This section was prepared by RMC Water and Environment.

3B.11 NOISE – WATER

3B.11.1 AFFECTED ENVIRONMENT

This section provides a description of the existing ambient noise environment for the "Water" Study Area. In the context of the actions proposed as part of the Off-site Water Facility Alternatives, emphasis is placed on portions of the "Water" Study Area where physical environmental changes would occur. As provided in Chapter 2, "Alternatives," physical improvements associated with the Off-site Water Facility Alternatives are limited to areas within Zone 4; whereas no physical improvements are proposed within Zones 1, 2, or 3. For this reason, the, "Noise" analysis for the "Water" project is focused primarily on Zone 4.

NOISE EXPOSURE AND COMMUNITY NOISE

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 and atmospheric conditions. Community noise is constantly changing throughout the day due to short duration single-event noise sources, such as aircraft flyovers, vehicle passbys, or sirens. These successive additions of sound to the community noise environment vary the community noise level from instant to instant. This requires 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 (Caltrans 1998):

- **L_{eq}:** the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

- **L_{max}:** the instantaneous maximum noise level for a specified period of time.

- **L_{dn}:** 24-hour day and night A-weighed noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dB to take into account the greater annoyance of nighttime noises.

EFFECTS OF NOISE ON PEOPLE

The effects of noise on people can be placed in three categories:

1. subjective effects of annoyance, nuisance, dissatisfaction;
2. interference with activities such as speech, sleep, learning; and
3. physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial settings can experience noise in the last category. A satisfactory method for measuring the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction does not exist. However, a wide variation in individual thresholds of annoyance does exist, 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., the "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans 1998):

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3 dBA change is considered a perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

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, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dB, the combined sound level would be 53 dB, not 100 dB. Because of this sound characteristic, if two noise emission sources, one producing a noise level greater than 9 dB than the other, the contribution of the quieter noise source is negligible and the sum of the noise sources is that of the louder noise source.

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).

EXISTING CONDITIONS

Existing Noise Environment

Emphasis for the description of the affected environment is placed on locations within Zone 4 of the "Water" Study Area where physical improvements would be constructed and operated as part of the Off-site Water Facility Alternatives. Results from a countywide community noise survey indicate that typical noise levels in noise-sensitive areas of the county are in the range of 50 to 60 dBA L_{dn}. The existing noise environment within Zone 4 of the "Water" Study Area is primarily influenced by the noise produced from the following sources:

- vehicle traffic along major roadways including Sunrise Boulevard, Douglas Road, Florin Road, and SR 16, Folsom Boulevard, Grant Line Road, and U.S. Highway 50 (U.S. 50);
- Regional Transit Light Rail (located along the Folsom Boulevard/U.S. 50 corridor);
- Mather Airport (formerly Mather Air Force Base);

- Operations at Aerojet, south of U.S. 50 between Hazel Avenue and Prairie City Road, include testing of rocket and high-performance aircraft engines for use in military and aerospace applications. However, GenCorp Realty Investments, Aerojet's parent company, is currently in the process of phasing out the testing of the large-diameter rocket and aircraft engines at this facility, although testing of smaller engines is expected to continue (Sacramento County 2008);

- Cordova Shooting Center, located on Douglas Road west of Sunrise Boulevard, includes weapons firing with noise levels ranging from approximately 97 to 112 dBA per round at approximately 50 feet. Based on these noise levels, predicted maximum noise levels of 70 dBA could occur at a distance of 1/2-half to 1 mile from this facility, depending on local shielding and atmospheric conditions (County of Sacramento 1993);

- Kiefer Landfill (located at 12701 Kiefer Boulevard, surrounded by undeveloped rolling terrain);

- Sacramento Raceway (located on Excelsior Road north of Jackson Highway/SR 16);

- Aggregate mining operations along White Rock, Grant Line, and Scott Roads; and

- Off-Highway Vehicle (OHV) Use at the Prairie City State OHV area.

In addition to the sources identified above, the Sunrise Boulevard corridor includes a variety of industrial operations ranging from heavy-equipment repair facilities, equipment and material storage yards, loading-dock operations, concrete batch plants, and various manufacturing operations. Industrial land uses are also located in the Security Park area, north of Douglas Road. Hours of operation for these land uses vary, but are generally limited to daytime hours. Noise levels associated with industrial land uses can vary greatly depending on the activities conducted. Activities involving the use of heavy-duty equipment such as front-end loaders, forklifts, and diesel-powered trucks are common noise sources typically associated with these land uses. Noise typically associated with industrial operations, including the use of heavy-duty equipment, can reach maximum levels of approximately 85 dBA at 50 feet (Caltrans 2004).

Sensitive Receptors

Although noise pollution can affect all segments of the population, certain groups and land uses are considered more sensitive to ambient noise levels than others, sensitivity being a function of noise exposure (in term of both exposure duration and insulation from noise) and the types of activities involved. Children, the elderly, and the chronically or acutely ill are the most sensitive population groups.

