.

Policy N 12.2 Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.

Policy N 12.4 Require that all construction equipment utilizes noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

County of Riverside Municipal Code

With respect to residential and recreational open space uses, Section 9.52.040 (General Sound Level Standards) of the County of Riverside Municipal Code identifies the following general sound level standards as shown in **Table 3.11-5**. These sound level standards apply to sound emanating from all noise sources.

TABLE 3.11-5
COUNTY OF RIVERSIDE SOUND LEVEL STANDARDS

Land Use	Maximum Decibel Level (dB Lmax)
Community Development Residential	
10:00 p.m. to 7:00 a.m.	45
7:00 a.m. to 10:00 p.m.	55
Open Space Recreation	
10:00 p.m. to 7:00 a.m.	45
7:00 a.m. to 10:00 p.m.	45

SOURCE: County of Riverside Ordinance 847 § 4, 2006

In addition to the Sound Level Standard included in Table 3.11-5, Section 9.52.060 (Special Sound Sources Standards) of the County of Riverside Municipal Code also prohibits the operation of any power tools or equipment between the hours of 10:00 p.m. and 8:00 a.m. such that the power tools or equipment are audible to the human ear inside an inhabited dwelling other than a dwelling in which the power tools or equipment may be located. Furthermore, the operation of any power tools or equipment is prohibited at any other time such that the power tools or equipment are audible to the human ear at a distance greater than 100 feet from the power tools or equipment. However, Section 9.52.070 states that exceptions to the standards set forth in Section 9.52.040 and 9.52.060 of the County of Riverside Municipal Code may be requested for construction-related events, which would be considered by the County's Director of Building and Safety.

City of Perris Municipal Code

According to Section 7.34.050 (General Prohibition) of the City of Perris Municipal Code, it is unlawful for any loud excessive or offensive noises or sounds to be created that would unreasonably disturb the peace and quiet of any residential neighborhood or be physically annoying to persons of ordinary sensitivity. To ensure that Section 7.34.050 would be complied with, the City established the noise standards shown in **Table 3.11-6**. In addition, a noise

violation would also result when a loud excessive or offensive noise level is generated that results in an increase in ambient noise levels of more than 1.0 dBA at the property line.

TABLE 3.11-6
CITY OF PERRIS NOISE LEVEL STANDARDS

Time Period	Maximum Noise Level (dBA)
10:01 p.m. –7:00 a.m.	60
7:01 a.m.–10:00 p.m.	80

SOURCE: City of Perris Ordinance 1082 § 2(part), 2000

Furthermore, Section 7.34.050 states that the characteristics and conditions that should be considered in determining whether a noise violation has occurred should include, but not be limited to, the following:

- The level of the noise
- Whether the nature of the noise is usual or unusual
- Whether the origin of the noise is natural or unnatural
- The level of the ambient noise
- The proximity of the noise to sleeping facilities
- The nature and zoning of the area from which the noise emanates and the area where it is received
- The time of day or night the noise occurs
- The duration of the noise
- Whether the noise is recurrent, intermittent, or constant

With respect to construction noise in the city, Section 7.34.060 stipulates that it would be unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate, alter, or repair any building or structure in such a manner as to create disturbing, excessive, or offensive noise. Additionally, construction activity is prohibited from exceeding 80 dBA in residential zones in the city between the hours of 7:00 a.m. and 7:00 p.m.

3.11.3 Impacts and Mitigation Measures

Significance Criteria

Based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may be deemed to have a significant effect on the environment with respect to noise and/or ground-borne vibration if it would result in:

- 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
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project
- Exposure of people residing or working in the project area to excessive noise levels (for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport)
- Exposure of people residing or working in the project area to excessive noise levels (for a project within the vicinity of a private airstrip)

Noise Criteria

Since the project does not produce any noise activities after the construction, the noise criteria focus on construction noise. The majority of the proposed project is located in an unincorporated portion of western Riverside County and a small portion is located within the city of Perris. As such, for the purpose of determining whether the proposed project would result in the exposure of persons to, or generate, noise levels that would exceed established noise standards, the standards that will be used to determine if the project's construction noise levels would result in a significant impact are those contained in the construction noise regulations of the County of Riverside and City of Perris.

