Chapter 23
Noise

23.1 Environmental Setting/Affected Environment

23.1.2 Groundborne Vibration

This section describes basic concepts related to groundborne vibration. In contrast to airborne sound, groundborne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually much lower than the threshold of human perception. Most perceptible indoor vibration is caused by sources within buildings, such as mechanical equipment operation, people moving, or doors slamming. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. Blasting at excavation sites is also a source of groundborne vibration and airblast.

23.1.2.1 Vibration from Construction

Construction activity can result in varying degrees of ground vibration depending on the equipment and method used. Equipment such as air compressors, light trucks, and hydraulic loaders generate little or no ground vibration. Pile drivers, vibratory compactors, and demolition equipment have the potential to generate substantial vibration, which may present a concern if close to buildings (Federal Transit Administration 2006).

Dynamic construction equipment such as pile drivers can create vibrations that radiate along the surface and downward into the earth. These surface waves can be felt as groundborne vibration. Vibration can result in effects ranging from annoying people to damaging structures. Variations in geology and distance result in different vibration levels comprising different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance from the vibration source.

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

Groundborne vibration can also be expressed in terms of root mean square (RMS) vibration velocity to evaluate human response to vibration levels. RMS is defined as the average of the squared amplitude of the vibration signal. The vibration amplitude is expressed in terms of vibration decibels (VdB), which use a reference level of 1 micro-inch per second. The threshold of perception for most people is around 65 VdB. Vibration levels in the 70–80 VdB range are often noticeable but acceptable. Typically, vibration levels must exceed 100 VdB before building damage occurs. Historic structures, however, may have a damage threshold as low as 90 VdB.

The potential for annoyance and physical damage to buildings from vibration is the primary issue associated with groundborne vibration. The human response to continuous groundborne vibration is shown in Table 23-2.

Table 23-2. Human Response to Continuous Vibration from Traffic

Peak Particle Velocity (Inches/Second)	Human Response
0.4–0.6	Unpleasant
0.2	Annoying
0.1	Begins to annoy
0.08	Readily perceptible
0.006–0.019	Threshold of perception

Source: Whiffen and Leonard 1971.

Damage potential thresholds for vibration generated by construction activities are shown in Table 23-3.

Table 23-3. Maximum Vibration Levels for Preventing Damage

Building Category	Limiting Velocity (PPV in Inches/ Second)	Approximate Maximum Vibration Level (VdB)
Reinforced-concrete, steel, or timber (no plaster)	0.5 [a]	102
Engineered concrete and masonry (no plaster)	0.3 [a]	98
Historic and some old buildings	0.25 [b]	96
Non-engineered timber and masonry buildings	0.2 [a]	94
Buildings extremely susceptible to vibration damage	0.12 [a]	90

PPV = peak particle velocity.
VdB = root mean square velocity in decibels are 1 micro-inch/second.
[a] Source: Federal Transit Administration 2006.
[b] Source: California Department of Transportation 2004.

23.1.2.2 Groundborne Noise

At higher frequencies, groundborne vibration can be perceived as a noise source. At sufficiently high amplitudes, propagation of vibration waves through the ground can cause building elements to vibrate at a frequency that is audible to the human ear. Groundborne noise could result in rattling of windows, walls, or other items coupled to building surfaces. Groundborne vibration levels resulting in groundborne noise are often experienced as a combination of perceptible vibration and low frequency noise.

Land uses sensitive to groundborne vibration include places where people reside, schools, libraries, and places of worship. Hospital operating rooms and certain types of industries that use vibration-sensitive equipment are considered highly sensitive to groundborne noise and vibration. Outdoor park facilities, such as picnic areas or athletic fields, are not considered sensitive to groundborne noise or vibration.

The human response to different levels of groundborne noise and vibration is shown in Table 23-4. Vibration levels with spectral components within the range of human hearing (30 hertz [Hz] and 60 Hz in the table) would produce the corresponding approximate A-weighted noise levels. Thus, it is

possible to experience vibrations as audible noise, even though physical vibrations may not be detected.

Table 23-4. Human Response to Groundborne Noise

Vibration Velocity (VdB)	Low-Frequency Noise Level[a] (dBA)	Mid-Frequency Noise Level[b] (dBA)	Human Response
65	25	40	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible; mid-frequency sound excessive for quiet sleeping areas.
75	35	50	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise acceptable for sleeping areas; mid-frequency noise annoying in most quiet occupied areas.
85	45	60	Vibration acceptable only for an infrequent number of events per day. Low-frequency noise annoying for sleeping areas; mid-frequency noise annoying for institutional land uses such as schools and churches, even with infrequent events.

Source: Federal Transit Administration 2006.
VdB = vibration decibel.
dBA = A-weighted decibel.
[a] Approximate noise level when vibration spectrum peak is near 30 Hz.
[b] Approximate noise level when vibration spectrum peak is near 60 Hz.

Groundborne noise also has the potential to affect nesting birds. This discussion is located in Chapter 12, *Terrestrial Biological Resources*.

23.1.2.3 Human Response to Airblast and Vibration from Blasting

Blasting creates seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Airblast and ground vibration can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance results in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes decrease with increasing distance.

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

Human response to blast vibration and airblast is difficult to quantify. Vibration and airblast 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 blast frequency. Blast events are relatively short—on the order of several seconds for sequentially delayed blasts. Generally, as blast duration and vibration frequency increase, the potential for adverse human response increases. Studies have shown that a

few blasts of longer duration produce a less adverse human response than short blasts that occur more often.

The average human response to vibration from a blast event begins to be strongly perceptible at a level of 0.5 inch/second PPV. The average human response to airblast from a blast event is within the range of mildly unpleasant to distinctly unpleasant at an overpressure level of 130 dB. These responses assume an average person at rest in quiet surroundings. If the person is engaged in any type of physical activity, the level required for the responses indicated is increased considerably.

23.2 Regulatory Setting

23.2.1 Federal Plans, Policies, and Regulations

23.2.1.1 U.S. Bureau of Mines Criteria for Airblast and Ground Vibration due to Blasting Activities

Conventional noise criteria (for steady-state noise sources) and limits established for repetitive impulsive noise (such as for gun-firing ranges) do not apply to air overpressures from blasting. U.S. Bureau of Mines Report of Investigations 8485 (U.S. Bureau of Mines 1980a) and the regulations issued more recently by the U.S. Office of Surface Mining and Reclamation Enforcement specify a maximum safe overpressure of 0.013 psi (133 dB) for impulsive airblast when recording is accomplished with equipment having a frequency range of response of at least 2 to 200 Hz.

U.S. Bureau of Mines Report of Investigations 8507 (U.S. Bureau of Mines 1980b) contains blasting-level criteria that can be appropriately applied to keep ground vibration well below levels that might cause damage to neighboring structures. At low-vibration frequencies, velocities of ground vibration are restricted to low levels. As vibration frequency increases, higher velocities are allowed up to a maximum of 2.00 inches per second.

To determine the velocity limit that would apply to neighboring properties, the dominant frequency ranges of the vibration must first be determined. The distribution of explosives, distance from the blast, and the nature of the transmitting medium (soil and rock) between the blast site and the affected structure all play a part in determining the dominant frequency of the blast vibration. Timing between the detonations of charges also affects the frequency, but only in relatively close proximity to the blast. The limits specified in the criteria range from 0.50 inch per second PPV at 4 Hz to 2.00 inches per second at 40 Hz and above.

23.3 Environmental Consequences

23.3.1 Methods for Analysis

23.3.1.1 Construction Noise and Vibration

~~The assessment of potential construction noise levels was based on methodology developed by the FTA (2006). Potential effects associated with construction activities would be temporary, which, for the purposes of this chapter, is defined as the 9-year construction period. Noise levels produced by~~

~~commonly used construction equipment are summarized in Table 23-12. Individual types of construction equipment are expected to generate maximum noise levels ranging from 80 to 96 dBA at a distance of 50 feet. The construction noise level at a given receiver depends on the type of construction activity, the noise level generated by that activity, and the distance and shielding between the activity and noise-sensitive receivers.~~

The assessment of potential construction noise levels was based on methodology developed by the FTA (2006). Construction assumptions for conveyance facilities are described in Appendix 3C. Potential effects associated with construction activities would be temporary, which, for the purposes of this chapter, is defined as the ~~13~~4-year construction period for the MPTO and 13-year construction period for all other alignments. Noise levels produced by commonly used construction equipment are summarized in Table 23-12. Individual types of construction equipment are expected to generate maximum noise levels ranging from 76 to 101 dBA at a distance of 50 feet. The construction noise level at a given receiver depends on the type of construction activity and the distance and shielding between the activity and noise-sensitive receivers.

An inventory of equipment expected to be in service by phase of project construction is included in Appendix 22B, *Air Quality Assumptions*. The source level is based on the L_{max} of equipment emission levels developed by FTA. Utilization factors for construction noise are used in the analysis to develop L_{eq} noise exposure values. The L_{eq} value accounts for the energy-average of noise over a specified interval (usually 1 hour), so a utilization factor represents the amount of time a type of equipment is used during the interval. In practice over a multi-year construction schedule, equipment utilization factors for a given hour of a workday would vary substantially.

To characterize the source level of the worst-case noise condition during a given phase of construction, the six loudest pieces of equipment were assumed to operate simultaneously at a perimeter location, at a receiver distance of 50 feet. Pile drivers were assumed to operate up to 100% of a given hour, assuming multiple drivers are used at a site. Heavy trucks were also assumed to operate up to 100% of a given hour. With the exception of pile driving, trucks are assumed to be a dominant source of noise. Source emission levels for trucks are up to 88 dBA at 50 feet, as shown in Table 23-12.

Other sources of construction noise include installation of power transmission lines, helicopters for installing conductor line, earth-moving activities at offsite areas, staging areas, concrete plants, and the use of barges for in-water pile driving. Excavation sites would involve the use of rock drills, crushers, and screens. Blasting may be required at some excavation sites.

Sheet piles would be driven using both impact and vibratory ~~impact~~ hammers during construction of intake facilities, and drilled piles will be used for other project components such as pumping plants, canal box culvert siphons, and barge unloading facilities. As shown in Table 23-12, the source levels for an impact pile driver is 101 dBA at 50 feet. Construction assumptions for pile driving, including numbers of pile installations per day are included in Appendix 3C. Timing of in-water pile driving is largely dependent on fish migration patterns. For most features, pile driving can be completed in less than six months (up to 113 days for cofferdams and other structures). For cofferdam installation at the modified Clifton Court forebay, pile driving is expected to take 367 days to complete, assuming 60 piles installed per day. Vibration source levels for pile drivers are shown in Table 23-13.

Table 23-12. Commonly Used Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 Feet from Source
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Grader	85
Bulldozers	85
Truck	~~85~~88
Loader	~~80~~85
Air Compressor	~~80~~81
Backhoe	80
Pneumatic Tool	85
Excavator	85
Auger Drill Rig (for drilled piles)	85
Crane, Derrick	88
~~Concrete Mixer Truck~~	~~79~~
Concrete Batch Plant	N/A
Compactor (Ground)	~~83~~82
Concrete mixer	85
Generator	81
Pump	76

Source: Federal Highway Administration 2006.
dBA = A-weighted decibel.

Table 23-13. Vibration Source Levels for Pile Drivers

Equipment		PPV at 25 feet (Inches/Second)	Approximate Vibration Level (Vdb)
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.170	93

Source: Federal Transit Administration 2006.
PPV = peak particle velocity.
VdB = root mean square velocity in decibels re 1 micro-inch/second.

23.3.1.2 Traffic Noise Modeling

Traffic noise level along highways and other major roadways were calculated using peak-hour traffic volume data provided by the project traffic consultant (Fehr & Peers 2015), and traffic noise emissions from data tables developed from the Federal Highway Administration FHWA Traffic Noise Model Version 2.5 (TNM) (FHWA 1998, FHWA 2004).~~Traffic noise levels at sensitive receptors near construction haul routes were evaluated through use of the FHWA Traffic Noise Model Lookup program (TNM).~~ TNM estimates average noise levels at fixed distances from the roadway centerline based on estimated traffic volumes for automobiles and medium- and heavy-duty trucks, vehicle

speeds, and a designated noise drop-off rate based on ground type. Shielding effects from topographical features and buildings are not accounted for in the model. The model was programmed to produce a conservative, worst-hour estimate of temporary traffic-generated noise levels due to heavy truck and increased commuter trips associated with construction of project and conservation components. An estimate of peak-hour construction-generated traffic was based on Appendix 19A, *Bay Delta Conservation Plan Construction Traffic Impact Analysis Report* prepared by Fehr & Peers (2015). The traffic study analyzed volume data for hours of the day from 6:00 a.m. to 7:00 p.m. The highest projected volume was used to simulate loudest hour, or worst case conditions, consistent with the methodology for analysis of construction noise. A provision of the environmental commitments states that off-site truck trips and commutes would be limited to daytime hours where feasible. Nighttime traffic conditions under all project alternatives assumes background growth only (i.e., No Project conditions). The analysis focuses on worst-hour noise conditions during peak travel hours.

The environmental consequences analysis includes an assessment of traffic noise impacts based on loudest-hour traffic noise levels under future project alternatives, compared to Existing Conditions. Existing loudest-hour noise levels are shown in Table 23-14.

23.3.1.4 Operations

Potential reasonable worst-case pump noise levels during operation of the intake structures and intermediate pumping plants were evaluated by calculating sound power levels of the pump based on horsepower (Hoover and Keith 2000). For Alternative 1A, faceplate horsepower for vertical column and vertical volute type pumps is specified in the pump selection appendix of the Pipeline/Tunnel Option Conceptual Engineering Report (CER) (California Department of Water Resources 2010b). The analysis assumes that pumps would be housed inside multistory concrete structures. The operations analysis includes continuous operation of air compressors for air handling in the pump stations concurrently with pumps inside each intake structure. Sedimentation ponds will require occasional dredging to remove solids.

~~23.3.1.4~~23.3.1.5 Existing Baseline Conditions in the Study Area

Under NEPA (and CEQA), the baseline is the existing ambient noise level in a given location. Baseline noise levels vary greatly depending on the extent of urban development and proximity to transportation corridors. Ambient rural noise levels are typically in the range of 40–50 dB (Table 23-5). Ambient noise levels near major highways can be as high as 75 dB. ~~Modeled existing traffic noise levels at locations near roadways in the study area are discussed in Section 23.4.1.2.~~ Existing traffic noise levels along highways and other major roadways were calculated using peak-hour traffic volume data provided by the project traffic consultant (Fehr & Peers 2015). The approach to calculation of traffic noise level is discussed in Section 23.4.1.2.

To assess increases in noise levels due to construction of the project, a baseline of 40 dBA is used to describe the existing ambient noise level in the study area. Because many of the facilities that would be constructed under the project alternatives are located primarily in rural areas, a baseline level of 40 dBA would be characteristic of the project's mostly rural setting, and was therefore assumed to apply to the entire study area. The ambient baseline level of 40 dBA is used in this analysis to conservatively account for increases in noise levels during daytime hours, and potentially sleep disturbance during nighttime hours. Noise monitoring at specific locations has not been conducted for this project.

The thresholds for construction indicate that, where existing ambient noise level is less than 60 dBA, impacts would be significant where construction noise levels are predicted exceed the DWR standard of 60 dBA (50 dBA during nighttime hours). Therefore an existing ambient noise level of 40 dBA conservatively accounts for the most stringent construction noise increase thresholds used in the environmental consequences analysis.

The existing Banks and Jones Pumping Plants contribute to the noise environment in an isolated rural setting near the Contra Costa/Alameda county line. Existing pump noise, along with traffic on Kelso Road and overflights from small aircraft, would contribute to the noise environment at residential and recreational use directly adjacent to the Jones Pumping Plant. Banks Pumping Plant is located at the end of Kelso Road, and is not adjacent to noise-sensitive residential or recreational use areas.

For noise-sensitive land uses adjacent to project truck routes, the environmental consequences analysis includes an assessment of traffic noise impacts based on loudest-hour traffic noise levels under future project alternatives compared to Existing Conditions. Existing loudest-hour noise levels are shown in Table 23-14.