Some land uses are considered more sensitive to changes in ambient noise levels than others, sensitivity being a function of noise exposure (in term of both exposure duration and insulation from noise) and the types of activities involved. Residential land uses are generally more sensitive to noise than commercial and industrial land uses. Sensitive receptors in the vicinity of the conveyance alignment alternatives include residences located on or adjacent to the roadway where construction would occur. The White Rock Water Treatment Plant (WTP) site is located within an undeveloped area within no residences located within a 1/2 mile of the site. However, multifamily high-density residential uses area planned within the SPA approximately 300 to 400 feet to the north of the White Rock WTP site.

Similarly, no sensitive land uses are currently located within 1/2 mile of the Folsom Boulevard WTP. However, medium- and high-density residential uses are proposed adjacent and to the west of the Folsom Boulevard WTP based on the current land use diagram for planned City of Rancho Cordova's Westborough Specific Plan.

GROUNDBORNE VIBRATION

Groundborne vibration consists of rapidly fluctuating motions or waves, which are also measured in decibels. Construction activities, train operations, and street traffic are some of the most common external sources of

vibration that can be perceptible inside structures. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. High frequency vibrations reduce much more rapidly than low frequencies, so that low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances.

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does frequency. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases. While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings may be perceived as motion of building surfaces or rattling of windows, items on shelves, and pictures hanging on walls. Vibration of building components can also take the form of an audible low-frequency rumbling noise, which is referred to as groundborne noise.

Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when the structure and the source of vibration are connected by foundations or utilities, such as sewer and water pipes. To assess a project's vibration impacts, Caltrans has prepared a publication concerning vibration impact assessment, entitled the "Transportation and Construction-Induced Vibration Guidance Manual," which was prepared in 2004. The guidance manual uses peak particle velocity (PPV) to quantify vibration amplitude. Peak particle velocity is defined as the maximum instantaneous peak of the vibratory motion.

Table 3B.11-1 identifies acceptable vibration limits for transportation and construction projects based on guidelines prepared by Caltrans.

Table 3B.11-1
Typical Groundborne Vibration Thresholds

Structure and Condition	Transient Sources PPV at 25 feet (in/sec)	Continuous/Frequent Intermittent Sources PPV at 25 feet (in/sec)
Extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
New residential structures with gypsum board walls/ceilings	1.00	0.50
Modern Industrial/commercial buildings	2.00	0.50
Strongly perceptible	0.90	0.10

PPV = Peak particle velocity
Source: Caltrans 2004

3B.11.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck passby noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. In addition to noise standards for individual vehicles, under regulations established by the U.S. Department of Transportation's Federal Highway Administration, noise abatement must be considered for certain federal or federally-funded projects. Abatement is an issue for new highways or significant modification of an existing

freeway. The agency must determine if the project would create a substantial increase in noise or if the predicted noise levels approach or exceed the Noise Abatement Criteria.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The state establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state passby standard is consistent with the federal limit of 80 dB. The State passby standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dB at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by state and local laws enforced against vehicle operators. For new roadway projects, Caltrans employs the Noise Abatement Criteria, discussed above in connection with the Federal Highway Administration.

The state has also established noise insulation standards for new multi-family 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 (California Code of Regulations, Title 24). The noise insulation standards set forth an interior standard of DNL 45 dB for any habitable room. They also 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 DNL 60 dB. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Sacramento County General Plan, Noise Element and Noise Control Ordinance

The Noise Element of the County General Plan identifies compatible noise environments for different types of land uses in the City. Table 3B.11-2 contains exterior noise standards for residential areas. These guidelines were used in evaluating the noise effects of the Off-site Water Facilities. Table 3B.11-3 provides the noise standards contained in the County's Noise Ordinance Standards. The County's noise ordinance is based on the application of a cumulative duration of an intrusive sound, whereby the longer the duration, the lower the standard.

The Noise Control Ordinance sets limits for exterior noise levels on designated agricultural and residential property. The standards found in the Noise Control Ordinance are based on the duration of noise on private property over one-hour periods. The ordinance is primarily concerned with regulating noise other than noise generated by transportation noise sources such as passing cars or aircraft flyovers. The ordinance limits the duration of sound based on many factors, including the type of source, tonal characteristics of the source, ambient noise levels, and time of day by using a system of noise criteria not to be exceeded based on the duration of noise over any given hour. Table 4.4-5 of the ordinance summarizes the exterior noise standards that would apply to the project.