County of Riverside

The land uses within unincorporated Riverside County are considered open space, including conservation habitat and recreational uses. Table 3.11-5 states that the maximum noise level of 45 dB throughout a day is allowed in open spaces. Section 9.52.060 prohibits construction activities between the hours of 10:00 p.m. and 8:00 a.m. However, Section 9.52.070 states that exceptions to the standards set forth in Section 9.52.040 and 9.52.060 of the County of Riverside Municipal Code may be requested for construction-related events, which would be considered by the County's Director of Building and Safety.

City of Perris

The City of Perris regulates construction noise levels under Section 7.34.060 of its municipal code, which establishes permitted hours for construction activities between the hours of 7:00 a.m. and 7:00 p.m. along with a numerical noise standard of 80 dBA that should not be exceeded in residential zones between the hours of 7:00 a.m. and 7:00 p.m.

As such, noise impacts from project construction could result in a significant construction impact if the construction activity occurred outside of the permitted construction hours or if the noise levels generated exceed the construction noise standards established in the applicable municipal code. In addition to a violation of established noise regulations or an exceedance of established

noise standards, the project's construction activities are also assessed to determine whether the noise levels generated would result in a temporary substantial increase in the ambient noise environment. The state CEQA Guidelines does not define the levels at which temporary increases in ambient noise are considered "substantial." Therefore, with regard to temporary construction noise, the significance of the proposed project's noise impacts can be determined by comparing estimated construction-related noise levels to existing non-construction noise levels. Generally speaking, the average healthy ear can barely perceive a noise level change of 3 dBA. A change from 3 to 5 dBA may be noticed by some individuals who are sensitive to changes in noise. A 5 dBA increase is readily noticeable, while the human ear perceives a 10 dBA increase as a doubling of sound. As such, for the purpose of the project's construction noise analysis, it is assumed that a significant impact on nearby off-site sensitive receptors from project construction would occur if the noise levels would cause the ambient noise level measured at the property line of a noise sensitive receptor to increase by 5 dBA.

Vibration Criteria

The County of Riverside and City of Perris do not have local standards regarding construction-related vibration, and there are no binding state or federal standards that would apply to this impact. For this Environmental Impact Report (EIR), DWR relies on the guidelines regarding construction-related vibration impacts on buildings based on the age and/or condition of the structures that are located in proximity to construction activity that have been developed by the FTA. Based on the FTA criteria, construction impacts relative to ground-borne vibration would be considered significant if any of the following were to occur:

- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.5 inch per second at a reinforced concrete, steel, or timber building.
- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.3 inch per second at any engineered concrete and masonry building.
- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.2 inch per second at any non-engineered timber and masonry buildings.
- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.12 inch per second at any buildings "extremely susceptible to vibration damage" (e.g., a historical building).

As a conservative estimate, nearby buildings are assumed to be non-engineered timber and masonry buildings and the 0.2 PPV threshold would be applied to assess potential structural damage. In terms of ground-borne vibration impacts associated with human annoyance, this analysis uses the FTA's vibration impact threshold of 80 VdB for residences under conditions where there are an infrequent number of events per day (FTA, 2006).

Given the nature of the proposed project as an infrastructure development that consists of upgrades to the existing emergency release structure at Perris Dam and installation of a conveyance facility consisting of levees and channels that connect to the Perris Valley Channel, any "excessive" ground-borne vibration or noises that would occur at the project site would be those generated during project construction. During its operation, the proposed project would not

involve the use of heavy machinery or generate heavy-duty truck trips that are often sources of vibration levels. As such, no sources of "excessive" ground-borne vibration or noise levels are anticipated during project operations.

Methodology

The proposed project consists of upgrading the existing emergency release structure at Perris Dam and the installation of a conveyance facility to convey water from the emergency release structure to the Perris Valley Channel. The upgrade of the emergency release structure would involve improvements to the existing valve, valve vault, and control systems to bring the structure to current building and seismic standards, and the conveyance facility components would consist of levees and channels. As none of these project-related facilities would involve the use of stationary mechanical equipment that would generate noise levels during operation, the primary source of noise associated with the proposed project would be the temporary construction activities at the project site. The increase in noise levels generated by the project's construction activities have been quantitatively estimated and evaluated against the applicable noise standards and thresholds of significance.

Aside from noise levels, ground-borne vibration would also be generated during construction of the project facilities at the project site by various construction-related activities and equipment. Thus, the ground-borne vibration levels generated by these sources have also been quantitatively estimated and compared to applicable thresholds of significance.