Table 23-14. Existing Loudest-Hour Traffic Noise Levels

Roadway	Segment	Existing Loudest-hour Volume	Existing Traffic Noise Level, dBA L_{eq} (1h) (100 feet from roadway centerline)
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	656	58
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	1,516	61
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	1,013	60
Balfour Rd	Brentwood Blvd to Brentwood City Limits	1,300	61
Bethel Island Rd	Oakley City Limits to End	330	55
Balfour Rd	Brentwood City Limits to Byron Hwy	297	54
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	1,682	62
Byron Hwy	Delta Rd to Old SR 4	240	53
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	907	59
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	476	59
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	180	55
SR 160	Scribner Rd to Hood Franklin Rd	125	53
SR 160	Hood Franklin Rd to Lambert Rd	170	55
SR 160	Lambert Rd to Paintersville Bridge	122	53
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	128	53
SR 160	Paintersville Bridge to Walnut Grove Bridge	128	53
SR 160	Walnut Grove Bridge to A St (Isleton)	465	59
SR 160	A St (Isleton) to SR 12	378	58
SR 160	SR 12 to Brannan Island Rd	894	62

Roadway	Segment	Existing Loudest-hour Volume	Existing Traffic Noise Level, dBA L_{eq} (1h) (100 feet from roadway centerline)
SR 84	West Sacramento City Limits to Courtland Rd	169	55
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	25	46
SR 12 EB	I-80 to Beck Ave	1,847	65
SR 12 WB	I-80 to Beck Ave	1,625	64
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	3,573	68
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	2,353	66
SR 12	Walters Rd/ to SR 113	1,075	63
SR 12	SR 113 to SR 84 (River Rd)	1,544	64
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	1,685	64
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	1,030	62
SR 12	Sacramento Co./ SJ Co. Line to I-5	1,164	63
SR 113	I-80 to Dixon City Limits	1,341	64
SR 113	Dixon City Limits to SR 12	294	57
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	733	61
SR 4	Marsh Creek Rd to Discovery Bay Blvd	1,224	63
SR 4	Discovery Bay Blvd to Tracy Blvd	746	61
SR 4	Tracy Blvd to I-5	1,492	64
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	75	48
Main Street (Old SR 4)	SR 160 to Cypress Rd	1,663	62
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	1,335	61
Cypress Rd	Main Street to Bethel Island Rd	764	58
Bethel Island Rd	Cypress Rd to Oakley City Limits	367	55
Delta Rd	Main Street to Byron Hwy	334	55
Pocket Rd	I-5 to Freeport Blvd	2,191	63
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	492	56
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	346	55
Hood Franklin Rd	SR 160 (River Rd) to I-5	137	51
Lambert Rd	SR 160 (River Rd) to Herzog Rd	29	44
Lambert Rd	Herzog Rd to Franklin Blvd	38	46
Franklin Blvd	Lambert Rd to Twin Cities Rd	71	48
Twin Cities Rd	River Rd to I-5	248	53
Twin Cities Rd	I-5 to Franklin Blvd	318	55
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	113	50
River Rd	Paintersville Bridge to Twin Cities Rd	134	51
River Rd	Twin Cities Rd to Walnut Grove Bridge	365	55

Roadway	Segment	Existing Loudest-hour Volume	Existing Traffic Noise Level, dBA L_{eq} (1h) (100 feet from roadway centerline)
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	332	55
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	283	54
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	34	45
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	39	46
Jackson Slough Rd	Isleton City Limits to SR 12	53	47
Jackson Slough Rd	Brannan Island Rd to SR 12	52	47
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	232	53
Peltier Rd	Blossom Rd to I-5	23	44
Tracy Blvd	SR 4 to Clifton Court Rd	209	53
Tracy Blvd	Clifton Court Rd to Tracy City Limits	171	52
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	824	59
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	298	54
Mountain House Pkwy	Arnaudo Blvd to I-205	769	58
Eight Mile Rd	Stockton City Limits to I-5	769	58
Tracy Blvd	Tracy City Limits to I-205	759	58
Harbor Blvd	Industrial Blvd to US 50	2,317	63
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	1,858	62
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	1,718	62
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	146	51
River Rd	Freeport Bridge to Courtland Rd	249	54
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	63	48
Courtland Rd	SR 84 to River Rd	77	48

Sources: Fehr & Peers 2015, FHWA 1998.

23.3.2 Determination of Effects

The thresholds discussed in this chapter and used for determination of effects under NEPA are equivalent to the thresholds used for determination of significant impacts under CEQA. Criteria derived from the Appendix G checklist of the CEQA Guidelines were also considered when establishing the applicable thresholds. Under CEQA, the program and/or project would pose a significant impact if it exceeds any of the following thresholds for terrestrial noise and vibrations:

1. Exposes persons to or generates noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies.

2. Exposes persons to or generates excessive groundborne vibration or groundborne noise levels.

3. Results in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

4. Results in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

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

6. Is located in the vicinity of a private airstrip and exposes people residing or working in the project area to excessive noise levels.

The narrative of effects and mitigation approaches is organized in terms of construction (temporary increase in ambient levels, noise levels in excess of applicable standards, and groundborne vibration), and operation (permanent increase in ambient levels, noise levels in excess of applicable standards).

There are several General Aviation (GA) airports and private airstrips within 2 miles of the project area. The project will not introduce new noise sensitive land uses into the area so no new noise sensitive uses will be exposed to aircraft noise. Because of the small number of operations at each airport, none are expected to expose workers in the project area to excessive aircraft noise.

The action alternatives pass through several counties and through or near several communities and cities. Many of these jurisdictions have noise standards that relate to land use compatibility with transportation noise sources (e.g., traffic, rail, and aircraft) and non-transportation sources (e.g., pumping plants, construction activity, heating and ventilating equipment) (refer to section 23.3.3 for a discussion of local plans and policies). ~~Noise from transportation sources is controlled at the federal level, not at the local level. As such, local noise ordinances do not apply to transportation sources but rather to non-transportation sources such as construction equipment.~~ The noise emission level of any vehicle traveling on a public road is regulated at the state and federal level. Vehicle emissions are regulated at the state and federal level because vehicles cross state boundaries and many local jurisdictional boundaries within a state. As such noise emissions from individual vehicles traveling on a public road are not regulated at the local level. The exposure of noise sensitive land uses to traffic noise is however typically controlled through land use compatibility standards adopted by local jurisdictions in their general plans. Noise generated by the operation of vehicles or construction equipment that is not on a public road is typically regulated at the local level through noise ordinances. In many of these jurisdictions, noise from construction activities is exempt from noise ordinance standards during daytime hours, leaving no numerical noise level limits that can be applied during daytime hours. ~~In many of these jurisdictions, noise from construction activities is exempt from noise ordinance standards during daytime hours, leaving no numerical noise level limits that can be applied during daytime hours.~~

Although construction noise is exempt from local noise ordinances during daytime hours, construction of some phases of the conveyance facility may take up to 13 years (see Appendix 22B, *Construction Schedule*). Increases in ambient noise levels that are readily perceptible and sustained over long periods of time have been shown to result in a higher probability of adverse community reaction when ambient noise levels increase by 10 to 20 dB. An increase of this magnitude has been shown to result in a community reaction characterized by “several threats of legal action” and

"vigorous action" according to social surveys and case studies of community reaction to noise (Schultz 1978).

Section 01570 of DWR Specification 05-16 identifies DWR noise thresholds that are reasonably consistent with local standards with regard to construction noise. As discussed above, the 60 dBA noise standard in DWR Specification 05-16 has been established by consensus of experts, local and resource agencies, including USFWS, as a threshold for establishing noise impacts.

Thresholds described below for determining if construction or restoration noise impacts would be adverse are based on the DWR 60 dBA threshold with a -10 dB adjustment for work that would occur at night. BDCP compatibility with applicable plans and policies is described throughout the impact headers (refer to Impacts NOI-1 through NOI-4). Exceedances of established noise thresholds could indicate an incompatibility with an applicable plan, policy, or regulation adopted to avoid or mitigate noise effects. Note that as discussed in Chapter 13, *Land Use,* Section 13.2.3, state and federal agencies are not generally subject to local land use regulations; incompatibilities with plans and policies are not, by themselves, physical consequences to the environment.

~~The thresholds discussed in this chapter and used for determination of effects under NEPA are equivalent to the thresholds used for determination of significant impacts under CEQA.~~ Thresholds described below for determining if construction vibration effects would be adverse under NEPA and have significant impacts under CEQA are based on guidance in FTA 2006. Thresholds described below for determining if operational noise impacts would be adverse under NEPA and have significant impacts under CEQA are based on local noise ordinance standards. ~~Criteria derived from the Appendix G checklist of the CEQA Guidelines were also considered when establishing the applicable thresholds.~~

Noise impacts to sensitive biological habitats are discussed in Chapter 12, *Terrestrial Biological Resources*.

23.3.2.1 Construction and Restoration Activity

Onsite Construction Equipment

Onsite construction and restoration activity between the hours of 7:00 a.m. to 10:00 p.m. (daytime) would have adverse noise effects if the activity is predicted to result in a 1-hour A-weighted equivalent sound level that exceeds 60 dBA at noise-sensitive land uses where the ambient noise level is less than 60 dBA, or if the activity is predicted to increase the ambient noise level at residential locations by 5 dB or more where the ambient noise level is already greater than 60 dBA (pursuant to Section 01570 of DWR Specification 05-16).

Onsite construction and restoration activity between the hours of 10:00 p.m. to 7:00 a.m. (nighttime) would have adverse noise effects if the activity is predicted to result in a 1-hour A-weighted equivalent sound level that exceeds 50 dBA at noise-sensitive land uses where the ambient noise level is less than 50 dBA, or if the activity is predicted to increase the ambient noise level at residential locations by 5 dB or more where the ambient noise level is already greater than 50 dBA. The lower noise threshold for nighttime activity is based on the 5 to 10 dB reduction in noise performance standards that is commonly applied to noise levels during nighttime hours as used in local noise ordinances in the Plan Area.

In addition to raising the overall ambient noise level, construction activities during nighttime hours can potentially result in noise events that can disturb the sleep of people living in nearby residential areas. To address the potential for sleep disturbance during nighttime hours, onsite construction and restoration activity between the hours of 10:00 p.m. to 7:00 a.m. would have adverse noise effects if the activity is predicted to result in a single event maximum sound level exceeding 50 dBA L_{max} at interior locations of the nearest residential use (Nelson 1987~~).~~), or 70 dBA L_{max} at exterior locations, assuming 20 dB of nominal noise attenuation for buildings with closed windows (FHWA 2011).

The 50 dBA ~~L_{max}~~ L_{eq} nighttime standard is used as the governing threshold for the construction noise analysis.

For the purposes of this analysis, sensitive land uses are defined as places where people reside, schools, libraries, and places of worship (e.g., residential parcels, natural/recreational parcels, agricultural parcels, and schools).

Truck Trips and Worker Commute Trips

~~Increased volumes of traffic on public roads due to project-generated heavy truck trips and commuter trips on local roadways are considered to result in a significant traffic noise impact if the increase in volume would result in a substantial increase in noise as defined in the Caltrans Protocol. The Protocol defines a substantial increase as a 12 dB increase in traffic noise levels under design year plus project conditions, compared to Existing Conditions. For the purposes of this analysis, sensitive land uses are defined as places where people reside, schools, libraries, and places of worship (e.g., residential parcels, natural/recreational parcels, agricultural parcels, and schools). Project-related transportation activity not occurring on public roads is evaluated as any other construction activity, using 60 dBA daytime and 50 dBA nighttime thresholds as described above.~~

Increased volumes of traffic on public roads due to project-generated heavy truck trips and commuter trips on local roadways are considered to result in an adverse traffic noise impact if the increase in volume would result in a substantial increase in noise levels. For the purposes of this analysis, a substantial increase is defined as 5 dB, which is defined as a discernible increase by FHWA (2011). An adverse impact under Future with Project conditions would occur at a residential location where the loudest-hour traffic noise level is predicted to be 60 dBA Leq or greater, and loudest-hour traffic noise is predicted to increase the ambient noise level at residential locations by 5 dB or more. For the purposes of this analysis, sensitive land uses are defined as places where people reside, schools, libraries, and places of worship (e.g., residential parcels, natural/recreational parcels, agricultural parcels, and schools). Project-related transportation activity not occurring on public roads is evaluated as any other construction activity, using 60 dBA daytime and 50 dBA nighttime thresholds as described above.

23.3.2.2 Groundborne Vibration and Noise during Construction

Groundborne vibration from pile driving was analyzed based on procedures specified in the FTA Guidance Manual (Federal Transit Administration 2006). Vibration propagating from pile driving events would be considered to result in adverse effects if vibration levels would exceed 0.2 in/sec PPV at nearby residences (Table 23-2). This conservative threshold is more stringent than the Caltrans recommended guideline for historic and older buildings (*see* Section 23.1.2).

The thresholds for groundborne noise used in this analysis are based on thresholds used in the IRP (Integrated Resources Plan) for the City of Los Angeles Department of Public Works, and adapted from tunnel equipment groundborne vibration data used in other tunneling projects in the city of Los Angeles (City of Los Angeles Department of Public Works 2005). The threshold for groundborne vibration effects from TBM operations is 80 VdB (using a crest factor of 4), or 0.04 inches per second PPV (in/sec PPV). Based on IRP data, at the minimum tunnel depth of 60 feet to be used in the alternatives using the pipeline/tunnel conveyance, vibrations from TBM operation are predicted to be about 0.008 in/sec PPV. The threshold for groundborne vibrations from locomotive operation is 75 VdB (using a crest factor of 5), or 0.025 in/sec PPV. The groundborne noise threshold for tunnel locomotives is 45 dBA, which is equivalent to approximately 0.01 in/sec PPV.

Based on IRP data for typical tunnel locomotive operations, the groundborne noise threshold of 0.01 in/sec PPV may be exceeded within a 110-foot diagonal distance from the tunnel centerline (or a 92-foot horizontal distance from the tunnel centerline above ground). However DWR has indicated that tunnel locomotives would be traveling at speeds of 5 to 10 miles per hour and would not cause excessive groundborne noise levels (Sanchez pers. comm.). Due to variations in geology, actual groundborne noise and vibration levels could vary along the conveyance alignments. For the east and west conveyance alignments, tunneling depth would be at least 120 feet below msl, and therefore groundborne noise under these alternatives would be well below the threshold discussed above and would not cause adverse effects to sensitive receptors within the immediate vicinity. For the purposes of this analysis, sensitive receptors that may be exposed to increased groundborne vibration include residences, outdoor parks, schools, and agriculture areas.

Predicted ground vibration from blasting would exceed U.S. Bureau of Mines vibration criterion of 0.5 in/second PPV at the nearest residence. The predicted peak overpressure from blasting would exceed the U.S. Bureau of Mines airblast criterion of 130 dB at the nearest residence.

23.3.3 Effects and Mitigation Approaches

The Noise Abatement Plan (see Appendix 3B, *Environmental Commitments*) will be in place during construction to avoid or minimize adverse effects. Supplementary information for the EIR/EIS Bay Delta Conservation Plan includes approaches to designing mitigation which are taken into account in the discussion of mitigation measures in the Environmental Consequences section of this chapter and are incorporated into the Noise Abatement Plan as appropriate. The supplementary information is included here as background information for the design of noise mitigation measures and the Noise Abatement Plan.

As applicable, the following Environmental Commitments will be included in the plan (these commitments are included in Appendix 3B):

Construction

Contracts shall specify that on-site construction noise levels will conform to mitigation measure NOI-1a and 1b. ~~during daytime and evening hours (7:00 a.m. to 10:00 p.m.) do not exceed relevant construction-related standards from local noise ordinances at the nearest residential receptor.~~ Exceptions to this restriction include back-up alarms, warning horns and devices, and other similar noise-generating activities.

Contracts shall specify that on-site construction noise levels during nighttime hours (10:00 p.m. to 7:00 a.m.) do not exceed relevant construction-related standards from local noise ordinances at the nearest residential receptor to the extent feasible.

Limit impact pile driving to daytime and evening hours (7 a.m. to 7~~10~~ p.m.).

In the event of complaints by affected residents due to on-site construction noise generated during nighttime hours, the contractor will monitor noise levels intermittently (between 10:00 p.m. and 7:00 a.m.) at the dwelling unit of the person lodging the complaint. In the event that measured construction noise during nighttime hours exceeds 50 dBA interior L_{max} (70 dBA exterior L_{max}) or 5 dB above ambient noise, whichever is greater, at the dwelling unit, the construction contractor will cease the construction activity causing the complaint in the area until sound-attenuating mitigation measures, such as temporary sound barriers, are implemented, such that nighttime construction noise at the dwelling unit is reduced to a level of 50 dBA interior L_{max} (70 dBA exterior L_{max}) or 5 dB above ambient noise, whichever is greater. Where the above-described strategies are ineffective in reducing noise to the identified levels, exceptions to this commitment can be made for legally-mandated warning devices, such as back-up alarms and warning horns.

Locate, store, and maintain portable and stationary equipment as far as feasible from nearby residents or install sound fencing or other sound attenuation to ensure that such residents do not experience on-site construction noise at levels inconsistent with the standards identified above. Where ambient noise levels are less than 60 dBA and it is determined that construction related noise will cause noise levels to exceed 60 dBA, or where the ambient noise levels are greater than 60 dBA and it is determined that construction related noise will cause noise levels to exceed the ambient level by 5 dBA, a temporary sound wall shall be constructed between the sensitive area and the construction related noise source.

To the extent feasible, route and schedule truck traffic to reduce construction noise impacts and traffic noise levels at noise-sensitive land uses (e.g., schools, libraries, and places of worship).

To the extent feasible (e.g., where required by haul permits), limit off-site trucking activities (e.g., deliveries, export of materials) to the hours of 7:00 a.m. to 10:00 p.m. to minimize noise impacts on nearby residences.

Operations

Pump station buildings will be designed and constructed such that operation noise levels at nearby residential receptors do not exceed 50 Leq during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA Leq during nighttime hours (10 p.m. to 7 a.m.). Acoustical measures such as terrain shielding, pump enclosures, and acoustical building treatments may be incorporated into the facility design in order to meet this performance standard.

23.3.3.2 Alternative 1A—Dual Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario A)

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

NEPA Effects:

Construction of Intakes

Potential reasonable worst-case equipment noise levels from construction of the intakes were evaluated by combining the noise levels of the six loudest pieces of equipment that would likely operate at the same time (~~cranes and~~heavy trucks). Assuming 100% utilization within a given hour of day, the combined noise level is 96 dBA L_{eq} (1hr) at 50 feet. The estimated sound levels from construction as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-16.

Table 23-16. Predicted Noise Levels from Construction Activities

Distance Between Source and Receiver (feet)	Calculated L_{eq} (1hr)~~/Nighttime L_{max} Sound Level (dBA)~~
50	96
100	88
200	80
400	72
600	68
800	64
1,000	62
1,200	**60**
1,500	57
2,000	54
2,500	51
2,800	**50**
3,000	49
4,000	46
5,280	43

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Bold denotes daytime (1hr) and nighttime (1hr) ~~maximum~~ noise thresholds.