Table 3B.11-2
Sacramento County Noise Level Standards for Residential Areas

Statistical Noise Level Descriptor	Exterior Noise Level Standard	
	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
L_{50}	50 dB	45 dB
L_{max}	70 dB	65 dB

Notes: L_{max} = the instantaneous maximum noise level for a specified period of time; db = decibels
These standards are for planning purposes and may vary from standards of the County Noise Ordinance, which are established for enforcement purposes.
These standards apply to new or existing residential areas affected by new or existing non-transportation sources.
Source: Sacramento County 1993

Table 3B.11-3 Sacramento County Noise Ordinance Standards			
Cumulative Duration of the Intrusive Sound	Noise Level Descriptor	Exterior Noise Standard (dB)	
		Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
30-60 minutes per hour	L_{50}	55	50
15-30 minutes per hour	L_{25}	60	55
5-15 minutes per hour	L_{05}	65	60
1-5 minutes per hour	L_{02}	70	65
Level not to be exceeded at any time	L_{max}	75	70
Source: Sacramento County 1993			

In addition to the above standards, an off-site activity may not create interfering or disturbing noise levels at any school, hospital, or church that exceed the exterior noise level standards or that are 10 dBA above ambient noise levels.

Under Section 6.68.090, the following activities are exempt from the quantitative limits of the Noise Control Ordinance described above:

- School activities, including bands, athletic and entertainment events.
- Outdoor gatherings, public dances, shows and sporting events. These activities may require a license or permit.
- Activities on parks, public playgrounds, and school grounds owned and operated by public entity or private school.
- Emergency activities and equipment.
- Agricultural activities between 6 a.m. and 8 p.m. or whenever using equipment to protect crops.
- Construction, demolition or similar activity, provided they occur between 6 a.m. and 8 p.m. Monday through Friday, and 7 a.m. and 8 p.m. on weekends.
- Residential property maintenance, provided it occurs between 6 a.m. and 8 p.m. Monday through Friday, and 7 a.m. and 8 p.m. on weekends.
- United States airports, aircraft, and armed service facilities.
- Noise and land use regulations related to airports.

Rancho Cordova General Plan and Noise Ordinance

The City of Rancho Cordova's General Plan was adopted in June 2006 and outlines goals and policies that set performance standards for stationary noise sources and maximum allowable noise exposure from transportation noise sources. Applicable noise standards as specified in the Noise Element of the City of Rancho Cordova's General Plan, are included below as Table 3B.11-4.

Table 3B.11-4
City of Rancho Cordova Noise Level Standards

Stationary Noise Source	Noise Level Descriptor	Exterior Noise Standard (dB)	
		Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Typical	Hourly L_{eq}, dB	55	45
Tonal, impulsive, repetitive, or consist primarily of speech or music	Hourly L_{eq}, dB	50	40

Notes:
The City may impose noise level standards which are more or less restrictive than those specified above based upon determination of existing low or high ambient noise levels.
Source: Rancho Cordova General Plan, 2006

According to Rancho Cordova's Noise Ordinance, activities generally considered to be exempt from the noise standards include construction activities (provided that they occur between the daytime hours of 7 a.m.–6 p.m., Monday through Saturday, and 9 a.m.–6 p.m. on Sunday), school athletic and entertainment events, activities conducted on public parks and playgrounds, and transportation noise.

3B.11.3 Environmental Consequences and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. For the purposes of this analysis, noise impacts as a result of the Off-site Water Facilities would be considered significant 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;
- expose of persons to or generate of excessive groundborne vibration or groundborne noise levels;
- create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
- for a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Analysis Methodology

This section provides a programmatic impact analysis of potential noise and vibration impacts as they relate to construction and operation of the Off-site Water Facility Alternatives. The significance of Off-site Water

Facilities-related noise impacts was determined by comparing estimated Off-site Water Facilities-related noise levels, based on published literature, to existing noise levels within Zone 4 of the "Water" Study Area as described in other recently-prepared environmental documents for other projects within Zone 4 including:

- White Rock Road Widening Project, Phases A, B, and C, EIR;
- Freeport Regional Water Project EIR/EIS;
- Easton Project EIR for the Easton Valley Parkway; and
- Rio del Oro Specific Plan EIR/EIS.

For the purposes of analysis, an increase of at least 3 dBA is usually required before most people will perceive a change in noise levels, and an increase of 5 dBA is required before the change will be clearly noticeable. A common practice has been to assume that minimally perceptible to clearly noticeable increases of 3 to 5 dBA represents a significant increase in ambient noise levels. A sliding scale is commonly used to identify the significance of noise increases, allowing greater increases at lower absolute sound levels than at higher sound levels. This approach is based on research that relates changes in noise to the percentage of individuals that would be highly annoyed by the change in ambient noise levels. Based on this approach, noise impacts are "generally significant" if the Off-site Water Facility Alternative would cause noise standards or ordinances to be exceeded, or increases in the community noise levels of greater than 5 dBA in built-up areas, or increases by 10 dBA or more in rural areas.

To ensure that potentially noise sensitive land uses that are not constructed and, hence, acknowledged under the 2008 baseline, this analysis also consider planned land uses that have received approval, but are not yet construction.