Construction Noise Levels

Construction noise levels were estimated using the FHWA's Roadway Construction Noise Model (RCNM). For the purpose of conducting a conservative analysis, it is assumed that up to three pieces of construction equipment used at the project site would be operating concurrently in proximity to the nearest off-site sensitive receptors. The estimated construction noise levels resulting from the proposed project at the nearby off-site sensitive receptors were then analyzed against the construction noise standards established in the municipal codes of the County of Riverside and City of Perris to determine whether an exceedance of allowable noise levels would occur across any adjacent property boundaries. Additionally, the estimated construction noise levels at the off-site sensitive receptors were also assessed against the ambient noise measurements measured at the selected off-site sensitive receptor locations shown in Table 3.11-1 to determine the anticipated increase in the noise environment during project construction. Existing noise-sensitive receptors surrounding the project site include residential uses located within the jurisdiction of City of Perris and passive recreation areas located within the jurisdiction of Riverside County.

Ground-borne Vibration Associated with Project Construction and Operation

Ground-borne vibration levels resulting from construction activities at the project site were estimated using data published by the FTA in its *Transit Noise and Vibration Impact Assessment* (2006) document. Potential vibration levels resulting from construction of the project facilities are identified for off-site locations that are sensitive to vibration, including the existing residences, based on their distance from construction activities. Because neither the County of Riverside nor the City of Perris has adopted any thresholds for construction or operational ground-borne

vibration impacts, the potential vibration levels at off-site sensitive locations resulting from implementation of the proposed project are analyzed against the vibration thresholds established by the FTA to determine whether an exceedance of allowable vibration levels would occur.

Impact Analysis

Impact 3.11-1: The project could have 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.

Construction of all proposed project components at each segment (refer to Figure 2-2) would require the use of heavy equipment during the site preparation, grading, excavation, and building activities at the project site. Development activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of development, there would be a different mix of equipment. As such, construction activity noise levels at and near the project site would fluctuate depending on the particular type, number, and duration of use of the various pieces of construction equipment. Construction-related material haul trips would increase noise levels along haul routes depending on the number of haul trips made and types of vehicles used.

Table 3.11-7 shows the anticipated noise levels (L_{max}) produced by some of the various types of construction equipment that would be used at the project site based on a distance of 50 feet between the equipment and the noise receptor. It should be noted that L_{max} noise levels associated with the construction equipment would only be generated when the equipment are operated at full power. Typically, the operating cycle for a piece of construction equipment would involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings. As such, the L_{max} noise levels shown in Table 3.11-7 would occur only occasionally throughout the construction day.

TABLE 3.11-7
MAXIMUM NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level at 50 Feet (dBA, L_{max})
Dump Truck	77
Excavator	81
Crane	81
Air Compressor	78
Backhoe	78
Grader	85
Scraper	84
Front End Loader	79
Dozer	82
Tractor	84
Paver	77
Roller	80
Pumps	81
Rock Blasting	115

SOURCE: Federal Highway Administration, 2006. Except for blasting; rock blasting data provided by the National Park Service.

During construction of the proposed project, the nearest and most notable off-site sensitive receptors would be the residential uses surrounding the project site. As described previously, the closest off-site residences to the proposed Western Segment, Fairgrounds Segment, and the proposed Main Levee would be located approximately 135 feet, 215 feet, and 570 feet away, respectively, across the Ramona Expressway. In addition, the patrons at the Lake Perris Fairgrounds could be approximately 50 feet from project construction. Finally, haul trucks would travel on Lake Perris Drive and would be 115 feet or more from residences to the west on Candelaria Way. Other sensitive receptors in the study area vicinity would be exposed to construction noise at incrementally lower levels. During project construction, these nearby off-site receptors would be exposed to increased exterior noise levels. **Table 3.11-8** shows the estimated construction noise levels that would occur at the nearest off-site sensitive uses during construction at the project site. The estimated noise levels at these off-site sensitive receptors were calculated using the FHWA's RCNM, and were based on the concurrent operation of two graders and a tractor at the nearest construction area within the project site relative to each of the identified nearest off-site receptor areas. As shown in Table 3.11-8, the construction noise levels would range from a high of 86 dBA L_{eq} at the Lake Perris Fairgrounds to a low of 55 dBA L_{eq} at the residential uses located north of the project site and east of Evans Road. Additionally, the haul trucks passing by residential uses on Candelaria Way could also result in noise exposure of 65 dBA L_{eq}.