L_{eq} (1 hour) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

Estimated sound levels from impact pile driving conducted during periods of construction described above are shown in Table 23-17. Typically noise from pile driving is not constant; however, ~~B~~because multiple ~~noise from pile driving~~pile drivers would be used ~~is not constant~~, a utilization factor of ~~20~~100% has been applied. ~~(Thalheimer 2000). The utilization factor reduces the impact pile driver peak level of 101 dBA to 94 dBA L_{eq} (1hr) at 50 feet.~~ Use of the pile driver simultaneously with noise from other equipment in Table 23-16 would produce a combined level of ~~98~~ 102 dBA L_{eq} (1hr) at 50 feet, as shown in Table 23-17.

The results shown in Table 23-17 indicate that during periods of pile driving, residences within ~~1,400~~2,000 feet of an active intake construction site could be exposed to construction noise in excess of the 60 dBA L_{eq} (1hr) daytime threshold. The nighttime threshold of 50 dBA L_{max} would be exceeded at a distance of 2,800 feet. Construction noise contours are shown in Appendix 23A.

Table 23-17. Predicted Noise Levels from Construction—Pile Driving and Construction Equipment for Intake Structures

Distance Between Source and Receiver (feet)	Calculated Daytime L_{eq} (1hr) Sound Level (dBA)	Nighttime ~~L_{max}~~ L_{eq} (1hr) Sound Level (dBA)
50~~50~~	102~~98~~	96~~96~~
100~~100~~	94~~90~~	88~~88~~
200~~200~~	86~~82~~	80~~80~~
400~~400~~	79~~74~~	72~~72~~
600~~600~~	74~~70~~	68~~68~~
800~~800~~	71~~66~~	64~~64~~
1,000~~1,000~~	68~~64~~	62~~62~~
1,200~~1,200~~	66~~62~~	60~~60~~
1,500~~**1,400**~~	63~~**60**~~	57~~57~~
2,000~~1,500~~	**60**~~59~~	54~~54~~
2,500~~2,000~~	58~~56~~	51~~51~~
2,800~~**2,800**~~	56~~52~~	**50**~~**50**~~
3,000~~3,500~~	56~~50~~	49~~49~~
4,000~~4,000~~	52~~48~~	46~~46~~
4,500~~5,280~~	51~~45~~	45~~43~~
5,000	50	43
5,280	49	43

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Nighttime ~~L_{max}~~ L_{eq} sound levels are based on the same operating assumptions as daytime levels with the exception of pile driving.

Bold denotes daytime and nighttime maximum noise thresholds.

L_{eq} (1hr) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

While equipment could operate at any work area identified for this alternative, ~~the highest noise levels~~ longer-term impacts at noise-sensitive receiver locations are expected to occur at those sites where the duration and intensity of construction activities would be greatest. The work areas for construction of Intakes 1–5 would extend through several residential areas and communities near the Sacramento River. Noise from intake construction activities is predicted to exceed daytime and nighttime noise thresholds at nearby residences, schools and outdoor parks in areas indicated in Table 23-18.

Although this assessment includes daytime and nighttime construction noise estimates, construction of the intakes would primarily occur during daytime hours. If nighttime construction of the intakes were to occur, noise levels could be the same as that generated during daytime hours.

The effect of exposing these noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Table 23-18. Land Use Affected by Equipment Noise from Construction of Intakes, Alternative 1A

Location	Zoning	Daytime Threshold (60 dBA L_{eq} [1h]) Total Affected Parcels	Nighttime Threshold (50 dBA ~~L_{max}~~ L_{eq} [1h]) Total Affected Parcels
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	121	121
	Natural/Recreational	1	4
	Agricultural/Other [a]	109	157
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Residential	4	98
	Natural/Recreational	1	5
	Agricultural/Other [a]	152	189
	Schools	None	Clarksburg Middle School

[a] Includes agricultural or unclassified use that permits residential use.

Construction of Conveyance (Tunnel), Forebays, Barge Unloading Facilities, and Intermediate Pumping Plant

Potential reasonable worst-case equipment noise levels from construction work areas adjacent to tunnel shaft sites would be comparable to those listed for the intake sites in Table 23-16. Assuming 100% equipment utilization within a given hour of day, the combined noise level at work areas is 96 dBA L_{eq} (1hr) at 50 feet.

The results shown in Table 23-16 indicate that noise-sensitive land uses within 1,200 feet of an active tunnel work area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 2,800 feet. Construction noise contours are shown in Appendix 23A.

~~While equipment could operate at any work area identified for this alternative, the highest noise levels are expected to occur at those sites where the duration and intensity~~While equipment could operate at any work area identified for this alternative, longer-term impacts at noise-sensitive receiver locations are expected to occur at those sites where the duration and intensity of construction activities would be greatest. This includes all construction sites along the tunnel conveyance alignment, as well as at the site of the Byron Tract Forebay adjacent to and south of Clifton Court Forebay. For a map of the proposed pipeline/tunnel alignment, see Mapbook Figure M3-1. The tunnel and forebay construction work areas would extend through several residential areas and communities near the Sacramento River. Noise from construction activities is predicted to exceed daytime and nighttime noise thresholds at nearby residences, schools and outdoor parks indicated in Table 23-19.

Although this assessment includes daytime and nighttime construction noise estimates for the forebays, barge unloading facilities, intermediate pumping plant, and conveyance tunnels, construction of the forebays, barge unloading facilities, and intermediate pumping plant would primarily occur during daytime hours. If nighttime construction of the forebays, barge unloading facilities, and intermediate pumping plant were to occur, noise levels could be the same as those

generated during daytime hours. Construction of the conveyance tunnels and reusable tunnel material (RTM) storage actions would occur on a 24-hour basis.

The effect of exposing these noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Table 23-19. Land Use Affected by Equipment Noise from Construction of Conveyance and Associated Facilities, Alternative 1A

Location	Zoning	Daytime Threshold (60 dBA L_{eq} [1h])	Nighttime Threshold (50 dBA ~~L_{max}~~ L_{eq} [1h])
		Total Affected Parcels	Total Affected Parcels
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	116	119
	Natural/Recreational	7	14
	Agricultural/Other [a]	313	503
	Schools	Bates Elementary, Mokelumne High	Bates Elementary, Mokelumne High
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Residential	0	89
	Natural/Recreational	1	5
	Agricultural/Other [a]	150	170
	Schools	None	Clarksburg Middle School, River Delta Community Day
San Joaquin County	Residential	9	18
	Natural/Recreational	1	1
	Agricultural/Other [a]	187	273
Contra Costa County	Agricultural/Other [a]	94	118
Alameda County	Agricultural/Other [a]	21	45

[a] Includes agricultural or unclassified use that permits residential use.

Truck Trips and Worker Commutes

Project-generated heavy trucks and worker commutes are predicted to result in increased traffic noise levels at noise-sensitive land uses adjacent to local roadways. Based on information provided by DWR as part of the cost estimate (see Appendix 22A), project-generated vehicle traffic volumes for the pipeline/tunnel alternative are predicted to have a maximum heavy truck composition of 41%, which was assumed to apply to any of the local roadways under a worst-case noise scenario. Future loudest-hour noise levels at a reference distance of 100 feet are shown in Table 23-20.

Table 23-20. Predicted Future Loudest-hour Traffic Noise Levels on Commuter Roads and Haul Routes, Pipeline/Tunnel Alignment

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	~~Substantial Increase?~~Adverse Impact due to Traffic Noise?
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	58	67	9	Yes
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	61	68	7	Yes
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	60	68	8	Yes
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	62	1	No
Bethel Island Rd	Oakley City Limits to End	55	56	1	No
Balfour Rd	Brentwood City Limits to Byron Hwy	54	56	2	No
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	68	6	Yes
Byron Hwy	Delta Rd to Old SR 4	53	54	1	No
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	67	8	Yes
I-5 NB	Florin Rd to Pocket Rd	72	74	2	No
I-5 SB	Florin Rd to Pocket Rd	72	74	2	No
I-5 NB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 SB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 NB	Laguna Blvd to Elk Grove Blvd	70	71	1	No
I-5 SB	Laguna Blvd to Elk Grove Blvd	70	71	1	No
I-5 NB	Elk Grove Blvd to Hood Franklin Rd	68	71	3	No
I-5 SB	Elk Grove Blvd to Hood Franklin Rd	68	71	3	No
I-5 NB	Hood Franklin Rd to Twin Cities Rd	67	72	5	Yes
I-5 SB	Hood Franklin Rd to Twin Cities Rd	67	72	5	Yes
I-5 NB	Twin Cities Rd to Walnut Grove Rd	67	71	4	No
I-5 SB	Twin Cities Rd to Walnut Grove Rd	67	71	4	No
I-5 NB	Walnut Grove Rd to Peltier Rd	67	69	2	No
I-5 SB	Walnut Grove Rd to Peltier Rd	67	69	2	No
I-5 NB	Peltier Rd to Turner Rd	67	69	2	No
I-5 SB	Peltier Rd to Turner Rd	68	69	1	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	~~Substantial Increase?~~Adverse Impact due to Traffic Noise?
I-5 NB	Turner Rd to SR 12	68	69	1	No
I-5 SB	Turner Rd to SR 12	66	68	2	No
I-5 NB	SR 12 to Eight Mile Rd	68	70	2	No
I-5 SB	SR 12 to Eight Mile Rd	68	69	1	No
I-5 NB	Eight Mile Rd to Hammer Ln	70	71	1	No
I-5 SB	Eight Mile Rd to Hammer Ln	69	70	1	No
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	68	9	Yes
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	68	13	Yes
SR 160	Scribner Rd to Hood Franklin Rd	53	68	15	Yes
SR 160	Hood Franklin Rd to Lambert Rd	55	70	15	Yes
SR 160	Lambert Rd to Paintersville Bridge	53	70	17	Yes
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	70	17	Yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	70	17	Yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	71	12	Yes
SR 160	A St (Isleton) to SR 12	58	71	13	Yes
SR 160	SR 12 to Brannan Island Rd	62	70	8	Yes
SR 84	West Sacramento City Limits to Courtland Rd	55	69	14	Yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	51	5	No
I-80 EB	Suisun Valley Rd to SR 12	73	75	2	No
I-80 WB	Suisun Valley Rd to SR 12	74	76	2	No
SR 12 EB	I-80 to Beck Ave	65	70	5	Yes
SR 12 WB	I-80 to Beck Ave	64	70	6	Yes
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	73	5	Yes
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	72	6	Yes
SR 12	Walters Rd/ to SR 113	63	71	8	Yes
SR 12	SR 113 to SR 84 (River Rd)	64	71	7	Yes
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	71	7	Yes
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	66	4	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	~~Substantial Increase?~~Adverse Impact due to Traffic Noise?
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	66	3	No
I-80 EB	SR 113 to Pedrick Rd	71	73	2	No
I-80 WB	SR 113 to Pedrick Rd	71	73	2	No
SR 113	I-80 to Dixon City Limits	64	70	6	Yes
SR 113	Dixon City Limits to SR 12	57	69	12	Yes
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	69	8	Yes
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	70	7	Yes
SR 4	Discovery Bay Blvd to Tracy Blvd	61	69	8	Yes
SR 4	Tracy Blvd to I-5	64	70	6	Yes
I-5 NB	SR 4 (Freeway) to SR 4 (Charter Way)	71	73	2	No
I-5 SB	SR 4 (Freeway) to SR 4 (Charter Way)	72	74	2	No
I-5 NB	SR 4 (Charter Way) to Eighth Street	71	73	2	No
I-5 SB	SR 4 (Charter Way) to Eighth Street	72	74	2	No
I-205 EB	I-580 to Mountain House Pkwy	69	71	2	No
I-205 WB	I-580 to Mountain House Pkwy	69	71	2	No
I-205 EB	Mountain House Pkwy to Eleventh St	69	71	2	No
I-205 WB	Mountain House Pkwy to Eleventh St	68	71	3	No
I-205 EB	Grant Line Rd to Tracy Blvd	68	70	2	No
I-205 WB	Grant Line Rd to Tracy Blvd	67	69	2	No
I-205 EB	Tracy Blvd to MacArthur Dr	68	70	2	No
I-205 WB	Tracy Blvd to MacArthur Dr	68	69	1	No
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	50	2	No
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	68	6	Yes
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	68	7	Yes
Cypress Rd	Main Street to Bethel Island Rd	58	60	2	No
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	57	2	No
Delta Rd	Main Street to Byron Hwy	55	55	0	No
Pocket Rd	I-5 to Freeport Blvd	63	67	4	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	~~Substantial Increase?~~Adverse Impact due to Traffic Noise?
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	66	10	Yes
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	56	1	No
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	69	18	Yes
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	68	24	Yes
Lambert Rd	Herzog Rd to Franklin Blvd	46	68	22	Yes
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	50	2	No
Twin Cities Rd	River Rd to I-5	53	62	9	Yes
Twin Cities Rd	I-5 to Franklin Blvd	55	56	1	No
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	67	17	Yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	59	8	No
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	62	7	Yes
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	62	7	Yes
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	59	5	No
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	59	14	No
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	49	3	No
Jackson Slough Rd	Isleton City Limits to SR 12	47	50	3	No
Jackson Slough Rd	Brannan Island Rd to SR 12	47	50	3	No
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	62	9	Yes
Peltier Rd	Blossom Rd to I-5	44	48	4	No
Tracy Blvd	SR 4 to Clifton Court Rd	53	62	9	Yes
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	62	10	Yes
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	67	8	Yes
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	67	13	Yes
Mountain House Pkwy	Arnaudo Blvd to I-205	58	67	9	Yes
Eight Mile Rd	Stockton City Limits to I-5	58	60	2	No
Tracy Blvd	Tracy City Limits to I-205	58	63	5	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	~~Substantial Increase?~~Adverse Impact due to Traffic Noise?
Harbor Blvd	Industrial Blvd to US 50	63	68	5	Yes
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	68	6	Yes
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	68	6	Yes
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	67	16	Yes
River Rd	Freeport Bridge to Courtland Rd	54	54	0	No
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	68	20	Yes
Courtland Rd	SR 84 to River Rd	48	68	20	Yes

As shown in Table 23-20, predicted future loudest-hour traffic noise levels from project-generated worker commutes and truck trips would result in a noise level of 60 dBA Leq or more, and an increase of 5 dB or more compared to existing traffic noise levels along 54 project roadway segments.~~predicted future traffic noise levels from project-generated worker commutes and truck trips would result in an increase of 12 dB or more compared to existing traffic noise levels along 16 project roadway segments.~~

During intake construction, segments of SR 160 between Freeport Bridge and Walnut Grove Bridge would be temporarily realigned around intake construction sites. As a result, future project noise levels would further increase at residences located near intake sites. Under Alternative 1A, noise levels at receivers near realigned segments of SR 160 would increase by up to 12 dB in addition to the noise increase shown in Table 23-20.

Traffic noise from haul trucks and commuter vehicles on public roads is predicted to exceed daytime traffic noise thresholds at nearby residences, parks and other uses at affected parcels indicated in Table 23-20A. Traffic noise contours are shown in Appendix 23A.

Table 23-20A. Land Use Zones Adjacent to Project Haul Routes Affected by Increases in Traffic Noise, Pipeline-Tunnel Conveyance Option

Location	Zoning	Total Affected Parcels, Daytime Threshold (60 dBA L_{eq} [1h]) and a 5 dB increase over existing levels
Alameda County	Agricultural/Other [a]	10
Contra Costa County	Agricultural/Other [a]	363
	Residential	3
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	120
	Natural/Recreational	155
	Agricultural/Other [a]	544
San Joaquin County	Residential	77
	Natural/Recreational	1
	Agricultural/Other [a]	192
City of Stockton		70
City of Tracy		11
Solano County	Natural/Recreational	9
	Agricultural/Other [a]	648
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Agricultural/Other [a]	90
City of West Sacramento		199
Other jurisdictions		538

[a] Includes agricultural or unclassified use that permits residential use.

The increase in noise levels would exceed the project threshold for traffic noise and would be considered adverse. Mitigation Measures NOI-1a and NOI-1b are available to address this effect.

Construction of Power Transmission Lines

Potential reasonable worst-case equipment noise levels from construction of the power transmission lines were evaluated by combining the noise levels of the three loudest pieces of equipment that would likely operate at the same time (an excavator, a truck and a drill rig for driving micropiles for construction of towers). Assuming 100% utilization within a given hour of day, the combined noise level is 91 dBA L_{eq} (1hr) at 50 feet. The estimated sound levels from construction as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-21.

Table 23-21. Predicted Noise Levels from Construction of Transmission Lines

Distance Between Source and Receiver (feet)	Calculated L_{eq} (1hr) ~~/ Nighttime L_{max} Sound Level (dBA)~~
50	91
100	83
200	75
400	67
600	63
800	**60**
1,000	57
1,200	55
1,400	53
1,800	**50**
2,000	49
3,000	44

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Bold denotes daytime (1hr) and nighttime (1hr) ~~maximum~~ noise thresholds.

L_{eq} (1 hour) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

The results shown in Table 23-21 indicate that noise-sensitive land uses within 800 feet of an active transmission line construction area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ ~~L_{eq}~~ would be exceeded at a distance of 1,800 feet from the construction area.

Construction of transmission lines would also include helicopter use for installing conductor line. Use of helicopters would be temporary and intermittent. Two light-duty helicopters were assumed to operate four hours a day to install new poles and lines. Light- to medium-duty helicopters have a source level of up to 84 L_{max} at a reference distance of 500 feet (Nelson 1987). It would generally take less than 10 minutes to string the line at each structure. It is estimated that helicopters would not be in any given line mile for more than 3 hours. Given that noise exposure to helicopters would be generally isolated to line-stringing events, it is not considered to contribute significantly to ambient noise during periods of construction.

Noise-sensitive land uses that could potentially be exposed to adverse noise impacts due to transmission line construction would extend outside the transmission line right-of-way within the utility planning area. Several residential land uses are near the proposed transmission line construction footprint. Likewise, Delta Elementary School and Delta High School on the west bank of the Sacramento River are within half a mile of the proposed Intake 2 transmission lines. Although there would be risk of increased noise levels, compared to the conveyance and associated components, the duration of construction of transmission lines would be shorter-term. Noise impacts would be intermittent and temporary, and would cease once construction work is complete.