ISSUES NOT DISCUSSED FURTHER IN THIS EIR/EIS

Airport Noise—The project would not involve the construction of sensitive land uses within two miles of a public or private airport and, therefore, would not expose people to excessive airport noise levels. Thus, this issue is not discussed further in this EIR/EIS.

IMPACT ANALYSIS

Impacts that would occur under each of the Off-site Water Facility Alternatives are identified as follows:

NCP (No USACE Permit Alternative)

PA (Proposed Off-site Water Facility Alternative)

1 (Off-site Water Facility Alternative 1 – Raw Water Conveyance – Gerber/Grant Line Road Alignment and White Rock WTP)

1A (Off-site Water Facility Alternative 1A Raw Water Conveyance – Gerber/Grant Line Road Alignment Variation and White Rock WTP)

2 (Off-site Water Facility Alternative 2 Treated Water Conveyance – Douglas Road Alignment and Vineyard SWTP)

2A (Off-site Water Facility Alternative 2A Treated Water Conveyance – Excelsior Road Alignment Variation and Vineyard SWTP)

2B (Off-site Water Facility Alternative 2B Treated Water Conveyance – North Douglas Tanks Variation and Vineyard SWTP)

3 (Off-site Water Facility Alternative 3 Raw Water Conveyance – Excelsior Road Alignment and White Rock WTP)

3A (Off-site Water Facility Alternative 3A Raw Water Conveyance – Excelsior Road Alignment Variation and White Rock WTP)

4 (Off-site Water Facility Alternative 4 Raw Water Conveyance – Easton Valley Parkway Alignment and Folsom Boulevard WTP)

4A (Off-site Water Facility Alternative 4A Raw Water Conveyance – Easton Valley Parkway Alignment Variation and Folsom Boulevard WTP).

The impacts for each alternative are compared relative to the PA at the end of each impact conclusion (i.e., similar, greater, lesser).

IMPACT 3B.11-1 **Temporary, Short-Term Exposure of Sensitive Receptors to Increased Equipment Noise from Project Construction.** *The Off-site Water Facility Alternatives could expose persons to or generate noise levels in excess of applicable City and County standards.*

NCP, PA, 1, 1A, and 4

Construction of the Off-site Water Facilities under these alternatives would occur in rural and industrial portions of the eastern Sacramento County. Over the entire length of these conveyance alternatives, there are approximately 25 rural residences that would be located within 50 to 100 feet of Off-site Water Facilities construction. Construction activities would generally involve excavation, concrete removal, earth movement, stockpiling, trenching activities, and truck hauling. These construction activities would generate temporary and intermittent noise at and near the conveyance pipeline alignment during the 36-month construction schedule. Noise levels would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. In addition, construction-related material haul trips would raise ambient noise levels along haul routes depending on the number of haul trips and the types of vehicles used. These activities would be more pronounced at the booster pump station facility where construction activities would occur for an extended duration of time. Table 3B.11-5 shows typical noise levels produced by various types of construction equipment at a distance of 50 feet.

Table 3B.11-5
Typical Noise Levels for Construction Equipment

Equipment	Typical Noise Levels (dBA, at 50 feet)	Equipment	Typical Noise Levels (dBA, at 50 feet)
Front loaders	85	Forklifts	76-82
Backhoes, excavators	80-85	Pumps	76
Tractors, dozers	83-89	Generators	81
Graders, scrapers	85-89	Compressors	83
Trucks	88	Pneumatic tools	85
Concrete pumps, mixers	82-85	Jack hammers, rock drills	98
Cranes (movable)	83	Pavers	89
Cranes (derrick)	88	Compactors	82
Pipelayers	83-88	Drill rigs	70-85

Source: Adapted from U.S. Environmental Protection Agency, Noise from Construction Equipment and Operations, 1972 and U.S. Department of Transportation, Federal Transit Administration, Noise and Vibration Impact Assessment Guideline, April 1995.

In addition to actual pipe installation, staging areas would be located at various points along the construction route. These areas would be used to store pipe, equipment, and other construction related material. In some cases, staging areas would be used for the duration of the Off-site Water Facilities construction. In other cases, the area

would be moved along the route to minimize the hauling distances and avoid disrupting any one area for an extended period of time. Potential staging areas include vacant private and public land and parking lots are identified in Exhibits 2-26, 2-28, 2-29, and 2-30. These staging areas could be considerable sources of noise, particularly if equipment is accessed and moved during nighttime hours when individuals are sensitive to intrusive noise.

Based on the noise levels provided in Table 3B.11-5 and in assuming a conservative attenuation rate of 4.5 dBA per doubling distance, noises levels generated during construction could range from 75.5 to over 80 dBA at the nearest sensitive receptor locations depending on the types of equipment in operation. Additionally, back-up beepers associated with trucks and equipment used for material loading and unloading at the staging area would generate significantly increased noise levels over the ambient noise environment in order to be discernable and protect construction worker safety as required by the U.S. Occupational Safety and Health Administration (OSHA) (29 CFR 1926.601 and 29 CFR 1926.602).