County of Riverside

Noise-sensitive receptors within the unincorporated areas of the County of Riverside include the Lake Perris Fairgrounds and Lake Perris SRA. Implementation of **Mitigation Measures NOISE-1** through **NOISE-4** would help reduce noise levels within and surrounding the proposed project area through limiting of nighttime work activities, requirement of specific equipment usage, daytime work restrictions, coordination with the Department of Parks and Recreation for proper signage, and proper notification of nighttime work. Nevertheless, due to the nighttime construction and the potential for exceedance of construction noise levels above 45 dB, the impact would be considered significant and unavoidable.

In addition, prior to the project's 3-year construction period, rock materials for the levees would be obtained from the Perris Dam quarry in the Bernasconi Hills north of the dam as a continuation of construction activities associated with the Dam Remediation Project and stockpiled within a staging area below the dam (Figure 2-5). The rock materials would be obtained from blasting at the Perris Dam quarry and these materials would be transported by dump trucks to the staging area below the dam. The nearest recreational area to the rock quarry is about 9,500 feet to the northeast, and the nearest residence is about 5,000 feet to the southwest. The loudest noise levels generated from these activities would be blasting at the rock quarry, which could generate noise levels up to 115 dBA at 50 feet. Periodic noise from blasting could be heard throughout the area up to three to four times a day, potentially for a period of approximately 12 days. The duration of each blast event is expected to last for less than five seconds. The noise levels at the nearest residences are expected to be 75 dBA based on the noise attenuation rate of 6 dBA per doubling the distance. Note that this calculation does not consider terrain, which would block the line-of-sight, and increase atmospheric absorption. Therefore, it is a conservative estimate. Since this noise level would not be constant, ambient noise levels would

not be raised significantly. The noise levels from blasting at the rock quarry would not exceed 80 dBA at the nearest residences in the City. In addition, noise levels associated with blasting at the nearest recreation area are expected to reach about 69 dBA. However, blasting would only occur in the daytime and would not occur outside of the construction hours permitted by the County. Overall, blasting activities at the rock quarry would be under City noise ordinance levels at the nearest residences and would not occur outside of the County's permitted construction hours. Therefore, noise impacts from blasting would be less than significant. In addition, implementation of **Mitigation Measure NOISE-4** would further reduce blasting-related impacts.

City of Perris

Noise-sensitive receptors within the City of Perris include single-family residences. For the city of Perris, construction-related noise levels are regulated under Section 7.34.060 of the city's Municipal Code, which stipulates that it would be unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate, alter, or repair any building or structure in such a manner as to create disturbing, excessive, or offensive noise. Additionally, construction activity is prohibited from exceeding 80 dBA in residential zones in the city between the hours of 7:00 a.m. and 9:00 p.m. Table 3.11-8 shows the construction noise at all receptors within the City of Perris would be less than 80 dBA. In addition, implementation of **Mitigation Measures NOISE-1** through **NOISE-4** would further ensure that noise levels would not exceed established standards. However, due to the potential for nighttime construction, the impact would still be considered significant and unavoidable.

Mitigation Measures

NOISE-1: Nighttime work shall not include blasting.

NOISE-2: In coordination with Department of Parks and Recreation at Lake Perris SRA, construction contractors shall implement the following:

- Signs shall be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number in the event of problems.
- An on-site complaint and enforcement manager shall respond to and track complaints and questions related to noise.

NOISE-3: To reduce noise impacts due to construction, DWR shall require construction contractors to implement the following measures:

- During construction, the contractor shall outfit all equipment, fixed or mobile, with properly operating and maintained exhaust and intake mufflers, consistent with manufacturers' standards.
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the

compressed air exhaust shall be used. External jackets on the tools themselves shall be used where feasible. Quieter procedures, such as use of drills rather than impact tools, shall be used whenever feasible.

- Stationary noise sources that could affect adjacent receptors shall be located as far from adjacent receptors as possible.
- Daytime construction activities would be limited to the times of 7:00 a.m. and 7:00 p.m.
- Residents and park visitors shall be notified in advance of the night work schedule.