Although this assessment includes daytime and nighttime construction noise estimates, construction of the transmission lines would primarily occur during daylight hours. If nighttime construction of

the transmission lines were to occur, noise levels could be the same as those generated during daytime hours.

The effect of exposing noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Earth-moving activities at offsite borrow/spoil areas

Potential reasonable worst-case equipment noise levels from earth-moving activities at offsite borrow/spoil areas were evaluated by combining the noise levels of the three loudest pieces of equipment that would likely operate at the same time (an excavator, a truck and a bulldozer). Assuming 100% utilization within a given hour of day, the combined noise level would be 91 dBA L_{eq} (1hr) at 50 feet. The estimated sound levels from construction as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-22.

The results shown in Table 23-22 indicate that noise-sensitive land uses within 800 feet of equipment operating in the borrow/spoil area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 1,800 feet from the area. Borrow/spoil areas are located throughout the conveyance alignment and are generally adjacent to or in close proximity of intake pumping plant sites, forebays, and main tunnel construction shafts. Noise-sensitive land uses that could potentially be exposed to adverse noise impacts due to earth-moving activities in offsite borrow/spoil areas would extend outside the borrow/spoil area right-of-way. The effect of exposing these noise-sensitive land uses to noise increases above thresholds would be adverse. However, with the exception of tunneling and RTM placement, most construction activities would occur during daytime hours. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Table 23-22. Predicted Noise Levels from Earth-moving at offsite borrow/spoil areas

Distance Between Source and Receiver (feet)	Calculated L_{eq} (1hr)~~/Nighttime L_{max} Sound Level (dBA)~~
50	91
100	83
200	75
400	67
600	63
800	**60**
1,000	57
1,200	55
1,400	53
1,800	**50**
2,000	49
3,000	44

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Bold denotes daytime (1hr) and nighttime (1hr) ~~maximum~~ noise thresholds.

L_{eq} (1 hour) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

Blasting at Excavation sites

Noise and vibration generated by blasting is a complex function of the charge size, charge depth, hole size, degree of confinement, initiation methods, spatial distribution of charges, and other factors. To provide a general indication of the potential for airblast and vibration impacts from blasting, airblast and ground-vibration values as a function of distance have been estimated using methods recommended by Caltrans (2004). The calculation assumes a charge size of 300 pounds ignited under average normal confinement. Ground vibration from blasting would exceed the U.S. Bureau of Mines vibration criterion of 0.5 in/second PPV within about 550 of a blasting site. The probable peak overpressure would be about 130 dB within 300 feet of the blasting site. This impact is considered to be less then significant. (This assumes that a commitment can be added to not conduct blasting within 1000 feet of noise sensitive areas.)

Noise exposure to workers at construction sites

Construction noise would affect workers on site. However, workers are subject to state and federal Occupational Health and Safety (OSHA) standards. OSHA mitigation standards for noise limits exposure are as follows: an 8-hour time-weighted average of 85 dBA or a dose of 50 percent are referred to as OSHA action levels [29 CFR 1910.95(c)(2)]. Occupational exposure to noise levels in excess of 85 dBA requires monitoring and mitigation to protect workers. Given that on-site workers would be protected under OSHA requirements, no adverse impacts would occur to workers.

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Prior to construction, BDCP proponents will make a construction schedule available to residents living in the vicinity of the construction areas before construction begins, and designate a noise disturbance coordinator. The coordinator will be responsible for responding to complaints regarding construction noise, will determine the cause of the complaint, and will ensure that reasonable measures are implemented to correct the problem when feasible. A contact telephone number for the noise disturbance coordinator will be conspicuously posted on construction site fences and will be included in the notification of the construction schedule.

Achievable noise reduction varies by measure. Shutting off a piece of equipment would eliminate its contribution to ambient noise. Noise barriers and enclosures would provide noise reduction within the discrete area shielding noise from surrounding noise sensitive receptors. Barriers can provide 5 to 15 dB of noise reduction depending configuration relative to surrounding terrain. Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.

~~23.3.3.2~~23.3.3.3 Alternative 1B—Dual Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario A)

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Table 23-30. Predicted Loudest-hour Future Traffic Noise Levels on Commuter Roads and Haul Routes, East Alignment

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	58	65	7	Yes
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	61	67	6	Yes
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	60	66	6	Yes
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	61	0	No
Bethel Island Rd	Oakley City Limits to End	55	56	1	No
Balfour Rd	Brentwood City Limits to Byron Hwy	54	56	2	No
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	67	5	Yes
Byron Hwy	Delta Rd to Old SR 4	53	54	1	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	65	6	Yes
I-5 NB	Florin Rd to Pocket Rd	72	74	2	No
I-5 SB	Florin Rd to Pocket Rd	72	74	2	No
I-5 NB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 SB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 NB	Laguna Blvd to Elk Grove Blvd	70	70	0	No
I-5 SB	Laguna Blvd to Elk Grove Blvd	70	70	0	No
I-5 NB	Elk Grove Blvd to Hood Franklin Rd	68	71	3	No
I-5 SB	Elk Grove Blvd to Hood Franklin Rd	68	71	3	No
I-5 NB	Hood Franklin Rd to Twin Cities Rd	67	73	6	Yes
I-5 SB	Hood Franklin Rd to Twin Cities Rd	67	73	6	Yes
I-5 NB	Twin Cities Rd to Walnut Grove Rd	67	70	3	No
I-5 SB	Twin Cities Rd to Walnut Grove Rd	67	70	3	No
I-5 NB	Walnut Grove Rd to Peltier Rd	67	69	2	No
I-5 SB	Walnut Grove Rd to Peltier Rd	67	69	2	No
I-5 NB	Peltier Rd to Turner Rd	67	69	2	No
I-5 SB	Peltier Rd to Turner Rd	68	70	2	No
I-5 NB	Turner Rd to SR 12	68	69	1	No
I-5 SB	Turner Rd to SR 12	66	68	2	No
I-5 NB	SR 12 to Eight Mile Rd	68	70	2	No
I-5 SB	SR 12 to Eight Mile Rd	68	70	2	No
I-5 NB	Eight Mile Rd to Hammer Ln	70	71	1	No
I-5 SB	Eight Mile Rd to Hammer Ln	69	71	2	No
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	70	11	Yes
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	70	15	Yes
SR 160	Scribner Rd to Hood Franklin Rd	53	70	17	Yes
SR 160	Hood Franklin Rd to Lambert Rd	55	72	17	Yes
SR 160	Lambert Rd to Paintersville Bridge	53	72	19	Yes
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	72	19	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	73	20	Yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	74	15	Yes
SR 160	A St (Isleton) to SR 12	58	74	16	Yes
SR 160	SR 12 to Brannan Island Rd	62	74	12	Yes
SR 84	West Sacramento City Limits to Courtland Rd	55	67	12	Yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	52	6	No
I-80 EB	Suisun Valley Rd to SR 12	73	76	3	No
I-80 WB	Suisun Valley Rd to SR 12	74	77	3	No
SR 12 EB	I-80 to Beck Ave	65	72	7	Yes
SR 12 WB	I-80 to Beck Ave	64	72	8	Yes
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	75	7	Yes
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	74	8	Yes
SR 12	Walters Rd/ to SR 113	63	74	11	Yes
SR 12	SR 113 to SR 84 (River Rd)	64	74	10	Yes
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	74	10	Yes
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	65	3	No
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	65	2	No
I-80 EB	SR 113 to Pedrick Rd	71	73	2	No
I-80 WB	SR 113 to Pedrick Rd	71	72	1	No
SR 113	I-80 to Dixon City Limits	64	69	5	Yes
SR 113	Dixon City Limits to SR 12	57	69	12	Yes
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	71	10	Yes
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	71	8	Yes
SR 4	Discovery Bay Blvd to Tracy Blvd	61	71	10	Yes
SR 4	Tracy Blvd to I-5	64	71	7	Yes
I-5 NB	SR 4 (Freeway) to SR 4 (Charter Way)	71	74	3	No
I-5 SB	SR 4 (Freeway) to SR 4 (Charter Way)	72	74	2	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
I-5 NB	SR 4 (Charter Way) to Eighth Street	71	74	3	No
I-5 SB	SR 4 (Charter Way) to Eighth Street	72	74	2	No
I-205 EB	I-580 to Mountain House Pkwy	69	71	2	No
I-205 WB	I-580 to Mountain House Pkwy	69	70	1	No
I-205 EB	Mountain House Pkwy to Eleventh St	69	71	2	No
I-205 WB	Mountain House Pkwy to Eleventh St	68	70	2	No
I-205 EB	Grant Line Rd to Tracy Blvd	68	70	2	No
I-205 WB	Grant Line Rd to Tracy Blvd	67	70	3	No
I-205 EB	Tracy Blvd to MacArthur Dr	68	70	2	No
I-205 WB	Tracy Blvd to MacArthur Dr	68	70	2	No
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	51	3	No
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	67	5	Yes
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	67	6	Yes
Cypress Rd	Main Street to Bethel Island Rd	58	59	1	No
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	56	1	No
Delta Rd	Main Street to Byron Hwy	55	56	1	No
Pocket Rd	I-5 to Freeport Blvd	63	69	6	Yes
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	69	13	Yes
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	62	7	Yes
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	71	20	Yes
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	64	20	Yes
Lambert Rd	Herzog Rd to Franklin Blvd	46	64	18	Yes
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	64	16	Yes
Twin Cities Rd	River Rd to I-5	53	60	7	Yes
Twin Cities Rd	I-5 to Franklin Blvd	55	64	9	Yes
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	65	15	Yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	53	2	No
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	60	5	Yes
Walnut Grove	Walnut Grove Bridge to	55	61	6	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Rd/River Rd	Sacramento Co./ SJ Co. Line				
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	55	1	No
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	50	5	No
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	50	4	No
Jackson Slough Rd	Isleton City Limits to SR 12	47	51	4	No
Jackson Slough Rd	Brannan Island Rd to SR 12	47	50	3	No
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	66	13	Yes
Peltier Rd	Blossom Rd to I-5	44	64	20	Yes
Tracy Blvd	SR 4 to Clifton Court Rd	53	67	14	Yes
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	67	15	Yes
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	65	6	Yes
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	65	11	Yes
Mountain House Pkwy	Arnaudo Blvd to I-205	58	65	7	Yes
Eight Mile Rd	Stockton City Limits to I-5	58	65	7	Yes
Tracy Blvd	Tracy City Limits to I-205	58	67	9	Yes
Harbor Blvd	Industrial Blvd to US 50	63	67	4	No
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	66	4	No
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	66	4	No
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	65	14	Yes
River Rd	Freeport Bridge to Courtland Rd	54	55	1	No
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	65	17	Yes
Courtland Rd	SR 84 to River Rd	48	65	17	Yes

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Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	58	65	7	no
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	61	66	5	no
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	60	66	6	no
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	61	0	no
Bethel Island Rd	Oakley City Limits to End	55	55	0	no
Balfour Rd	Brentwood City Limits to Byron Hwy	54	54	0	no
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	66	4	no
Byron Hwy	Delta Rd to Old SR 4	53	53	0	no
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	65	6	no
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	70	11	no
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	69	14	yes
SR 160	Scribner Rd to Hood Franklin Rd	53	69	16	yes
SR 160	Hood Franklin Rd to Lambert Rd	55	71	16	yes
SR 160	Lambert Rd to Paintersville Bridge	53	71	18	yes
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	72	19	yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	72	19	yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	72	13	yes
SR 160	A St (Isleton) to SR 12	58	72	14	yes
SR 160	SR 12 to Brannan Island Rd	62	73	11	no
SR 84	West Sacramento City Limits to Courtland Rd	55	66	11	no
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	46	0	no
SR 12 EB	I-80 to Beck Ave	65	71	6	no
SR 12 WB	I-80 to Beck Ave	64	71	7	no

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	74	6	no
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	74	8	no
SR 12	Walters Rd/ to SR 113	63	73	10	no
SR 12	SR 113 to SR 84 (River Rd)	64	73	9	no
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	73	9	no
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	65	3	no
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	65	2	no
SR 113	I-80 to Dixon City Limits	64	69	5	no
SR 113	Dixon City Limits to SR 12	57	68	11	no
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	70	9	no
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	71	8	no
SR 4	Discovery Bay Blvd to Tracy Blvd	61	70	9	no
SR 4	Tracy Blvd to I-5	64	71	7	no
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	48	0	no
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	66	4	no
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	66	5	no
Cypress Rd	Main Street to Bethel Island Rd	58	58	0	no
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	55	0	no
Delta Rd	Main Street to Byron Hwy	55	55	0	no
Pocket Rd	I-5 to Freeport Blvd	63	69	6	no
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	68	12	yes
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	65	10	no
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	69	18	yes
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	63	19	yes
Lambert Rd	Herzog Rd to Franklin Blvd	46	63	17	yes
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	63	15	yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Twin Cities Rd	River Rd to I-5	53	59	6	no
Twin Cities Rd	I-5 to Franklin Blvd	55	63	8	no
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	64	14	yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	51	0	no
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	60	5	no
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	61	6	no
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	54	0	no
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	45	0	no
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	46	0	no
Jackson Slough Rd	Isleton City Limits to SR 12	47	47	0	no
Jackson Slough Rd	Brannan Island Rd to SR 12	47	47	0	no
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	65	12	yes
Peltier Rd	Blossom Rd to I-5	44	63	19	yes
Tracy Blvd	SR 4 to Clifton Court Rd	53	66	13	yes
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	66	14	yes
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	65	6	no
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	64	10	no
Mountain House Pkwy	Arnaudo Blvd to I-205	58	65	7	no
Eight Mile Rd	Stockton City Limits to I-5	58	65	7	no
Tracy Blvd	Tracy City Limits to I-205	58	67	9	no
Harbor Blvd	Industrial Blvd to US 50	63	66	3	no
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	66	4	no
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	66	4	no
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	64	13	yes

~~Roadway~~	~~Segment~~	~~Existing Noise Level, dBA~~	~~Future With-Project Noise Level, dBA~~	~~Noise Level Increase, dB~~	~~Substantial Increase?~~
~~River Rd~~	~~Freeport Bridge to Courtland Rd~~	~~54~~	~~54~~	~~**0**~~	~~**no**~~
~~River Rd~~	~~Courtland Rd to Sacramento Co./ Yolo Co. Line~~	~~48~~	~~64~~	~~**16**~~	~~**yes**~~
~~Courtland Rd~~	~~SR 84 to River Rd~~	~~48~~	~~64~~	~~**16**~~	~~**yes**~~

As shown in Table 23-30, predicted future loudest-hour traffic noise levels from project-generated worker commutes and truck trips would result in a noise level of 60 dBA Leq or more, and an increase of 5 dB or more compared to existing traffic noise levels along 57 project roadway segments.~~predicted future traffic noise levels from project-generated worker commutes and truck trips would result in an increase of 12 dB or more compared to existing traffic noise levels along 21 project roadway segments.~~

During intake construction, segments of SR 160 between Freeport Bridge and Walnut Grove Bridge would be temporarily realigned around intake construction sites. As a result, future project noise levels would further increase at residences located near intake sites. Under Alternative 1B, noise levels at receivers near realigned segments of SR 160 would increase by up to 12 dB in addition to the noise increase shown in Table 23-30.

Traffic noise from haul trucks and commuter vehicles on public roads is predicted to exceed daytime traffic noise thresholds at nearby residences, parks and other uses at affected parcels indicated in Table 23-30A. Traffic noise contours are shown in Appendix 23A.

Table 23-30A. Land Use Zones Adjacent to Project Haul Routes Affected by Increases in Traffic Noise, East Conveyance Alignment Option

Location	Zoning	Total Affected Parcels, Daytime Threshold (60 dBA L_{eq} [1h]) and a 5 dB increase over existing levels
Alameda County	Agricultural/Other [a]	10
Contra Costa County	Agricultural/Other [a]	363
	Residential	3
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	120
	Natural/Recreational	156
	Agricultural/Other [a]	576
San Joaquin County	Residential	77
	Natural/Recreational	1
	Agricultural/Other [a]	210
City of Stockton		147
City of Tracy		11
Solano County	Natural/Recreational	9
	Agricultural/Other [a]	648
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Agricultural/Other [a]	95
City of West Sacramento		21
Other Jurisdictions		538

[a] Includes agricultural or unclassified use that permits residential use.

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Please see Mitigation Measure NOI-1b under Impact NOI-1 in the discussion of Alternative 1A.

Achievable noise reduction varies by measure. Shutting off a piece of equipment would eliminate its contribution to ambient noise. Noise barriers and enclosures would provide noise reduction within the discrete area shielding noise from surrounding noise sensitive receptors. Barriers can provide 5 to 15 dB of noise reduction depending configuration relative to surrounding terrain. Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.