Because existing daytime noise levels in the vicinity of the conveyance pipeline alignment are assumed to range from 50 to 60 dBA, daytime construction work associated with the Off-site Water Facilities would significantly affect the noise environment of residences in close proximity to construction activities by increasing ambient noise levels by five dBA or more. While construction activities would occur when a majority of people are at work, retired persons, people who work at home, and people caring for their children in their homes could be significantly affected temporarily by noise when construction activities are occurring in the immediate vicinity. This **direct** temporary and short-term impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

In contrast, the nearest existing sensitive receptors to the on-site, White Rock, and Folsom Boulevard WTP site(s) are located over 1/2 mile or more away from any sensitive receptors. Further, the White Rock WTP site location under Off-site Water Facility Alternatives 1 and 1A is bordered by other noise intensive uses including aggregate mining and OHV use. Similarly, Folsom Boulevard WTP site is situated adjacent to existing industrial uses. For these reasons, temporary and short-term construction noise at the WTP site(s) would not exceed noise standards established in the County General Plan or noise control ordinance and a **less-than-significant**, **direct** temporary and short-term impact would result. **No indirect** impacts would occur. ***[Similar]***

The exposure of individual sensitive receptors to elevated noise levels would be contingent on the types of equipment in use and the duration of use. For example, while construction of the Off-site Water Facilities would occur on a 36-month construction schedule, pipeline construction would progress at rate of approximately 50 to 100 feet a day and, therefore, no one particular receptor along the selected alignment would be subjected to elevated noise for more than a couple of days. Construction activities associated with the Off-site Water Facilities would therefore be temporary in nature and related noise impacts would be short-term. However, since pipeline construction activities could substantially increase ambient noise levels at noise-sensitive locations, with potential intermittent noise levels exceeding 80 dBA, construction noise would result in **potentially significant**, temporary, **direct** impacts to sensitive receptors. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure 3B.11-1a: Limit Construction Hours.

Construction activities shall be limited to daylight hours between 7 a.m. and 7 p.m. Monday through Friday, and 9 a.m. and 5 p.m. on Saturday. No construction shall be allowed on Sundays or holidays.

Implementation: City of Folsom Utilities Department

Timing: During construction of all Off-site Water Facility components

Enforcement:
1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department.

2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.

3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.

Mitigation Measure 3B.11-1b: Minimize Noise from Construction Equipment and Staging.

Construction equipment noise shall be minimized during project construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications) and by shrouding or shielding impact tools, where used. The City's construction specifications shall also require that the contractor select staging areas as far as feasibly possible from sensitive receptors.

Implementation: City of Folsom Utilities Department

Timing: During construction of all Off-site Water Facility components

Enforcement:

1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department.

2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.

3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.

Mitigation Measure 3B.11-1c: Maximize the Use of Noise Barriers.

Construction contractors shall locate fixed construction equipment (such as compressors and generators) and construction staging areas as far as possible from nearby residences. If feasible, noise barriers shall be used at the construction site and staging area. Temporary walls, stockpiles of excavated materials, or moveable sound barrier curtains would be appropriate in instances where construction noise would exceed 90 dBA and occur within less than 50 feet from a sensitive receptor. The final selection of noise barriers will be subject to the City's approval and shall provide a minimum 10 dBA reduction in construction noise levels.

Implementation: City of Folsom Utilities Department

Timing: During construction of all Off-site Water Facility components

Enforcement:

1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department.

2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.

3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.

Mitigation Measure 3B.11-1d: Prohibit Non-Essential Noise Sources During Construction.

No amplified sources (e.g., stereo "boom boxes") shall be used in the vicinity of residences during project construction.

Implementation: City of Folsom Utilities Department

Timing: During construction of all Off-site Water Facility components

Enforcement:

1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department.

2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.

3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.

Mitigation Measure 3B.11-1e: Monitor Construction Noise and Provide a Mechanism for Filing Noise Complaints.

An on-site complaint and enforcement manager shall track and respond to noise complaints. The City shall also provide a mechanism for residents, businesses, and agencies to register complaints with the City if construction noise levels are overly intrusive or construction occurs outside the required hours.

Implementation: City of Folsom Utilities Department

Timing: During construction of all Off-site Water Facility components

Enforcement:

1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department.

2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.

3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.

2, 2B, and 3

Under Off-site Water Facility Alternatives 2, 2B, and 3, impacts described for pipeline construction would be similar to those described for Off-site Water Facility Alternatives 1 and 1A. The main difference with these alternatives is the number of sensitive receptors affected by Off-site Water Facilities construction. As a result of new residential development along and south of Douglas Road and west of Ivan Way, pipeline construction under these alternatives would temporarily impact a higher number of sensitive receptors; estimated at over 100. This temporary, short-term **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3B.11-1a, 3B.11-1b, 3B.11-1c, 3B.11-1d, and 3B.11-1e.