NOISE-4: A Blasting Plan for construction shall be prepared and followed that includes the following:

- Primary components of the Blasting Plan shall include:
  - Identification of blast officer;
  - Scaled drawings of blast locations, and neighboring buildings, streets, or other locations which could be inhabited;
  - Blasting notification procedures, lead times, and list of those notified. Public notification to potentially affected vibration and nuisance noise receptors describing the expected extent and duration of the blasting;
  - Description of means for transportation and on-site storage and security of explosives in accordance with local, state and federal regulations;
  - Minimum acceptable weather conditions for blasting and safety provisions for potential stray current (if electric detonation);
  - Traffic control standards and traffic safety measures (if applicable);
  - Required personal protective equipment;
  - Minimum standoff distances and description of blast impact zones and procedures for clearing and controlling access to blast danger;
  - Procedures for handling, setting, wiring, and firing explosives; and procedures for handling misfires per Federal code;
  - Type and quantity of explosives and description of detonation device.
- Sequence and schedule of blasting rounds, including general method of excavation, lift heights, etc.;
  - Methods of matting or covering of blast area to prevent flyrock and excessive air blast pressure;
  - Description of blast vibration and air blast monitoring programs;
  - Dust control measures in compliance with applicable air pollution control regulations (to interface with general construction dust control plan);

  - Emergency Action Plan to provide emergency telephone numbers and directions to medical facilities. Procedures for action in the event of injury;
  - Material Safety Data Sheets for each explosive or other hazardous materials to be used;
  - Evidence of licensing, experience, and qualifications of blasters;
  - Description of insurance for the blasting work.

- A sound attenuation plan shall be prepared outlining sound control measures that would include the use of blasting mats or sound walls.
- If vibration results in damage to any nearby structures or utilities, or scenic rock faces, blasting shall immediately cease. The stability of segmental retaining walls, existing slopes, creek canals, etc. shall be monitored and any evidence of instability due to blasting operations shall result in immediate termination of blasting.
- Explosive materials shall be delivered in specially built vehicles marked with United
- Nations (UN) hazardous materials placards. Explosives and detonators shall be delivered in separate vehicles or be separated in compartments meeting DOT rules within the same vehicle. Vehicles shall have at least two ten-pound Class-A fire extinguishers and all sides of the vehicles display placards displaying the UN Standard hazard code for the onboard explosive materials. Drivers shall have commercial driver licenses (CDL) with Hazmat endorsements, and drivers shall carry bill-of-lading papers detailing the exact quantities and code dates of transported explosives or detonators.
- The contractor must comply with U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) table-of-distance requirements (CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division Part 555) that restrict explosive quantities based on distance from occupied buildings and public roadways. Employees must also comply with the security requirements of the Safe Explosives Act (Title XI, Subtitle C of Public Law 107-296, Interim Final Rule), implemented in March 2003. These requirements require background checks for all persons that use, handle or have access to explosive materials; and responsible persons on a now required federal explosives license must submit photographs and fingerprints with the application to ATF.

Significance Determination: Significant and Unavoidable due to elevated noise levels in County open space and due to nighttime construction.

TABLE 3.11-8
EXTERIOR NOISE AT OFFSITE SENSITIVE USES FROM PROJECT CONSTRUCTION

Off-site Sensitive Land Uses	Location	Approximate Distance to Project Site Construction Area (ft.)[a]	Estimated Construction Noise Levels (dBA L_{eq})	Daytime Applicable Noise Standard (dBA L_{eq})[b]	Exceed Noise Standard?
Single-family residences (City of Perris)	Southwest of project site, across Ramona Expressway.	585	64	80	No
Single-family residences (City of Perris)	West and south of project site, across Ramona Expressway.	570	64	80	No
Single-family residences (City of Perris)	South of project site, across Ramona Expressway, and east of Avalon Parkway.	215	73	80	No
Single-family residences (City of Perris)	South of project site, across Ramona Expressway, and south of Center Street.	720	62	80	No
Single-family residences (City of Perris)	South of project site, across Ramona Expressway, and west of Evans Road.	135	77	80	No
Single-family residences (City of Perris)	North of project site and east of Evans Road.	1,692	55	80	No
Lake Perris Fairgrounds (County of Riverside)	North of and adjacent to the project site.	50	86	45[c]	Yes
Single-family residences (City of Perris)	Southwest of rock quarry, across from Ramona Expressway.	5,000	75	80	No

NOTES: NA = non-applicable

[a] The approximate distances are measured from the sensitive-receptor property line to the nearest construction area at the project site.

[b] The City of Perris has established a noise standard of 80 dBA for construction activities occurring near residential zones between the hours of 7:00 a.m. and 7:00 p.m.

[c] The County of Riverside has established a noise standard of 45 dBA for open spaces.