~~23.3.3.3~~23.3.3.4 Alternative 1C—Dual Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario A)

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

Table 23-37. Predicted Loudest-hour Future Traffic Noise Levels on Commuter Roads and Haul Routes, West Alignment

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	58	68	10	Yes
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	61	69	8	Yes
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	60	68	8	Yes
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	65	4	No
Bethel Island Rd	Oakley City Limits to End	55	58	3	No
Balfour Rd	Brentwood City Limits to Byron Hwy	54	63	9	Yes
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	69	7	Yes
Byron Hwy	Delta Rd to Old SR 4	53	65	12	Yes
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	68	9	Yes
I-5 NB	Florin Rd to Pocket Rd	72	75	3	No
I-5 SB	Florin Rd to Pocket Rd	72	75	3	No
I-5 NB	Pocket Rd to Laguna Blvd	72	73	1	No
I-5 SB	Pocket Rd to Laguna Blvd	72	73	1	No
I-5 NB	Laguna Blvd to Elk Grove Blvd	70	70	0	No
I-5 SB	Laguna Blvd to Elk Grove Blvd	70	70	0	No
I-5 NB	Elk Grove Blvd to Hood Franklin Rd	68	68	0	No
I-5 SB	Elk Grove Blvd to Hood Franklin Rd	68	69	1	No
I-5 NB	Hood Franklin Rd to Twin Cities Rd	67	68	1	No
I-5 SB	Hood Franklin Rd to Twin Cities Rd	67	68	1	No
I-5 NB	Twin Cities Rd to Walnut Grove Rd	67	71	4	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
I-5 SB	Twin Cities Rd to Walnut Grove Rd	67	72	5	Yes
I-5 NB	Walnut Grove Rd to Peltier Rd	67	72	5	Yes
I-5 SB	Walnut Grove Rd to Peltier Rd	67	72	5	Yes
I-5 NB	Peltier Rd to Turner Rd	67	68	1	No
I-5 SB	Peltier Rd to Turner Rd	68	68	0	No
I-5 NB	Turner Rd to SR 12	68	70	2	No
I-5 SB	Turner Rd to SR 12	66	69	3	No
I-5 NB	SR 12 to Eight Mile Rd	68	69	1	No
I-5 SB	SR 12 to Eight Mile Rd	68	69	1	No
I-5 NB	Eight Mile Rd to Hammer Ln	70	71	1	No
I-5 SB	Eight Mile Rd to Hammer Ln	69	70	1	No
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	72	13	Yes
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	56	1	No
SR 160	Scribner Rd to Hood Franklin Rd	53	55	2	No
SR 160	Hood Franklin Rd to Lambert Rd	55	56	1	No
SR 160	Lambert Rd to Paintersville Bridge	53	55	2	No
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	71	18	Yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	74	21	Yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	74	15	Yes
SR 160	A St (Isleton) to SR 12	58	74	16	Yes
SR 160	SR 12 to Brannan Island Rd	62	74	12	Yes
SR 84	West Sacramento City Limits to Courtland Rd	55	72	17	Yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	63	17	Yes
I-80 EB	Suisun Valley Rd to SR 12	73	76	3	No
I-80 WB	Suisun Valley Rd to SR 12	74	77	3	No
SR 12 EB	I-80 to Beck Ave	65	72	7	Yes
SR 12 WB	I-80 to Beck Ave	64	72	8	Yes
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	75	7	Yes
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	75	9	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
SR 12	Walters Rd/ to SR 113	63	74	11	Yes
SR 12	SR 113 to SR 84 (River Rd)	64	74	10	Yes
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	74	10	Yes
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	68	6	Yes
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	68	5	Yes
I-80 EB	SR 113 to Pedrick Rd	71	73	2	No
I-80 WB	SR 113 to Pedrick Rd	71	73	2	No
SR 113	I-80 to Dixon City Limits	64	70	6	Yes
SR 113	Dixon City Limits to SR 12	57	70	13	Yes
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	70	9	Yes
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	70	7	Yes
SR 4	Discovery Bay Blvd to Tracy Blvd	61	70	9	Yes
SR 4	Tracy Blvd to I-5	64	71	7	Yes
I-5 NB	SR 4 (Freeway) to SR 4 (Charter Way)	71	74	3	No
I-5 SB	SR 4 (Freeway) to SR 4 (Charter Way)	72	74	2	No
I-5 NB	SR 4 (Charter Way) to Eighth Street	71	74	3	No
I-5 SB	SR 4 (Charter Way) to Eighth Street	72	74	2	No
I-205 EB	I-580 to Mountain House Pkwy	69	72	3	No
I-205 WB	I-580 to Mountain House Pkwy	69	71	2	No
I-205 EB	Mountain House Pkwy to Eleventh St	69	72	3	No
I-205 WB	Mountain House Pkwy to Eleventh St	68	71	3	No
I-205 EB	Grant Line Rd to Tracy Blvd	68	69	1	No
I-205 WB	Grant Line Rd to Tracy Blvd	67	68	1	No
I-205 EB	Tracy Blvd to MacArthur Dr	68	69	1	No
I-205 WB	Tracy Blvd to MacArthur Dr	68	68	0	No
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	51	3	No
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	69	7	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	69	8	Yes
Cypress Rd	Main Street to Bethel Island Rd	58	65	7	Yes
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	58	3	No
Delta Rd	Main Street to Byron Hwy	55	66	11	Yes
Pocket Rd	I-5 to Freeport Blvd	63	71	8	Yes
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	70	14	Yes
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	70	15	Yes
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	53	2	No
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	49	5	No
Lambert Rd	Herzog Rd to Franklin Blvd	46	49	3	No
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	51	3	No
Twin Cities Rd	River Rd to I-5	53	69	16	Yes
Twin Cities Rd	I-5 to Franklin Blvd	55	56	1	No
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	72	22	Yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	69	18	Yes
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	58	3	No
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	70	15	Yes
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	55	1	No
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	49	4	No
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	49	3	No
Jackson Slough Rd	Isleton City Limits to SR 12	47	50	3	No
Jackson Slough Rd	Brannan Island Rd to SR 12	47	50	3	No
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	70	17	Yes
Peltier Rd	Blossom Rd to I-5	44	49	5	No
Tracy Blvd	SR 4 to Clifton Court Rd	53	54	1	No
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	53	1	No
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	68	9	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	68	14	Yes
Mountain House Pkwy	Arnaudo Blvd to I-205	58	68	10	Yes
Eight Mile Rd	Stockton City Limits to I-5	58	59	1	No
Tracy Blvd	Tracy City Limits to I-205	58	59	1	No
Harbor Blvd	Industrial Blvd to US 50	63	71	8	Yes
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	71	9	Yes
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	71	9	Yes
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	70	19	Yes
River Rd	Freeport Bridge to Courtland Rd	54	70	16	Yes
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	72	24	Yes
Courtland Rd	SR 84 to River Rd	48	70	22	Yes

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~~Roadway~~	~~Segment~~	~~Existing Noise Level, dBA~~	~~Future With-Project Noise Level, dBA~~	~~Noise Level Increase, dB~~	~~Substantial Increase?~~
~~Byron Hwy~~	~~Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line~~	~~58~~	~~68~~	~~**10**~~	~~**no**~~
~~Brentwood Blvd~~	~~Delta Rd (Oakley City Limits) to Balfour Rd~~	~~61~~	~~69~~	~~**8**~~	~~**no**~~
~~Brentwood Blvd~~	~~Balfour Rd to Brentwood City Limits (South)~~	~~60~~	~~69~~	~~**9**~~	~~**no**~~
~~Balfour Rd~~	~~Brentwood Blvd to Brentwood City Limits~~	~~61~~	~~65~~	~~**4**~~	~~**no**~~
~~Bethel Island Rd~~	~~Oakley City Limits to End~~	~~55~~	~~57~~	~~**2**~~	~~**no**~~
~~Balfour Rd~~	~~Brentwood City Limits to Byron Hwy~~	~~54~~	~~63~~	~~**9**~~	~~**no**~~
~~Old SR 41~~	~~Brentwood City Limits (South) to Marsh Creek Rd~~	~~62~~	~~69~~	~~**7**~~	~~**no**~~
~~Byron Hwy~~	~~Delta Rd to Old SR 4~~	~~53~~	~~66~~	~~**13**~~	~~**yes**~~
~~Byron Hwy~~	~~SR 4 to Contra Costa Co./ Alameda Co. Line~~	~~59~~	~~69~~	~~**10**~~	~~**no**~~
~~SR 160 (Freeport Blvd)~~	~~Sacramento City Limits to Freeport Bridge~~	~~59~~	~~72~~	~~**13**~~	~~**yes**~~

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	55	0	no
SR 160	Scribner Rd to Hood Franklin Rd	53	53	0	no
SR 160	Hood Franklin Rd to Lambert Rd	55	55	0	no
SR 160	Lambert Rd to Paintersville Bridge	53	53	0	no
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	74	21	yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	74	21	yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	74	15	yes
SR 160	A St (Isleton) to SR 12	58	74	16	yes
SR 160	SR 12 to Brannan Island Rd	62	74	12	yes
SR 84	West Sacramento City Limits to Courtland Rd	55	72	17	yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	63	17	yes
SR 12 EB	I-80 to Beck Ave	65	72	7	no
SR 12 WB	I-80 to Beck Ave	64	72	8	no
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	75	7	no
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	75	9	no
SR 12	Walters Rd/ to SR 113	63	74	11	no
SR 12	SR 113 to SR 84 (River Rd)	64	74	10	no
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	74	10	no
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	67	5	no
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	67	4	no
SR 113	I-80 to Dixon City Limits	64	71	7	no
SR 113	Dixon City Limits to SR 12	57	70	13	yes
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	70	9	no
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	71	8	no
SR 4	Discovery Bay Blvd to Tracy Blvd	61	70	9	no
SR 4	Tracy Blvd to I-5	64	71	7	no
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	48	0	no

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	69	7	no
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	69	8	no
Cypress Rd	Main Street to Bethel Island Rd	58	64	6	no
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	57	2	no
Delta Rd	Main Street to Byron Hwy	55	66	11	no
Pocket Rd	I-5 to Freeport Blvd	63	71	8	no
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	70	14	yes
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	70	15	yes
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	51	0	no
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	44	0	no
Lambert Rd	Herzog Rd to Franklin Blvd	46	46	0	no
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	48	0	no
Twin Cities Rd	River Rd to I-5	53	69	16	yes
Twin Cities Rd	I-5 to Franklin Blvd	55	55	0	no
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	72	22	yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	69	18	yes
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	57	2	no
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	69	14	yes
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	54	0	no
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	45	0	no
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	46	0	no
Jackson Slough Rd	Isleton City Limits to SR 12	47	47	0	no
Jackson Slough Rd	Brannan Island Rd to SR 12	47	47	0	no
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	69	16	yes
Peltier Rd	Blossom Rd to I-5	44	44	0	no
Tracy Blvd	SR 4 to Clifton Court Rd	53	53	0	no
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	52	0	no
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	69	10	no

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	68	**14**	**yes**
Mountain House Pkwy	Arnaudo Blvd to I-205	58	69	**11**	**no**
Eight Mile Rd	Stockton City Limits to I-5	58	58	**0**	**no**
Tracy Blvd	Tracy City Limits to I-205	58	58	**0**	**no**
Harbor Blvd	Industrial Blvd to US 50	63	71	**8**	**no**
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	71	**9**	**no**
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	71	**9**	**no**
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	70	**19**	**yes**
River Rd	Freeport Bridge to Courtland Rd	54	70	**16**	**yes**
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	72	**24**	**yes**
Courtland Rd	SR 84 to River Rd	48	70	**22**	**yes**

As shown in Table 23-37, predicted future loudest-hour traffic noise levels from project-generated worker commutes and truck trips would result in a noise level of 60 dBA Leq or more, and an increase of 5 dB or more compared to existing traffic noise levels along 55 project roadway segments.predicted future traffic noise levels from project-generated worker commutes and truck trips would result in an increase of 12 dB or more compared to existing traffic noise levels along 22 project roadway segments.

During intake construction, segments of County Highway E9 would be temporarily realigned around intake construction sites. Under the west alignment alternative, no additional noise increase is anticipated at residences adjacent to intake construction sites.

Traffic noise from haul trucks and commuter vehicles on public roads is predicted to exceed daytime traffic noise thresholds at nearby residences, parks and other uses at affected parcels indicated in Table 23-37A. Traffic noise contours are shown in Appendix 23A.

Table 23-37A. Land Use Zones Adjacent to Project Haul Routes Affected by Increases in Traffic Noise, West Conveyance Alignment Option

Location	Zoning	Total Affected Parcels, Daytime Threshold (60 dBA L_{eq} [1h]) and a 5 dB increase over existing levels
Alameda County	Agricultural/Other [a]	10
Contra Costa County	Agricultural/Other [a]	537
	Residential	14
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	69
	Natural/Recreational	125
	Agricultural/Other [a]	426
San Joaquin County	Residential	73
	Natural/Recreational	3
	Agricultural/Other [a]	179
City of Stockton		70
Solano County	Natural/Recreational	9
	Agricultural/Other [a]	691
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Agricultural/Other [a]	284
	Residential	11
City of West Sacramento		199
Other Jurisdictions		660

[a] Includes agricultural or unclassified use that permits residential use.

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Please see Mitigation Measure NOI-1b under Impact NOI-1 in the discussion of Alternative 1A.

Achievable noise reduction varies by measure. Shutting off a piece of equipment would eliminate its contribution to ambient noise. Noise barriers and enclosures would provide noise reduction within the discrete area shielding noise from surrounding noise sensitive receptors. Barriers can provide 5 to 15 dB of noise reduction depending configuration relative to surrounding terrain. Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.

~~23.3.3.8~~23.3.3.9 Alternative 4—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H)

Three intakes would be constructed under Alternative 4 on the east bank of the Sacramento River. This alternative would also construct an intermediate forebay, and the conveyance facility would be a buried pipeline (see Figures 3-9 and 3-10 in Chapter 3, *Description of Alternatives*).

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

NEPA Effects:

Construction of Intakes

Potential reasonable worst-case equipment noise levels from construction of the intakes were evaluated by combining the noise levels of the six loudest pieces of equipment that would likely operate at the same time (~~cranes and~~heavy trucks). Assuming 100% utilization within a given hour of day, the combined noise level is 96 dBA L_{eq} (1hr) at 50 feet. The estimated sound levels from construction as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-59.

Table 23-59. Predicted Noise Levels from Construction Activities

Distance Between Source and Receiver (feet)	Calculated L_{eq} (1hr)~~/Nighttime L_{max} Sound Level (dBA)~~
50	96
100	88
200	80
400	72
600	68
800	64
1,000	62
1,200	**60**
1,500	57
2,000	54
2,500	51
2,800	**50**
3,000	49
4,000	46
5,280	43

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Bold denotes daytime (1hr) and nighttime (1hr) ~~maximum~~ noise thresholds.

L_{eq} (1 hour) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

Estimated sound levels from impact pile driving conducted during periods of construction described above are shown in Table 23-60.

Typically noise from pile driving is not constant; however, because multiple pile drivers would be used, a utilization factor of 100% has been applied. Use of the pile driver simultaneously with noise from other equipment in Table 23-16 would produce a combined level of 102 dBA L_{eq} (1hr) at 50 feet, as shown in Table 23-60.

The results shown in Table 23-60 indicate that during periods of pile driving, residences within 2,000 feet of an active intake construction site could be exposed to construction noise in excess of the 60 dBA L_{eq} (1hr) daytime threshold. The nighttime threshold of 50 dBA L_{max} would be exceeded at a distance of 2,800 feet. Construction noise contours are shown in Appendix 23A.~~Because noise from pile driving is not constant, a utilization factor of 20% has been applied (Thalheimer 2000). The utilization factor reduces the impact pile driver peak level of 101 dBA to 94 dBA L_{eq} (1hr) at 50 feet. Use of the pile driver simultaneously with noise from other equipment in Table 23-59 would produce a combined level of 98 dBA L_{eq} (1hr) at 50 feet, as shown in Table 23-60. The results shown in Table 23-60 indicate that during periods of pile driving, residences located within 1,400 feet of an active intake construction site could be exposed to construction noise in excess of the DWR daytime (7 a.m. to 10 p.m.) maximum noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA L_{max} would be exceeded at a distance of 2,800 feet from an active intake construction site.~~

Table 23-60. Predicted Noise Levels from Construction—Pile Driving and Construction Equipment for Intake Structures

Distance Between Source and Receiver (feet)	Calculated Daytime L_{eq} (1hr) Sound Level (dBA)	Nighttime L_{eq} (1hr) ~~L_{max} Sound Level (dBA)~~
50~~50~~	102~~98~~	96~~96~~
100~~100~~	94~~90~~	88~~88~~
200~~200~~	86~~82~~	80~~80~~
400~~400~~	79~~74~~	72~~72~~
600~~600~~	74~~70~~	68~~68~~
800~~800~~	71~~66~~	64~~64~~
1,000~~1,000~~	68~~64~~	62~~62~~
1,200~~1,200~~	66~~62~~	60~~60~~
1,500~~**1,400**~~	63~~**60**~~	57~~57~~
2,000~~1,500~~	**60**~~59~~	54~~54~~
2,500~~2,000~~	58~~56~~	51~~51~~
2,800~~**2,800**~~	56~~52~~	**50**~~**50**~~
3,000~~3,500~~	56~~50~~	49~~49~~
4,000~~4,000~~	52~~48~~	46~~46~~
4,500~~5,280~~	51~~45~~	45~~43~~
5,000	50	43
5,280	49	43

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

~~Nighttime L_{max} sound levels are based on the same operating assumptions as daytime levels with the exception of pile driving.~~

Bold denotes daytime and nighttime ~~maximum~~ noise thresholds.

L_{eq} (1hr) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

~~While equipment could operate at any work area identified for this alternative, the highest noise levels are expected to occur at those sites where the duration and intensity~~While equipment could operate at any work area identified for this alternative, longer-term impacts at noise-sensitive receiver locations are expected to occur at those sites where the duration and intensity of construction activities would be greatest. The work areas for construction of Intakes 2, 3 and 5 would extend through several residential areas and communities located near the Sacramento River. Noise from intake construction activities is predicted to exceed daytime and nighttime noise thresholds at nearby residences~~, schools~~ and outdoor ~~parks in~~use areas indicated in Table 23-61.

Although this assessment includes daytime and nighttime construction noise estimates, construction of the intakes would primarily occur during daytime hours. If nighttime construction of the intakes were to occur, noise levels could be the same as that generated during daytime hours.