2A, 3A, and 4A

Under Off-site Water Facility Alternatives 2A, 3A, and 4A, impacts described for pipeline construction would be similar to those described for Off-site Water Facility Alternatives 1, 1A, and 4. The main difference with these alternatives is the number of sensitive receptors affected by Off-site Water Facilities construction. As a result of new residential development along and south of Douglas Road and existing residential development along Mather Boulevard, pipeline construction under these alternatives would temporarily impact a higher number of sensitive receptors; estimated at over 200. This temporary and short-term **direct** impact is considered **potentially significant**. **No indirect** impacts would occur. ***[Similar]***

Mitigation Measure: Implement Mitigation Measures 3B.11-1a, 3B.11-1b, 3B.11-1c, 3B.11-1d, and 3B.11-1e.

Although implementation of the above mitigation measures would generally reduce construction noise, construction-related noise levels could occasionally exceed the Sacramento County and City of Rancho Cordova standards regarding construction noise. Although there are smaller number of receptors potentially affected under Off-site Water Facility Alternatives 1, 1A, 4, and 4A, the implementation of the prescribed mitigation would not reduce construction-related noise impacts to less than significant level at these locations. In addition, construction activities at the pump station facility may occur over a more extended period of time, up to several months, and could contribute to noises levels in excess of 80 dBA. These impacts could remain **significant and unavoidable**, because there is no feasible mitigation to fully reduce temporary, short-term construction-related impacts to a less-than-significant level. Based on the larger number of receptors affected along the conveyance alignments, construction-related noise impacts under Off-site Water Facility Alternatives 2, 2A, 2B, 3, and 3A could also remain significant and unavoidable to these residential centers, because there is no feasible mitigation to fully reduce temporary, short-term construction-related impacts to a **less-than-significant** level.

IMPACT 3B.11-2 Exposure to and/or Generation of Groundborne Vibration. *The Off-site Water Facilities could expose persons to or generate excessive groundborne vibration or groundborne noise levels.*

NCP, PA, 1, 1A, 2, 2A, 2B, 3, 3A, 4, and 4A

There are two groundborne vibration impacts of general concern: annoyance to humans and damage to buildings. For other locations, it is anticipated that installation of distribution pipelines would require a backhoe or similar forms of other trenching equipment. Vibration from typical construction activity is typically below the threshold of perception when the activity is more than about 50 feet from the receiver. Construction activities are not expected to encroach within 50 feet of existing structures and, therefore, the level of **direct** and **indirect** vibration impact at these receptors would be **less than significant**. ***[Similar]***

In relation to the potential for structural damage at adjacent residential and commercial structures, peak particle velocity (PPV) is the maximum instantaneous positive or negative peak of the vibration signal, measured as a distance per time (such as millimeters or inches per second). The PPV measurement has been used historically to evaluate shock-wave type vibrations from actions like blasting, pile driving, and mining activities, and their relationship to building damage.

As provided in Table 3B.11-1, the level of potential impact resulting project construction is generally contingent on the structural composition of the buildings potentially affected. As shown in Table 3B.11-1, new residential structures with gypsum board walls/ceilings have a PPV threshold of 1.0 in/sec respectively and would be the types of structures most likely to be impacted by project construction activities. However, given that construction activities would employ the use of equipment similar to those identified in Table 3B.11-6, would not involve the use of pile driving, and would be situated 50 feet or more from existing structures , project construction is

unlikely to generate vibration levels in excess of the thresholds identified in Table 3B.11-6. Based on these considerations, the Proposed Project Alternative would result in **less than significant, direct** and **indirect** impacts from groundborne vibration during construction. ***[Similar]***

Table 3B.11-6
Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)	Equipment	PPV at 25 feet (in/sec)
Vibratory roller	0.210		
Large bulldozer	0.089		
Caisson drilling	0.089		
Loaded trucks	0.076		
Jackhammer	0.035		
Small bulldozer	0.003		

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006

Limited areas along the conveyance alignment, east of Grant Line Road, and the WTP site may require the use of explosives to break through the underlying bedrock and allow for the installation of pipeline or foundation materials. Blasting can generate an instantaneous PPV of greater than 0.2 in/sec and can contribute to damage of existing structures. However, in the event that explosives are required, the amount of explosives used would be minimal and in short durations. Further, given that no existing structures are currently located in close proximity to these portions of Zone 4 of the Off-site Water Facilities Study Area, these activities, if required, are not expected to produce ground shockwaves that could damage nearby structures or cause a significant nuisance. For this reason, the **direct** and indirect impact is considered **less than significant**. ***[Similar]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3B.11-3 Permanent Increase in Ambient Noise Levels. *The Off-site Water Facility Alternatives could create a substantial permanent increase in ambient noise levels in the vicinity of new pumping facilities.*

NCP, PA

The principal long-term, operational noise impacts resulting from the Off-site Water Facilities under the Proposed Off-site Water Facility Alternative would result from the pumps and generators operated at the proposed booster pump station and WTP. Noise generated from each of these facilities is discussed in more detail below.