Impact 3.11-2: The project could have a significant impact if it would expose persons to or generate excessive ground-borne vibration or ground-borne noise levels.

As shown in **Table 3.11-9**, use of a large bulldozer for project construction generates vibration levels of up to 0.089 PPV or 87 VdB at a distance of 25 feet. Loaded trucks could also result in vibration levels of 0.076 PPV and 86 VdB along haul routes.

TABLE 3.11-9
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment Activity	PPV at 25 Feet (inches/second)[a]	RMS at 25 Feet (VdB)[b]
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86

[a] Buildings can be exposed to ground-borne vibration levels of 0.2 PPV without experiencing structural damage.
[b] The human annoyance response level is 80 VdB.

SOURCE: FTA, 2006.

County of Riverside

In regard to off-road equipment, the nearest building structures would be on the Lake Perris Fairgrounds at approximately 50 feet of the Fairgrounds segment of the proposed project. The nearest structures could be exposed to 0.03 PPV, which is less than impact threshold of 0.2 PPV. Note that the nearest building in the Lake Perris Fairgrounds is considered commercial use, not residential or vibration sensitive. Therefore, it is not a subject to human annoyance assessment.

In addition, as discussed previously, rock materials for the levees would be obtained from the Perris Dam quarry in the Bernasconi Hills north of the dam as a continuation of construction activities associated with the Dam Remediation Project and stockpiled within a staging area below the dam prior to the project's 3-year construction period. Although the blasting activities would generate vibration levels, the nearest off-site sensitive structures would be the single-family residential uses located approximately 5,000 feet to the southwest. At this distance, the vibration level would be 0.018 in/sec PPV and 73 VdB, based on the reference vibration level of 0.05 in/sec at 2,500 feet provided by DWR. Thus, the thresholds of significance for both structural damage (0.2 PPV) and human annoyance (80 VdB) would not be exceeded. Furthermore, a Blasting Plan would be implemented that requires a vibration monitoring program to further attenuate vibration levels on the surrounding area in the vicinity of the quarry as described in **Mitigation Measure NOISE-4**. The Blasting Plan would include provisions for ceasing blasting activities that may affect stability of the surrounding cliffs, including the rock climbing areas. Overall, vibration impacts would be less than significant.

City of Perris

The nearest residential structure from the construction site would be as close as 150 feet at the corner of Ramona Expressway and Akina Avenue. The vibration level was estimated to be 0.006

PPV and 64 VdB from large bulldozer operation. Haul trucks would travel on Lake Perris Drive and would be 115 feet or more from residences to the west. These residential receptors could be exposed to 0.008 PPV and 66 VdB. Other residential and recreational receptors would be located at a greater distance from equipment and trucks and would be exposed to less vibration.

Thus, off-road equipment and on-road haul trucks associated with the proposed project construction would result in ground-borne vibration levels that would not exceed the applied structural damage (0.2 PPV) or human annoyance response (80 VdB) thresholds. This impact would be less than significant.

Mitigation Measures

Implement **Mitigation Measure NOISE-4.**

Significance Determination: Less than Significant with Mitigation.

Impact 3.11-3: The project could have a significant impact if it would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

The proposed project would temporarily generate noise and vibrations during construction. After construction, the completed flood-protection features would be passive structures that would not generate noise or vibration except under extraordinary circumstances, if and when used for their intended emergency release purpose. However, the noise and vibration resulting from water flowing in the emergency release channel would be less than the noise and vibration resulting from a catastrophic dam failure, which is what the emergency release facility is intended to prevent. Either event would be extremely unlikely to occur, so the impact would be less than significant.

Operation and maintenance of the structures, once complete, would likewise involve no new noise or vibrations. Most such impacts would be the result of employee travel to and from those structures for routine maintenance and inspections. Such trips already occur for the existing emergency release structures. The proposed project would not result in the addition of trips beyond those already carried out, and the impact would be less than significant.

Significance Determination: Less than Significant.

Impact 3.11-4: The project could have a significant impact if it would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

As discussed under Impact 3.11-1, project construction would increase noise levels at the nearby off-site receptors. **Table 3.11-10** summarizes the increase in ambient daytime noise levels at the off-site sensitive receptor locations as a result of project construction.