The effect of exposing these noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Table 23-61. Land Use Affected by Equipment Noise from Construction of Intakes, Alternative 4

Location	Zoning	Daytime Threshold (60 dBA L_{eq} [1h]) Total Affected Parcels	Nighttime Threshold (50 dBA ~~L_{max}~~ L_{eq} [1h]) Total Affected Parcels
Sacramento County – including River Road across the river from the community of Clarksburg.	Residential	121	121
	Natural/Recreational	~~2~~6	~~2~~6
	Agricultural/Other[a]	~~105~~116	~~120~~124
	Schools	None	~~None~~N/A
Contra Costa County	Agricultural/Other[a]	5	5
San Joaquin County	Agricultural/Other[a]	57	74
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Residential	~~9~~27	~~70~~70
	Natural/Recreational	~~1~~3	~~5~~5
	Agricultural/Other[a]	~~100~~104	~~104~~105
	Schools	None	~~Clarksburg Middle School~~N/A

[a] Includes agricultural or unclassified use that permits residential use.

Construction of Conveyance (Tunnel), Forebays, and Barge Unloading Facilities

Potential reasonable worst-case equipment noise levels from construction work areas adjacent to tunnel shaft sites would be comparable to those listed for the intake sites in Table 23-59. Assuming 100% equipment utilization within a given hour of day, the combined noise level at work areas is 96 dBA L_{eq} (1hr) at 50 feet.

The results shown in Table 23-59 indicate that noise-sensitive land uses within 1,200 feet of an active tunnel work area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 2,800 feet.

~~While equipment could operate at any work area identified for this alternative, the highest noise levels are expected to occur at those sites where the duration and intensity~~While equipment could operate at any work area identified for this alternative, longer-term impacts at noise-sensitive receiver locations are expected to occur at those sites where the duration and intensity of construction activities would be greatest. This includes all construction sites along the tunnel conveyance alignment, as well as at the site of the Byron Tract Forebay adjacent to and south of Clifton Court Forebay. For a map of the proposed pipeline/tunnel alignment under Alternative 4, see Mapbook Figure M3-4. The tunnel and forebay construction work areas would extend through several residential areas and communities near the Sacramento River. Noise from construction activities is predicted to exceed daytime and nighttime noise thresholds at nearby residences~~,~~ ~~schools~~ and outdoor ~~parks~~ use areas indicated in Table 23-62.

Although this assessment includes daytime and nighttime construction noise estimates for the forebays, barge unloading facilities, and conveyance tunnels, construction of the forebays and barge unloading facilities would primarily occur during daytime hours. If nighttime construction of the forebays and barge unloading facilities were to occur, noise levels could be the same as those generated during daytime hours. Construction of the conveyance tunnels and RTM storage actions would occur on a 24-hour basis.

The effect of exposing these noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b are available to reduce this effect.

Table 23-62. Land Use Affected by Equipment Noise from Construction of Conveyance and Associated Facilities, Alternative 4

Location	Zoning	Daytime Threshold (60 dBA L_{eq} [1h]) Total Affected Parcels	Nighttime Threshold (50 dBA ~~L_{max}~~ L_{eq} [1h]) Total Affected Parcels
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Twin Cities Road.	Residential	~~120~~118	~~121~~120
	Natural/Recreational	~~10~~7	~~29~~18
	Agricultural/Other[a]	~~184~~237	~~250~~394
	Schools	None	~~None~~N/A
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Residential	10	~~95~~105
	Natural/Recreational	1	~~5~~6
	Agricultural/Other[a]	~~100~~99	104140
	Schools	None	N/A~~Clarksburg Middle School, River Delta Community Day~~
San Joaquin County	Residential	8	18
	Natural/Recreational	4	~~10~~8
	Agricultural/Other[a]	~~164~~239	~~435~~521
Contra Costa County	Agricultural/Other[a]	~~92~~125	~~122~~216
	Natural/Recreational	1	~~1~~2
Alameda County	Agricultural/Other[a]	13	~~27~~22

[a] Includes agricultural or unclassified use that permits residential use.

Truck Trips and Worker Commutes

Project-generated heavy trucks and worker commutes are predicted to result in increased traffic noise levels at noise-sensitive land uses adjacent to local roadways. Based on information provided by DWR as part of the cost estimate (see Appendix 22A), project-generated vehicle traffic volumes for the pipeline/tunnel conveyance alternative are predicted to have a maximum heavy truck composition of 41%, which was assumed to apply to any of the local roadways under a worst-case noise scenario. Future noise levels at a reference distance of 100 feet are shown in Table 23-63.

Table 23-63. Predicted ~~Future~~ Loudest-hour Future Traffic Noise Levels on Commuter Roads and Haul Routes, Alternative 4

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	58	66	8	Yes
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	61	67	6	Yes
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	60	67	7	Yes
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	62	1	No
Bethel Island Rd	Oakley City Limits to End	55	56	1	No
Balfour Rd	Brentwood City Limits to Byron Hwy	54	56	2	No
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	67	5	Yes
Byron Hwy	Delta Rd to Old SR 4	53	55	2	No
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	67	8	Yes
I-5 NB	Florin Rd to Pocket Rd	72	74	2	No
I-5 SB	Florin Rd to Pocket Rd	72	74	2	No
I-5 NB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 SB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 NB	Laguna Blvd to Elk Grove Blvd	70	71	1	No
I-5 SB	Laguna Blvd to Elk Grove Blvd	70	71	1	No
I-5 NB	Elk Grove Blvd to Hood Franklin Rd	68	71	3	No
I-5 SB	Elk Grove Blvd to Hood Franklin Rd	68	71	3	No
I-5 NB	Hood Franklin Rd to Twin Cities Rd	67	71	4	No
I-5 SB	Hood Franklin Rd to Twin Cities Rd	67	71	4	No
I-5 NB	Twin Cities Rd to Walnut Grove Rd	67	71	4	No
I-5 SB	Twin Cities Rd to Walnut Grove Rd	67	71	4	No
I-5 NB	Walnut Grove Rd to Peltier Rd	67	69	2	No
I-5 SB	Walnut Grove Rd to Peltier Rd	67	69	2	No
I-5 NB	Peltier Rd to Turner Rd	67	69	2	No
I-5 SB	Peltier Rd to Turner Rd	68	69	1	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
I-5 NB	Turner Rd to SR 12	68	69	1	No
I-5 SB	Turner Rd to SR 12	66	68	2	No
I-5 NB	SR 12 to Eight Mile Rd	68	70	2	No
I-5 SB	SR 12 to Eight Mile Rd	68	69	1	No
I-5 NB	Eight Mile Rd to Hammer Ln	70	71	1	No
I-5 SB	Eight Mile Rd to Hammer Ln	69	70	1	No
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	67	8	Yes
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	66	11	Yes
SR 160	Scribner Rd to Hood Franklin Rd	53	66	13	Yes
SR 160	Hood Franklin Rd to Lambert Rd	55	68	13	Yes
SR 160	Lambert Rd to Paintersville Bridge	53	68	15	Yes
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	68	15	Yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	68	15	Yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	69	10	Yes
SR 160	A St (Isleton) to SR 12	58	68	10	Yes
SR 160	SR 12 to Brannan Island Rd	62	69	7	Yes
SR 84	West Sacramento City Limits to Courtland Rd	55	68	13	Yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	54	8	No
I-80 EB	Suisun Valley Rd to SR 12	73	75	2	No
I-80 WB	Suisun Valley Rd to SR 12	74	76	2	No
SR 12 EB	I-80 to Beck Ave	65	69	4	No
SR 12 WB	I-80 to Beck Ave	64	69	5	Yes
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	72	4	No
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	71	5	Yes
SR 12	Walters Rd/ to SR 113	63	70	7	Yes
SR 12	SR 113 to SR 84 (River Rd)	64	70	6	Yes
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	71	7	Yes
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	65	3	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	65	2	No
I-80 EB	SR 113 to Pedrick Rd	71	73	2	No
I-80 WB	SR 113 to Pedrick Rd	71	73	2	No
SR 113	I-80 to Dixon City Limits	64	69	5	Yes
SR 113	Dixon City Limits to SR 12	57	68	11	Yes
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	68	7	Yes
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	69	6	Yes
SR 4	Discovery Bay Blvd to Tracy Blvd	61	68	7	Yes
SR 4	Tracy Blvd to I-5	64	69	5	Yes
I-5 NB	SR 4 (Freeway) to SR 4 (Charter Way)	71	73	2	No
I-5 SB	SR 4 (Freeway) to SR 4 (Charter Way)	72	74	2	No
I-5 NB	SR 4 (Charter Way) to Eighth Street	71	73	2	No
I-5 SB	SR 4 (Charter Way) to Eighth Street	72	74	2	No
I-205 EB	I-580 to Mountain House Pkwy	69	71	2	No
I-205 WB	I-580 to Mountain House Pkwy	69	71	2	No
I-205 EB	Mountain House Pkwy to Eleventh St	69	71	2	No
I-205 WB	Mountain House Pkwy to Eleventh St	68	71	3	No
I-205 EB	Grant Line Rd to Tracy Blvd	68	70	2	No
I-205 WB	Grant Line Rd to Tracy Blvd	67	69	2	No
I-205 EB	Tracy Blvd to MacArthur Dr	68	70	2	No
I-205 WB	Tracy Blvd to MacArthur Dr	68	69	1	No
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	50	2	No
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	67	5	Yes
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	67	6	Yes
Cypress Rd	Main Street to Bethel Island Rd	58	59	1	No
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	57	2	No
Delta Rd	Main Street to Byron Hwy	55	55	0	No
Pocket Rd	I-5 to Freeport Blvd	63	67	4	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	65	9	Yes
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	56	1	No
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	66	15	Yes
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	66	22	Yes
Lambert Rd	Herzog Rd to Franklin Blvd	46	66	20	Yes
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	58	10	No
Twin Cities Rd	River Rd to I-5	53	63	10	Yes
Twin Cities Rd	I-5 to Franklin Blvd	55	56	1	No
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	66	16	Yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	57	6	No
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	63	8	Yes
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	62	7	Yes
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	58	4	No
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	56	11	No
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	49	3	No
Jackson Slough Rd	Isleton City Limits to SR 12	47	50	3	No
Jackson Slough Rd	Brannan Island Rd to SR 12	47	50	3	No
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	62	9	Yes
Peltier Rd	Blossom Rd to I-5	44	48	4	No
Tracy Blvd	SR 4 to Clifton Court Rd	53	63	10	Yes
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	63	11	Yes
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	67	8	Yes
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	66	12	Yes
Mountain House Pkwy	Arnaudo Blvd to I-205	58	67	9	Yes
Eight Mile Rd	Stockton City Limits to I-5	58	60	2	No
Tracy Blvd	Tracy City Limits to I-205	58	64	6	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Harbor Blvd	Industrial Blvd to US 50	63	68	5	Yes
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	68	6	Yes
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	67	5	Yes
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	66	15	Yes
River Rd	Freeport Bridge to Courtland Rd	54	54	0	No
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	66	18	Yes
Courtland Rd	SR 84 to River Rd	48	66	18	Yes

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~~Roadway~~	~~Segment~~	~~Existing Noise Level, dBA~~	~~Future With-Project Noise Level, dBA~~	~~Noise Level Increase, dB~~	~~Substantial Increase?~~
~~Byron Hwy~~	~~Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line~~	~~58~~	~~66~~	~~8~~	~~no~~
~~Brentwood Blvd~~	~~Delta Rd (Oakley City Limits) to Balfour Rd~~	~~61~~	~~67~~	~~6~~	~~no~~
~~Brentwood Blvd~~	~~Balfour Rd to Brentwood City Limits (South)~~	~~60~~	~~66~~	~~6~~	~~no~~
~~Balfour Rd~~	~~Brentwood Blvd to Brentwood City Limits~~	~~61~~	~~61~~	~~0~~	~~no~~
~~Bethel Island Rd~~	~~Oakley City Limits to End~~	~~55~~	~~55~~	~~0~~	~~no~~
~~Balfour Rd~~	~~Brentwood City Limits to Byron Hwy~~	~~54~~	~~54~~	~~0~~	~~no~~
~~Old SR 41~~	~~Brentwood City Limits (South) to Marsh Creek Rd~~	~~62~~	~~67~~	~~5~~	~~no~~
~~Byron Hwy~~	~~Delta Rd to Old SR 4~~	~~53~~	~~53~~	~~0~~	~~no~~
~~Byron Hwy~~	~~SR 4 to Contra Costa Co./ Alameda Co. Line~~	~~59~~	~~67~~	~~8~~	~~no~~
~~SR 160 (Freeport Blvd)~~	~~Sacramento City Limits to Freeport Bridge~~	~~59~~	~~67~~	~~8~~	~~no~~
~~SR 160 (Freeport Blvd/ River Rd)~~	~~Freeport Bridge to Scribner Rd~~	~~55~~	~~67~~	~~12~~	~~yes~~
~~SR 160~~	~~Scribner Rd to Hood Franklin Rd~~	~~53~~	~~66~~	~~13~~	~~yes~~
~~SR 160~~	~~Hood Franklin Rd to Lambert Rd~~	~~55~~	~~68~~	~~13~~	~~yes~~
~~SR 160~~	~~Lambert Rd to Paintersville Bridge~~	~~53~~	~~68~~	~~15~~	~~yes~~

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	68	**15**	**yes**
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	68	**15**	**yes**
SR 160	Walnut Grove Bridge to A St (Isleton)	59	69	**10**	**no**
SR 160	A St (Isleton) to SR 12	58	69	**11**	**no**
SR 160	SR 12 to Brannan Island Rd	62	70	**8**	**no**
SR 84	West Sacramento City Limits to Courtland Rd	55	67	**12**	**yes**
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	46	**0**	**no**
SR 12 EB	I-80 to Beck Ave	65	69	**4**	**no**
SR 12 WB	I-80 to Beck Ave	64	69	**5**	**no**
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	72	**4**	**no**
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	72	**6**	**no**
SR 12	Walters Rd/ to SR 113	63	71	**8**	**no**
SR 12	SR 113 to SR 84 (River Rd)	64	71	**7**	**no**
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	71	**7**	**no**
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	65	**3**	**no**
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	65	**2**	**no**
SR 113	I-80 to Dixon City Limits	64	69	**5**	**no**
SR 113	Dixon City Limits to SR 12	57	68	**11**	**no**
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	68	**7**	**no**
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	69	**6**	**no**
SR 4	Discovery Bay Blvd to Tracy Blvd	61	68	**7**	**no**
SR 4	Tracy Blvd to I-5	64	69	**5**	**no**
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	48	**0**	**no**
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	67	**5**	**no**
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	67	**6**	**no**
Cypress Rd	Main Street to Bethel Island Rd	58	58	**0**	**no**

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	55	0	no
Delta Rd	Main Street to Byron Hwy	55	55	0	no
Pocket Rd	I-5 to Freeport Blvd	63	67	4	no
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	65	9	no
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	55	0	no
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	67	16	yes
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	66	22	yes
Lambert Rd	Herzog Rd to Franklin Blvd	46	66	20	yes
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	48	0	no
Twin Cities Rd	River Rd to I-5	53	61	8	no
Twin Cities Rd	I-5 to Franklin Blvd	55	55	0	no
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	66	16	yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	58	7	no
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	61	6	no
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	61	6	no
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	59	5	no
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	57	12	yes
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	46	0	no
Jackson Slough Rd	Isleton City Limits to SR 12	47	47	0	no
Jackson Slough Rd	Brannan Island Rd to SR 12	47	47	0	no
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	61	8	no
Peltier Rd	Blossom Rd to I-5	44	44	0	no
Tracy Blvd	SR 4 to Clifton Court Rd	53	61	8	no
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	61	9	no
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	66	7	no
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	66	12	yes
Mountain House	Arnaudo Blvd to I-205	58	66	8	no

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Pkwy					
Eight Mile Rd	Stockton City Limits to I-5	58	58	0	no
Tracy Blvd	Tracy City Limits to I-205	58	63	5	no
Harbor Blvd	Industrial Blvd to US 50	63	68	5	no
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	67	5	no
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	67	5	no
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	66	15	yes
River Rd	Freeport Bridge to Courtland Rd	54	54	0	no
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	66	18	yes
Courtland Rd	SR 84 to River Rd	48	66	18	yes

As shown in Table 23-63, predicted future loudest-hour traffic noise levels from project-generated worker commutes and truck trips would result in a noise level of 60 dBA Leq or more, and an increase of 12 5 dB or more compared to existing traffic noise levels along 16 50 project roadway segments.

During intake construction, segments of SR 160 between Freeport Bridge and Walnut Grove Bridge would be temporarily realigned around intake construction sites. As a result, future project noise levels would further increase at residences located near intake sites. Under Alternative 4, noise levels at receivers near realigned segments of SR 160 would increase by up to 3 dB in addition to the noise increase shown in Table 23-63.

Traffic noise from haul trucks and commuter vehicles on public roads is predicted to exceed daytime traffic noise thresholds at nearby residences, parks and other uses at affected parcels indicated in Table 23-63A. Traffic noise contours are shown in Appendix 23A.

Table 23-63A. Land Use Zones Adjacent to Project Haul Routes Affected by Increases in Traffic Noise, Modified Pipeline-Tunnel Conveyance Option

Location	Zoning	Total Affected Parcels, Daytime Threshold (60 dBA L_{eq} [1h]) and a 5 dB increase over existing levels
Alameda County	Agricultural/Other [a]	10
Contra Costa County	Agricultural/Other [a]	363
	Residential	3
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	116
	Natural/Recreational	155
	Agricultural/Other [a]	504
San Joaquin County	Residential	77
	Natural/Recreational	1
	Agricultural/Other [a]	192
City of Stockton		70
City of Tracy		11
Solano County	Natural/Recreational	9
	Agricultural/Other [a]	589
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Agricultural/Other [a]	628
City of West Sacramento		199
Other jurisdictions		538

[a] Includes agricultural or unclassified use that permits residential use.