Pump Station(s)

The booster pump station would eventually consist of multiple 400 horsepower (HP) vertical turbine pumps. At times, the pumps may operate 24 hours a day, 7 days a week. Based on a review of publish literature, the typical noise level for water supply pumping facilities ranges from 70 to 76 dBA at 50 feet (Environmental Science Associates 2005). However, the pumping facilities sampled as part the referenced analysis included substantially less horsepower than the Off-site Conveyance Pump's proposed capacity and, therefore, noise levels from the proposed pumping facilities could be higher. This could result in a **potentially significant direct** impact to adjacent residences. **No indirect** impacts would occur. ***[Similar]***

Additionally, a small standby generator would be installed in an enclosure to operate up to two pumps during a power outage. The typical noise level for a generator is approximately 80 dBA at 50 feet. With a surrounding

masonry buffer, or with generator placement using other structures as shielding, the effective noise level may be reduced by 10 to 15 dBA at 50 feet. Since emergency generators would operate infrequently, they would generally not contribute substantially to the overall community noise exposure outside of the site boundary. However, the combined operation of the pumps, the back-up generator, and maintenance activities depending on the proximity to the nearest sensitive receptor could generate long-term noise level in excess of Sacramento County or City of Rancho Cordova standards. This would be a **potentially significant**, **direct** impact. **No indirect** impacts would occur. ***[Similar]***

Water Treatment Plant

The On-site WTP site is currently located in an undeveloped area, with the nearest sensitive receptors being over a mile away from the site. However, the Folsom Specific Plan designates areas around the WTP site as multifamily, medium-density residential. The final placement of the On-site WTP would be required to adhere to setback requirements contained within the Folsom Specific Plan and, therefore, **direct** increases in noise from the stationary and mobile sources present at the WTP are expected to result in a **less-than-significant** impact. **No indirect** impacts would occur. ***[Similar]*** This issue is discussed in more detail in Section 3A.11, "Noise – Land" of this EIR/EIS.

Traffic Noise

Operation of the WTP and conveyance facilities would result in a minor increase in the use of motor vehicles, primarily associated with employees traveling to and from the WTP facility and routine maintenance and inspection activities. It is expected that no more than 10 staff personnel would be on-site at any one time for typical operation and maintenance of the WTP, most on-site during typical working hours, 7 a.m. to 5 p.m. Assuming an average of four trips per employee (including lunch breaks), operation of the proposed facilities would result in approximately 40 one-way daily employee trips. Due to the relatively low volume of Off-site Water Facilities-generated traffic, operation of the proposed facilities would not result in noticeable changes in the traffic noise along area roadways in relation to existing and projected roadway traffic volumes (e.g., with the Folsom Specific Plan Area). As a result, **direct** and **indirect** long-term increases in traffic noise levels would be **less than significant**. ***[Similar]***

Mitigation Measure 3B.11-3: Implement Operational Noise Minimization Measures.

The following mitigation measures shall be implemented for the design of the WTP and the pump station(s) to ensure that operational noise levels at the property line do not exceed the City/County standards:

- Shielding and other specified measures as deemed appropriate and effective by the design engineer shall be incorporated into the design in order to comply with performance standards.
- Pumps located underground shall be shielded to not affect nearby sensitive receptors.
- Project equipment shall be outfitted and maintained with noise-reduction devices such as equipment closures, fan silencers, mufflers, acoustical louvers, noise barriers, and acoustical panels to minimize operational noise.
- Particularly noisy equipment shall be located as far away as feasibly possible from nearby sensitive receptors.
- The orientation of acoustical exits shall always be facing away from nearby sensitive receptors.
- Buildings and landscaping shall be incorporated, where possible, to absorb or redirect noise away from nearby sensitive receptors.

Implementation: City of Folsom Utilities Department

Timing: Approval of engineering plans for the On- or Off-site WTPs and Off-site booster pumping facilities prior to construction

Enforcement:

1. For structural improvements that would be located within the City of Folsom: City of Folsom Neighborhood Services Department and City of Folsom Community Development Department.

2. For structural improvements that would be located within unincorporated Sacramento County: Sacramento County Planning and Community Development Department.

3. For structural improvements that would be located within the City of Rancho Cordova: City of Rancho Cordova Planning Department.