TABLE 3.11-10
AMBIENT NOISE LEVEL INCREASES AT OFF-SITE SENSITIVE USES

Off-site Sensitive Land Uses	Location	Existing Monitored Ambient Noise Levels (dBA L_{eq})	Estimated Construction Noise Levels (dBA L_{eq})	Composite Noise Level at Off-site Receptors[a]	Noise Level Difference
Single-family residences	Southwest of project site, across Ramona Expressway.	64	64	67	3
Single-family residences	West and south of project site, across Ramona Expressway.	60	64	65	5
Single-family residences	South of project site, across Ramona Expressway, and east of Avalon Parkway.	61	73	73	12
Single-family residences	South of project site, across Ramona Expressway, and south of Center Street.	56	62	63	7
Single-family residences	South of project site, across Ramona Expressway, and west of Evans Road.	69	77	78	9
Single-family residences	North of project site and east of Evans Road.	50	55	56	6
Lake Perris Fairgrounds	North of and adjacent to the project site.	61[b]	86	86	25
Single-family residences	Southwest of rock quarry, across from Ramona Expressway.	64	75	75	11

a The composite noise level represents the combined noise level from the project's construction activities with the existing ambient noise levels at the off-site receptor locations.

b An existing ambient noise measurement was not initially conducted at the Lake Perris Fairgrounds during the noise survey conducted on August 20, 2013 as both the County of Riverside and City of Perris noise regulations pertaining to construction activities are primarily concerned with residential uses. However, for the purpose of conducting a conservative analysis for the project, the Lake Perris Fairgrounds are also considered to be a noise-sensitive use. For this assessment, the noise level measured at the nearest location to the Lake Perris Fairgrounds, which is the measurement conducted at the single-family residences located south of the project site and east of Avalon Parkway (refer to Noise Measurement Location 3 on Figure 3.11-2), was used to represent the existing ambient noise levels at this receptor location.

As shown in Table 3.11-10, with the exception of the single-family residences that are located southwest of the project site, across Ramona Expressway, the ambient exterior noise levels at all of the remaining identified off-site sensitive receptor locations would experience an increase in noise levels exceeding 5 dBA during construction of the proposed project. The highest increase in ambient daytime noise levels would be approximately 25 dBA, which would occur at the Lake Perris Fairgrounds. At these locations, construction noise associated with the proposed project would be substantially greater than existing noise levels. Implementation of **Mitigation Measures NOISE-1 and NOISE-3** would help reduce noise impacts associated with increases in ambient noise levels. Nevertheless, because construction activities associated with the proposed project would generate a substantial temporary or periodic increase in ambient noise levels in the project vicinity, these construction noise impacts would be significant.

Implementation of **Mitigation Measure NOISE-2** would ensure that signs are posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number to call in the event of problems. DWR would notify the Lake Perris Fairgrounds and Lake Perris SRA of the construction schedule and coordinate the construction activities to minimize the impacts to active recreational uses and activities.

The proposed project would nonetheless result in temporary significant and unavoidable impacts at the nearest residential and recreational receptors during the duration of the construction activities. As such, even with incorporation of mitigation measures, the temporary noise impacts from project construction would remain significant and unavoidable.

Mitigation Measures

Implement **Mitigation Measures NOISE-1** through **NOISE-3.**

Significance Determination: Significant and Unavoidable.

Impact 3.11-5: 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, the project could have a significant impact if it would expose people residing or working in the project area to excessive noise levels.

The project site is located approximately 2 miles from the March Air Reserve Base. According to March Air Reserve Base / Inland Port Airport Land Use Compatibility Plan, the project site is located within Airport Land Use Compatibility Zone E. However, the proposed project is an infrastructure project and would not introduce land uses that would be sensitive to aircraft noise, such as people residing or working in the project area. Therefore, no impacts are anticipated

Significance Determination: No Impact.

Impact 3.11-6: For a project within the vicinity of a private airstrip, the project could have a significant impact if it would expose people residing or working in the project area to excessive noise levels.

The nearest privately owned airport to the project site is Perris Valley Airport, located at 2091 Goetz Road, which is approximately 6.8 miles southwest of the project site. Perris Valley Airport is located on private property, but is open to the public. This airport is used for skydiving and ballooning activities and the project site is located outside the Airport Influence Area for the Perris Valley Airport. Given its distance from the project site and given that the proposed project would not introduce land uses that would be sensitive to aircraft noise, the project would not expose people residing or working in the project area to excessive noise levels from this airstrip. Therefore, no impacts are anticipated.

Significance Determination: No Impact.

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