The increase in noise levels would exceed the project threshold for traffic noise and would be considered adverse. Mitigation Measures NOI-1a and NOI-1b are available to address this effect.

Construction of Power Transmission Lines

Potential reasonable worst-case equipment noise levels from construction of the power transmission lines were evaluated by combining the noise levels of the three loudest pieces of equipment that would likely operate at the same time (an excavator, a truck and a drill rig for driving micropiles for construction of towers). Assuming 100% utilization within a given hour of day, the combined noise level is 91 dBA L_{eq} (1hr) at 50 feet. The estimated sound levels from construction as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-64.

Table 23-64. Predicted Noise Levels from Construction of Transmission Lines

Distance Between Source and Receiver (feet)	Calculated L_{eq} (1hr)/Nighttime ~~L_{max}~~ L_{eq} Sound Level (dBA)
50	91
100	83
200	75
400	67
600	63
800	**60**
1,000	57
1,200	55
1,400	53
1,800	**50**
2,000	49
3,000	44

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Bold denotes daytime (1hr) and nighttime (1hr) ~~maximum~~ noise thresholds.

L_{eq} (1 hour) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

The results shown in Table 23-64 indicate that noise-sensitive land uses within 800 feet of an active transmission line construction area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 1,800 feet from the construction area.

Construction of transmission lines would also include helicopter use for installing conductor line. Use of helicopters would be temporary and intermittent. Two light-duty helicopters were assumed to operate four hours a day to install new poles and lines. Light- to medium-duty helicopters have a source level of up to 84 L_{max} at a reference distance of 500 feet (Nelson 1987). It would generally take less than 10 minutes to string the line at each structure. It is estimated that helicopters would not be in any given line mile for more than 3 hours. Given that noise exposure to helicopters would be generally isolated to line-stringing events, it is not considered to contribute significantly to ambient noise during periods of construction.

Noise-sensitive land uses that could potentially be exposed to adverse noise impacts due to transmission line construction would extend outside the transmission line right-of-way within the utility planning area. Several residential land uses are near the proposed transmission line construction footprint. Likewise, Delta Elementary School and Delta High School on the west bank of the Sacramento River are within half a mile of the proposed Intake 2 transmission lines. Although there would be risk of increased noise levels, compared to the conveyance and associated components, the duration of construction of transmission lines would be shorter-term. Noise impacts would be intermittent and temporary, and would cease once construction work is complete.

Although this assessment includes daytime and nighttime construction noise estimates, construction of the transmission lines would primarily occur during daylight hours. If nighttime construction of

the transmission lines were to occur, noise levels could be the same as those generated during daytime hours.

The effect of exposing noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Earth-moving activities at offsite borrow/spoil areas

Potential reasonable worst-case equipment noise levels from earth-moving activities at offsite borrow/spoil areas were evaluated by combining the noise levels of the three loudest pieces of equipment that would likely operate at the same time (an excavator, a truck and a bulldozer). Assuming 100% utilization within a given hour of day, the combined noise level would be 91 dBA L_{eq} (1hr) at 50 feet. The estimated sound levels from construction as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-65.

The results shown in Table 23-65 indicate that noise-sensitive land uses within 800 feet of equipment operating in the borrow/spoil area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 1,800 feet from the area. Borrow/spoil areas are located throughout the conveyance alignment and are generally adjacent to or in close proximity of intake pumping plant sites, forebays, and main tunnel construction shafts. Noise-sensitive land uses that could potentially be exposed to adverse noise impacts due to earth-moving activities in offsite borrow/spoil areas would extend outside the borrow/spoil area right-of-way. The effect of exposing these noise-sensitive land uses to noise increases above thresholds would be adverse. However, with the exception of tunneling and RTM placement, most construction activities would occur during daytime hours. Mitigation Measures NOI-1a and NOI-1b would be available to reduce this effect.

Table 23-65. Predicted Noise Levels from Earth-moving at offsite borrow/spoil areas

Distance Between Source and Receiver (feet)	Calculated L_{eq} (1hr)/Nighttime ~~L_{max}~~ L_{eq} Sound Level (dBA)
50	91
100	83
200	75
400	67
600	63
800	**60**
1,000	57
1,200	55
1,400	53
1,800	**50**
2,000	49
3,000	44

Notes: Calculations are based on Federal Transit Administration 2006. Calculations do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.

Bold denotes daytime (1hr) and nighttime (1hr) ~~maximum~~ noise thresholds.

L_{eq} (1 hour) = hourly-equivalent sound level (over 1 hour).

dBA = A-weighted decibel.

Blasting at Excavation sites

Noise and vibration generated by blasting is a complex function of the charge size, charge depth, hole size, degree of confinement, initiation methods, spatial distribution of charges, and other factors. To provide a general indication of the potential for airblast and vibration impacts from blasting, airblast and ground-vibration values as a function of distance have been estimated using methods recommended by Caltrans (2004). The calculation assumes a charge size of 300 pounds ignited under average normal confinement. Ground vibration from blasting would exceed the U.S. Bureau of Mines vibration criterion of 0.5 in/second PPV within about 550 of a blasting site. The probable peak overpressure would be about 130 dB within 300 feet of the blasting site. This impact is considered to be less then significant. (This assumes that a commitment can be added to not conduct blasting within 1000 feet of noise sensitive areas.)

Noise exposure to workers at construction sites

Construction noise would affect workers on site. However, workers are subject to state and federal Occupational Health and Safety (OSHA) standards. OSHA mitigation standards for noise limits exposure are as follows: an 8-hour time-weighted average of 85 dBA or a dose of 50 percent are referred to as OSHA action levels [29 CFR 1910.95(c)(2)]. Occupational exposure to noise levels in excess of 85 dBA requires monitoring and mitigation to protect workers. Given that on-site workers would be protected under OSHA requirements, no adverse impacts would occur to workers.

CEQA Conclusion: The impact of exposing noise-sensitive land uses during construction to noise levels above the 60 dBA L_{eq} (1hr) daytime, the 50 dBA ~~L_{max}~~ L_{eq} nighttime, or the ~~12~~ 5 dB traffic noise

increase threshold would be considered significant. Based on reasonable worst-case modeling, the following significant impacts are expected as a result of Alternative 4 construction.

- **Intakes:** Sensitive receptors within ~~1,40~~2,000~~0~~ feet of an active intake construction site could be exposed to construction noise in excess of the 60 dBA L_{eq} (1hr) daytime threshold. The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 2,800 feet. As shown in Table 23-61, ~~130~~ 148 residential parcels, ~~3~~ 9 natural/recreational parcels, and ~~205~~ 282 agricultural parcels would be affected by daytime noise levels in excess of this threshold during construction. The nighttime threshold would be exceeded at ~~191~~ 191 residential parcels, ~~7~~ 11 natural/recreational parcels, and ~~224~~ 308 agricultural parcels~~, and 1 school~~.
- **Conveyance and Associated Facilities:** Sensitive receptors within 1,200 feet of an active tunnel work area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 2,800 feet. As shown in Table 23-62, ~~138~~ 136 residential parcels, ~~15~~ 12 natural/recreational parcels, and ~~553~~ 713 agricultural parcels would be affected by daytime noise levels in excess of this threshold during construction. The nighttime threshold would be exceeded at ~~234~~ 243 residential parcels, ~~45~~ 34 natural/recreational parcels, and ~~938~~ 1,293 agricultural parcels~~, and 2 schools~~.
- **Truck Trips and Worker Commutes:** Traffic noise from truck trips and worker commutes would result in an increase of ~~12~~ 5 dB or more compared to existing traffic noise levels at residences and outdoor use areas along ~~16~~ 50 project roadway segments in the study area as shown in Table 23-63. The increase in noise levels would be ~~substantial~~ significant and exceed the project threshold for traffic noise.
- **Power Transmission Lines:** Sensitive receptors within 800 feet of an active transmission line construction area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 1,800 feet from the construction area. As noted above, several residential land uses are near the proposed transmission line construction footprint. Likewise, Delta Elementary School and Delta High School on the west bank of the Sacramento River are within half a mile of the proposed Intake 2 transmission lines.
- **Borrow/spoil areas:** Sensitive receptors within 800 feet of equipment operating in the borrow/spoil area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded at a distance of 1,800 feet from the area. Borrow/spoil areas are located throughout the conveyance alignment and are generally adjacent to or in close proximity of intake pumping plant sites, forebays, and main tunnel construction shafts.

As part of the project, DWR will implement the noise abatement plan as outlined in Appendix 3B, Environmental Commitments. Mitigation Measures NOI-1a and NOI-1b would further reduce noise impacts to sensitive land uses. ~~Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.~~

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

During construction, BDCP proponents will employ best practices to reduce construction noise at noise-sensitive land uses. Implementation of this measure will ensure that construction noise levels, as applicable, do not exceed 60 dBA (one-hour L_{eq}) during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA (one-hour L_{eq} ~~single-event maximum~~) during nighttime hours (10:00 p.m. to 7:00 a.m.).

Measures used to limit construction noise include the following:

- Limiting above-ground noise-generating construction operations to the hours between 7 a.m. and 6 p.m. Monday through Friday, and between 8 a.m. and 5 p.m. on Saturdays.
- ~~Locating stationary equipment (e.g., generators, compressors, rock crushers, cement mixers, idling trucks) as far as possible from noise-sensitive land uses.~~
- Prohibiting gasoline or diesel engines from having unmuffled exhaust.
- Requiring that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Preventing excessive noise by shutting down idle vehicles or equipment.
- Using noise-reducing enclosures around noise-generating equipment.
- Selecting haul routes that affect the fewest number of people.
- Constructing barriers between noise sources and noise-sensitive land uses or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission to noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment.

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Prior to construction, BDCP proponents will make a construction schedule available to residents living in the vicinity of the construction areas before construction begins, and designate a noise disturbance coordinator. The coordinator will be responsible for responding to complaints regarding construction noise, will determine the cause of the complaint, and will ensure that reasonable measures are implemented to correct the problem when feasible. A contact telephone number for the noise disturbance coordinator will be conspicuously posted on construction site fences and will be included in the notification of the construction schedule.

Achievable noise reduction varies by measure. Shutting off a piece of equipment would eliminate its contribution to ambient noise. Noise barriers and enclosures would provide noise reduction within the discrete area shielding noise from surrounding noise sensitive receptors. Barriers can provide 5 to 15 dB of noise reduction depending configuration relative to surrounding terrain. Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.

Impact NOI-2: Exposure of Sensitive Receptors to Vibration or Groundborne Noise from Construction of Water Conveyance Facilities

NEPA Effects: Construction at the intake sites would involve use of impact pile driving and drilled piles, and tunnel construction would involve the use of TBMs and tunnel locomotives, both of which would cause groundborne vibration in localized areas. Groundborne vibrations from pile driving at intake sites and barge loading facilities would be intermittent, and temporary, occurring over a two month period during the in-river work period (June 1 to October 31). All pile driving activities will cease after construction is complete. During tunnel construction, groundborne noise due to vibrations from tunnel locomotive passbys and TBMs could occur intermittently where tunnels are located under or near residential areas.

Pile Driving at Intake Sites

Construction of the intakes would involve driving sheet piles within the intake rights-of-way. Use of impact piles would cause groundborne vibrations to exceed the threshold of 0.2 in/sec PPV at residential buildings within 70 feet of pile driving sites, as shown in Table 23-66.

Table 23-66. Predicted Vibration Levels from Construction Activities—Impact Pile Driving at Intake Structures

Distance Between Source and Receiver (feet)	Calculated Peak Particle Velocity (in/sec PPV)
50	0.3004
60	0.2458
70	**0.2075**
75	0.1923
80	0.1792
90	0.1574
100	0.1402
150	0.0897

Note: Calculations are based on Federal Transit Administration 2006 and California Department of Transportation Vibration Guidance Manual 2004. Assumes ground type n value of 1.1.
PPV = peak particle velocity.

Groundborne vibration from impact pile driving is predicted to exceed vibration thresholds at nearby residences in the areas shown in Table 23-67. While groundborne vibration levels in excess of 0.2 in/sec PPV could occur at any of these residences, the highest vibration levels are expected at those residences nearest to the intake work areas. Construction of intakes and barge unloading facilities would result in excessive groundborne vibration levels at these nearby residential structures. The effect of exposing sensitive receptors to groundborne vibration would be adverse. Mitigation Measure NOI-2 is available to reduce this effect.

Table 23-67. Land Use Affected By Vibrations From Pile Driving During Construction Of Intakes, Alternative 4

Location	Zoning	Total Affected Parcels
Sacramento County – including River Road near the community of Hood; Neighborhoods in the community of Hood	Residential[a]	~~78~~62
San Joaquin County	Residential[a]	~~4~~7
Contra Costa County	Residential[a]	1

[a] Includes agricultural or unclassified use that permits residential use.

Construction of Water Conveyance (Tunnel)

The use of tunneling equipment during construction would cause groundborne vibration and potentially groundborne noise within buildings in the vicinity of tunnel construction areas. Vibration sources include the TBM and locomotives moving soil, equipment, and construction workers between tunnel shaft sites. As discussed in Chapter 3, *Description of Alternatives*, the typical depth of tunnel installation would be approximately 100 feet below msl, but could be up to 160 feet below msl depending on site conditions. This analysis uses a conservative worst-case assumption of 60 feet below msl despite the fact that all proposed Delta tunnels will be constructed with a minimum of 100 feet of soil (soft ground) cover.

Groundborne vibration levels from operation of the TBM and tunnel locomotives are described below. Sensitive receptors that may be exposed to increased groundborne vibration include residences, outdoor parks, schools, and agriculture areas. As shown in Table 23-67~~19~~, there are a number of potentially affected parcels within 1,200 feet of the tunnel conveyance. However, at a 60-foot tunnel depth, groundborne vibrations from the TBM are estimated to be 0.008 in/sec PPV, which is below the threshold of 0.04 in/sec PPV.[1] As demonstrated by measured ground vibration data from modern tunneling projects, the deep soil cover will effectively dampen, and absorb propagated energy.

During tunnel construction, passbys from locomotives hauling workers and material inside of the tunnel would produce localized groundborne vibration that could manifest as noise inside of buildings. However, as described in Section 23.4.2, *Determination of Effects*, tunnel locomotives would be operated at slow speeds inside of tunnels and would not result in excessive vibrations. Groundborne noise from tunnel locomotive operation during construction is therefore not predicted to exceed groundborne noise thresholds or result in an adverse noise impact to sensitive receptors along the tunnel conveyance.

The potential for tunneling induced ground vibration effects will be thoroughly analyzed in the preliminary and final design phases of the project, using site-specific geotechnical data and the expected TBM configuration. ~~Potential effects on surface structures and human perception will be evaluated in detail during preliminary design. As additional precautions, and where necessary, a ground vibration monitoring program using seismographs and other high-precision equipment will~~

[1] A case study of a similar tunneling project (the New Crystal Springs Bypass Tunnel Project) shows that in a tunneling project which took place 60-155 feet below ground surface in an urban residential neighborhood more heavily populated than any of the BDCP alternatives, the groundborne vibration did not exceed 0.032 in/sec PPV during the daytime hours of 7 am to 6 pm, or 0.016 in/sec PPV during the nighttime hours of 6 pm to 7 am and was indistinguishable from the surrounding noise. (Wilson et al., 2011)

~~be implemented during construction to ensure ground vibration is within the required contract limits.~~

CEQA Conclusion: Groundborne vibrations during tunneling would not exceed 0.008 in/sec PPV at 60-foot tunnel depth and would therefore be less than significant. Likewise, locomotives are not expected to generate significant noise levels because they will travel at low speeds between 5 and 10 miles per hour. However, the impact of exposing residential structures to groundborne vibration during intake construction would be significant as reasonable worst-case modeling indicates that up to 82 residential parcels could be exposed to vibration levels in excess of 0.2 in/sec PPV during intake pile driving (see Table 23-67). Although Mitigation Measure NOI-2 will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce vibration to levels below the applicable thresholds. This impact would therefore be considered significant and unavoidable.

Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

During construction, BDCP proponents will implement vibration-reducing construction practices such that vibration from pile driving does not exceed 0.2 in/sec PPV at nearby residences.

The BDCP proponents shall ensure that the following measures are implemented to reduce adverse effects and/or significant effects as described above if the measures are applicable and feasible. Not all measures listed below may be feasible or applicable to all contractors. Rather, these measures serve as an overlying mitigation framework to be used for specific construction practices. The applicability of measures listed below would vary based on the location, timing, nature, and feasibility of each activity.

- Locating equipment as far as practical from vibration-sensitive (and noise-sensitive) land uses (at least 100 feet)
- Use of alternative pile driving methods such as vibratory driving, hydraulic press-in driving, or use of pre-drilled pile holes.

Depending on the equipment selected, the measures identified above can reduce vibration from pile driving to below 0.2 in/sec PPV at nearby residences. The specific noise reduction cannot be currently quantified since the actual equipment to be used is unknown and that the contractor may have alternative ways to achieve the performance limit. If the above measures are determined feasible, BDCP proponents will retain a qualified acoustical consultant or engineering firm to conduct vibration monitoring at potentially affected buildings to measure the actual vibration levels during construction and ensure vibration from pile driving does not exceed 0.2 in/sec PPV.

For cases where the above measures are not feasible, the resident or property owner will be notified in writing prior to construction activity that construction may occur within 100 feet of their building. A representative for the BDCP proponents will inspect the potentially affected buildings prior to construction to inventory existing cracks in paint, plaster, concrete, and other building elements. BDCP proponents will retain a qualified acoustical consultant or engineering firm to conduct vibration monitoring at potentially affected buildings to measure the actual vibration levels during construction. Following completion of construction, a representative for the BDCP proponents will conduct a second inspection to inventory changes in existing cracks

and new cracks or damage, if any, that occurred as a result of construction-induced vibration. If new damage is found, then the BDCP proponents will promptly arrange to have the damage repaired, or will reimburse the property owner for appropriate repairs.