1, 1A, 3, and 3A

Long-term noise impacts identified for the booster pumping station under the Proposed Off-site Water Facility Alternative would be similar under Off-site Water Facility Alternatives 1, 1A, 3 and 3A. **Direct** noise impacts relating to pumping could be **potentially significant** at the nearest sensitive receptor. **No indirect** impacts would occur. ***[Similar]***

In contrast to the Proposed Off-site Water Alternative, these alternatives would involve the construction and operation of the White Rock WTP site in a currently undeveloped area south of White Rock Road and in close proximity to the City Corporation Yard, with the nearest sensitive receptors over 1/2 mile away from the site. However, the Folsom Specific Plan designates an area just north of WTP site as multifamily, high-density. Because these uses are not currently present, the City has assumed a conservative distance of 200 feet based on a minimum 50-foot setback for the WTP from the northern property line, a 100 right-of-way for White Rock Road, and an additional setback of 50 feet for the multifamily residential uses on the north side of White Rock Road.

The WTP would operate continuously at various flow rates during the year with ongoing operations and maintenance. Potential operational noise impacts at the WTP would primarily be from maintenance vehicle circulation and the operation of stationary mechanical equipment. This equipment includes blowers, generators, pumps, process motors, and heavy trucks delivering chemical supplies and materials. Minor noises associated with the operation of low power equipment, such as sludge collectors and flocculators, and water flow noise would also occur. The level of noise generated by pumps and other stationary equipment would depend on: characteristics of the noise source, number of noise sources clustered together, type and effectiveness of building enclosure, and operational characteristics. Based on the noisiest pieces of equipment expected to be present (e.g., pumps) and applying a noise attenuation rate of 4.5 dBA per doubling distance, the noise levels from the pumping facilities and on-site generator at 200 feet would be expected to range between 67 and 72 dBA.

Without the inclusion of noise reduction measures in the design and operation of the WTP, noise generated from ongoing operations at the WTP would contribute noise levels to the surrounding area that could exceed County and City standards. For this reason, the operation of the WTP under these alternatives could result in **potentially significant**, **direct** long-term noise impacts. **No indirect** impacts would occur. ***[Greater]***

Mitigation Measure: Implement Mitigation Measures 3B.11-3.

2, 2A, and 2B

These alternatives would further integrate the Off-site Water Facilities components with existing water supply infrastructure, which includes SCWA's Vineyard SWTP and, potentially, the North Douglas Tanks. Although pumping facilities would be required, these facilities along with water treatment operations would occur at the existing Vineyard SWTP. In addition, the number of Off-site Water Facilities operational staff under these alternatives would be smaller than if the City constructed a new WTP. However, based on these considerations, these Off-site Water Facility Alternatives would not generate increased noise levels from new water conveyance and treatment facilities at new locations where these facilities do not currently exist and, therefore, this **direct** impact is considered **less than significant**. **No indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

4 and 4A

Long-term noise impacts under Off-site Water Facility Alternatives 4 and 4A would be similar to the Off-site Water Facility Alternatives 1 and 1A. The main difference in relation to potential long term noise impacts under Off-site Water Facility Alternatives 4 and 4A is the distance of the WTP from residential uses are planned within the Westborough Specific Plan. Under a worst-case scenario, the WTP could be constructed within 50 to 100 feet of these future residential uses thereby subjecting them to noise levels approaching 80 dBA. These noise levels are considered unacceptable for residential uses according to City of Rancho Cordova standards and therefore represent a **potentially significant direct** impact. **No indirect** impacts would occur. ***[Greater]***

Mitigation Measure: Implement Mitigation Measures 3B.11-3.

Implementation of the above mitigation measures are expected to reduce potential impacts to levels at or below standards and would generally reduce the impacts to less than significant levels. However, because of the uncertainty associated with the placement of these facilities, especially the booster pump station, and the pump station's actual design (above- verses below-ground), the City is unable to verify whether noise levels would be reduced to below Sacramento County and City of Rancho Cordova standards as a result of the measures above and the impact could remain **potentially significant and unavoidable** for Alternatives PA, 1, 1A, 3, 3A, 4, and 4A. In addition, given the potential for the placement of the WTP in close proximity to planned residences under Off-site Water Facility Alternatives 4 and 4A, permanent noise impacts could remain **significant and unavoidable**.

3B.11.4 RESIDUAL SIGNIFICANT IMPACTS

Even after implementation of all feasible mitigation, construction noise impacts would remain significant and unavoidable for all Off-site Water Facilities Alternatives. The operation of the pumps and generators for Off-site Water Facilities pump stations and WTP facilities could occur within close proximity of sensitive receptors, thereby resulting in a permanent increase in noise levels. Although the City has identified a series of mitigation measures to address potential long-term impacts to adjacent sensitive receptors, given uncertainties regarding the design of these facilities and their respective locations, the City is unable to confirm whether the mitigation imposed would be effective in reducing long-term noise to a less-than-significant level. For this reason, long-term, residual noise impacts from these facilities under Alternatives PA, 1, 1A, 3, 3A, 4, and 4A could be significant and unavoidable.

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