In addition, if construction activity is required within 100 feet of residences or other vibration-sensitive buildings, a designated complaint coordinator will be responsible for handling and responding to any complaints received during such periods of construction. A reporting program will be required that documents complaints received, actions taken, and the effectiveness of these actions in resolving disputes.

Impact NOI-3: Exposure of Noise-Sensitive Land Uses to Noise from Operation of Water Conveyance Facilities

NEPA Effects: Potential reasonable worst-case pump noise levels during operation of the ~~intake structures were~~ Combined Pumping Plant was evaluated by calculating sound power levels of the pump based on horsepower (Hoover and Keith 2000). The analysis assumes that air handling units, compressors and emergency generators are integrated into the building structure. Faceplate horsepower for ~~vertical column and vertical volute type~~ pumps is specified in ~~pump selection appendix of~~ the Conceptual Engineering Report. The results shown assume maximum horsepower and flow capacity of the plant. Pump specifications are shown in Table 23-68. Combined source noise levels assume that pump enclosures (including buildings) provide a nominal 15 dB of noise attenuation. This is a conservative estimate based on masonry construction with openings in the structure for ventilation (FHWA 2011). This analysis assumes that pumps are operating 24 hours a day.

Table 23-68. Pump Specifications—Alternative 4

Pump Location	Quantity	Pumping Plant Capacity (cfs)	Pump Horsepower	Individual Pump Source Level (dBA)	Combined Equipment Source Level (dBA)	Assumed Attenuation (dB)	Combined Source Level with Attenuation (dBA)
Clifton Court Forebay Pumping Plant	7	9,000	6,000	98	106	15	91
	2		3,000	95	98		

cfs = cubic feet per second.
dB = decibels.
dBA = A-weighted sound level in decibels.

The estimated sound levels from pump operation as a function of distance based on calculated point-source attenuation over "soft" (i.e., acoustically absorptive) ground are shown in Table 23-69. Project operation noise contours are shown in Appendix 23B.

Table 23-69. Predicted Noise Levels from Pumping Plant Operation, ~~Intakes~~, Alternative 4

Distance Between Source and Receiver (Feet)	~~Intake 2~~Combined Pumping Plant Calculated L_{eq} Sound Level (dBA)	~~Intakes 3 and 5 Calculated L_{eq} Sound Level (dBA)~~
50	91~~89~~	~~88~~
100	83~~82~~	~~80~~
200	75~~74~~	~~72~~
300	71~~69~~	~~68~~
400	67~~66~~	~~65~~
600	63~~61~~	~~60~~
800	59~~58~~	~~57~~
1,000	57~~55~~	~~54~~
1,200	55~~53~~	~~52~~
1,400	53~~52~~	~~**50**~~
1,600	52~~**50**~~	~~49~~
~~2,000~~1,800	**50**~~47~~	~~46~~
2,~~200~~000	49~~46~~	~~**45**~~
2,~~600~~500	47~~**45**~~	~~43~~
~~3,600~~2,800	~~**45**~~~~**41**~~	~~40~~
~~5,000~~3,500	43~~37~~	~~36~~
~~6,000~~4,500	40~~35~~	~~34~~
~~7,000~~5,280	38~~33~~	~~32~~

Notes: Calculations are based on Federal Transit Administration 2006. Calculation do not include the effects, if any, of local shielding from walls, topography, or other barriers that may reduce sound levels further.
Noise levels assume a nominal pump enclosure attenuation of 15 dB.
Bold denotes daytime and nighttime ~~maximum~~ noise thresholds.
dBA = A-weighted sound level in decibels.

The results shown in Table 23-69 indicate that operating noise ~~from intake pumping plants~~ would exceed the nighttime threshold of 45 dBA at noise-sensitive land uses within a distance of up to ~~2,600~~2,800 feet from ~~intake pumping plant locations~~the Combined Pumping Plant. Noise from operation of ~~intake~~ the pumping plant~~s~~ is predicted to exceed daytime and nighttime noise thresholds at ~~nearby residences and outdoor parks in~~ areas indicated in Table 23-70.

Table 23-70. Land Use Affected by Noise from Operation of Pumping Plants, Alternative 4

Location	Zoning	50 dBA L_{eq} Daytime Operations Threshold Total Affected Parcels	45 dBA L_{eq} Nighttime Operations Threshold Total Affected Parcels
~~Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.~~	~~Natural/Recreational~~	~~1~~	~~1~~
	~~Agricultural/Other[a]~~	~~27~~	~~38~~
~~Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.~~	~~Agricultural/Other[a]~~	~~43~~	~~72~~
Contra Costa County	Agricultural/Other[a]	3	5
San Joaquin County	Agricultural/Other[a]	1	3

[a] Includes agricultural or unclassified use that permits residential use.

Operation of water conveyance facilities could result in increases in noise levels affecting nearby communities and residences. While operating noise levels in excess of applicable thresholds could occur throughout the affected area, the highest noise levels are expected at those land uses most adjacent to the pumping plants. The effect of exposing noise-sensitive land uses to noise increases above thresholds would be adverse. Mitigation Measure NOI-3 is available to reduce this effect.

Noise exposure to workers at conveyance facilities

Noise from operation of conveyance facilities would affect workers on site. However, workers are subject to state and federal Occupational Health and Safety (OSHA) standards. OSHA mitigation standards for noise limits exposure are as follows: an 8-hour time-weighted average of 85 dBA or a dose of 50 percent are referred to as OSHA action levels [29 CFR 1910.95(c)(2)]. Occupational exposure to noise levels in excess of 85 dBA requires monitoring and mitigation to protect workers. Given that on-site workers would be protected under OSHA requirements, no adverse impacts would occur to workers.

CEQA Conclusion: The impact of exposing noise-sensitive land uses during pumping plant operations to noise levels above the daytime (50 dBA ~~L_{max}~~L_{eq}) or nighttime (45 dBA ~~L_{max}~~L_{eq}) noise thresholds would be considered significant. Based on reasonable worst-case modeling, ~~70~~ 4 agricultural parcels would be affected by daytime noise levels in excess of the operational threshold. The nighttime threshold would be exceeded at ~~110~~ 8 agricultural parcels (see Table 23-70). ~~The impact of exposing these receptors to noise increases above thresholds would be significant.~~ Mitigation Measure NOI-3 would reduce operational noise levels below applicable thresholds, thus resulting in a less-than-significant level.

Mitigation Measure NOI-3: Design and Construct ~~Intake Facilities and Other~~ Pumping Plant Facilities Such That Operational Noise Does Not Exceed 50 dBA (One-Hour L_{eq}) during Daytime Hours (7:00 A.M. to 10:00 P.M.) or 45 dBA (One-Hour L_{eq}) during

Nighttime Hours (10:00 P.M. to 7:00 A.M.) or the Applicable Local Noise Standard (Whichever Is Less) at the property line of Nearby Noise Sensitive Land Uses

BDCP proponents will retain a qualified acoustical consultant to design acoustical treatments for the ~~intake facilities and other~~ pumping plant facilities. Implementation of this measure will ensure that operational noise levels, as applicable, do not exceed 50 dBA (one-hour L_{eq}) during daytime hours (7:00 a.m. to 10:00 p.m.) or 45 dBA (one-hour L_{eq}) during nighttime hours (10:00 p.m. to 7:00 a.m.) or the applicable local noise standard (whichever is less) at nearby noise-sensitive land uses. Measures that can be implemented to achieve this include but are not limited to:

- enclosing all pumps, motors, and other noise-generating equipment in solid wall structures;
- limiting openings in the enclosing structure and installing acoustic ventilation louvers where ventilation openings are required,
- installing acoustic access doors and wall panels,
- using low-noise motors (if available and feasible),
- using low noise transformers (if available and feasible),
- placing sound barriers (earth berms or constructed barriers) around noise sources

Verification noise monitoring will be conducted at ~~each operational intake or~~the pumping plant ~~location~~ to confirm that acoustical treatments reduce operational noise to comply with the applicable noise standard. If noise is not in compliance with the applicable standard, BDCP proponents will implement additional necessary treatments until compliance is achieved.

Impact NOI-4: Exposure of Noise-Sensitive Land Uses to Noise from Implementation of Proposed ~~Conservation Measures 2-10~~CM2–CM10

NEPA Effects: Implementation of CM2 and CM3–CM10 could generate increases in noise related to restoration or enhancement activities. Habitat restoration and enhancement conservation measures are anticipated to require use of noise-generating equipment during construction and maintenance:

- Grading, excavation, and placement of fill material.
- Breaching, modification, or removal of existing levees, and construction of new levees.
- Modification, demolition, and removal of existing infrastructure (e.g., buildings, roads, fences, electric transmission and gas lines, irrigation infrastructure).
- Construction of new infrastructure (e.g., buildings, roads, fences, electric transmission and gas lines, irrigation infrastructure).
- Removal of existing vegetation and planting/seeding of vegetation.
- Levee maintenance.
- Mowing, burning, and trimming to manage vegetation.
- Because the specific areas for implementing these conservation measures have not been determined, this effect is evaluated qualitatively.
- Yolo Bypass Fishery Enhancement (CM2). Noise-generating activities from enhancement activities in the Yolo Bypass would include use of construction vehicles and equipment for

modifying or installing new facilities, or changes in operation of existing facilities, including the following.

- Installing fish ladders and experimental ramps at Fremont Weir or widening the existing fish ladder.
- Installing fish screens on small Yolo Bypass diversions.
- Constructing new or replacement operable check-structures at Tule Canal/Toe Drain.
- Replacing the Lisbon Weir with a fish-passable gate structure.
- Realigning Lower Putah Creek.
- Increasing operation of upstream unscreened pumps.
- Installing operable gates at Freemont Weir.
- Constructing physical barriers in the Sacramento River.
- Constructing associated support facilities (operations buildings, parking lots, access facilities such as roads and bridges).
- Improving levees adjacent to the Fremont Weir Wildlife Area.
- Replacing agricultural crossings of the Tule Canal/Toe Drain with fish-passable structures such as flat car bridges, earthen crossings with large, open culverts.
- Grading, removal of existing berms, levees, and water control structures, construction of berms or levees, re-working of agricultural delivery channels, and earthwork or construction of structures to reduce Tule Canal/Toe Drain channel capacities.

- Tidal Habitat Restoration (CM4). Restoration of freshwater tidal habitat in the Cache Slough, Cosumnes/Mokelumne, West Delta, South Delta, and Suisun Marsh ROAs would require breaching and lowering of levees, installing new or modified levees to protect adjacent areas from flooding, connecting remnant sloughs or channels to improve circulation, and modifying ground elevations to reduce impacts of subsidence. Noise-generating activities would include use of construction vehicles and equipment for the following activities.
  - Construction site preparation could require clearing and grubbing, demolition of existing structures, surface water quality protection, dust control, establishment of storage areas and stockpile areas, temporary utilities and fuel storage, and erosion control.
  - Earthwork activities for development of the restoration habitat areas could include the construction activities described below on the landside and waterside of existing levees in areas that would be selected for tidal habitat restoration.
- Seasonally Inundated Floodplain Restoration (CM5). Seasonally inundated floodplain habitat would be restored within the north, east, and/or south Delta. Noise-generating activities would include use of construction vehicles and equipment for modifying or installing new facilities, or changes in operation of existing facilities, including the following activities.
  - Site preparation could require clearing and grubbing, demolition of existing structures, surface water quality protection, dust control, establishment of storage areas and stockpile areas, temporary utilities and fuel storage, and erosion control.

- Earthwork activities for development of the seasonally inundated floodplains could include setting back levees, removal of existing levees, removal of riprap to allow for channel meander between the setback levees, grading to restore drainage patterns and increase inundation frequency and duration, and establishment of riparian habitat.

- Channel Margin Habitat Enhancement (CM6). Channel margin habitat would be enhanced on the Sacramento River between Freeport and Walnut Grove, the San Joaquin River between Vernalis and Mossdale, Steamboat and Sutter Sloughs, and the North and South Forks of the Mokelumne River. Noise-generating activities would include use of construction vehicles and equipment for the following activities.
  - Site preparation could require clearing and grubbing, demolition of existing structures, surface water quality protection, dust control, establishment of storage areas and stockpile areas, temporary utilities and fuel storage, and erosion control.
  - Earthwork activities for development of the channel margin habitat areas could include modification of levees or setting back levees. Riprap would be removed where levees are set back and channel geometry would be modified in unconfined channel reaches or along channels where levees are set back.
- Riparian Habitat Restoration (CM7). Riparian habitat restoration in Cosumnes/Mokelumne, east, west, and south Delta areas would require site preparation and earthwork using noise-generating construction vehicles and equipment for the following activities.
  - Clearing and grubbing, demolition of existing structures, surface water quality protection, dust control, establishment of storage areas and stockpile areas, temporary utilities and fuel storage, and erosion control.
  - Removal of riprap, minor landform modifications to restore water circulation, planting of riparian vegetation, irrigation and maintenance of plantings, and control of nonnative species.
- Grassland Communities Restoration (CM8). Restoration of grassland habitat would require sowing native species using a variety of techniques (e.g., seed drilling, native hay spreading, plugs). Noise-generating activities would include use of construction vehicles and equipment for reseeding and for recontouring graded land.
- Vernal Pool Complex Restoration (CM9). Vernal pool complex restoration could require use of noise-generating construction vehicles and equipment to excavate or recontour historical vernal pools and swales to natural bathymetry.
- Nontidal Marsh Restoration (CM10). Nontidal wetlands restoration could include the use of noise-generating construction vehicles and equipment for site preparation, planting of native marsh vegetation, and maintenance of plantings, including grading to establish an elevational gradient to support both open water perennial aquatic habitat intermixed with shallower marsh habitat.

The effect would vary according to the type of construction equipment and techniques used in construction of the specific conservation measure, the location and timing of the actions called for in the conservation measure, and the noise environment at the time of implementation. However, the noise levels from these activities are expected to be similar to those shown in Table 23-16~~5~~ because similar types of equipment will be used. The results shown in Table 23-16 indicate that residences within 1,200 feet of an active restoration work area could be exposed to construction noise in excess

of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded within a distance of 2,800 feet.

The effect of exposing sensitive land uses to increases in construction noise levels above thresholds would be adverse. Mitigation Measures NOI-1a and NOI-1b are available to reduce this effect.

CEQA Conclusion: The impact of exposing noise-sensitive land uses during construction to noise increases above the daytime (60 dBA L_{eq}) and nighttime (50 dBA ~~L_{max}~~L_{eq}) thresholds would be significant. Noise levels during implementation of these conservation measures are expected to vary according to the type of construction equipment and techniques used, but are likely to be similar to noise levels shown in Table 23-59. The results shown in Table 23-59 indicate that residences within 1,200 feet of an active restoration work area could be exposed to construction noise in excess of the daytime (7 a.m. to 10 p.m.) noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~ L_{eq} would be exceeded within a distance of 2,800 feet. The impact of exposing these receptors to noise increases above thresholds would be significant. Although Mitigation Measures NOI-1a and NOI-1b will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be considered significant and unavoidable.

Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices during Construction

Please see Mitigation Measure NOI-1a under Impact NOI-1.

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Please see Mitigation Measure NOI-1b under Impact NOI-1.

~~23.3.3.15~~23.3.3.16Alternative 9—Through Delta Separate Corridors (15,000 cfs; Operational Scenario G)

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Water Conveyance Facilities

NEPA Effects: Construction of operable barriers and pumping plants under Alternative 9 would require the use of impact-driven sheet piles to construct cofferdams and barrier foundations. Potential reasonable worst-case equipment noise levels from construction work areas would be comparable to those listed for the intake sites in Table 23-17. Assuming 100% equipment utilization within a given hour of day, the combined noise level at work areas is 98 dBA L_{eq} (1hr) at 50 feet.

The results shown in Table 23-17 indicate that during periods of pile driving, residences located within 1,400 feet of an active intake construction site could be exposed to construction noise in excess of the DWR daytime (7 a.m. to 10 p.m.) maximum noise threshold of 60 dBA L_{eq} (1hr). The nighttime threshold of 50 dBA ~~L_{max}~~L_{eq} would be exceeded at a distance of 2,800 feet. Construction noise contours are shown in Appendix 23A.

Truck Trips and Worker Commutes

Table 23-82. Predicted ~~Future~~ Loudest-hour Future Traffic Noise Levels on Commuter Roads and Haul Routes, Through Delta/Separate Corridors

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Byron Hwy	Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line	58	74	16	Yes
Brentwood Blvd	Delta Rd (Oakley City Limits) to Balfour Rd	61	76	15	Yes
Brentwood Blvd	Balfour Rd to Brentwood City Limits (South)	60	76	16	Yes
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	62	1	No
Bethel Island Rd	Oakley City Limits to End	55	56	1	No
Balfour Rd	Brentwood City Limits to Byron Hwy	54	56	2	No
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	76	14	Yes
Byron Hwy	Delta Rd to Old SR 4	53	55	2	No
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	74	15	Yes
I-5 NB	Florin Rd to Pocket Rd	72	73	1	No
I-5 SB	Florin Rd to Pocket Rd	72	73	1	No
I-5 NB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 SB	Pocket Rd to Laguna Blvd	72	72	0	No
I-5 NB	Laguna Blvd to Elk Grove Blvd	70	70	0	No
I-5 SB	Laguna Blvd to Elk Grove Blvd	70	70	0	No
I-5 NB	Elk Grove Blvd to Hood Franklin Rd	68	69	1	No
I-5 SB	Elk Grove Blvd to Hood Franklin Rd	68	69	1	No
I-5 NB	Hood Franklin Rd to Twin Cities Rd	67	73	6	Yes
I-5 SB	Hood Franklin Rd to Twin Cities Rd	67	73	6	Yes
I-5 NB	Twin Cities Rd to Walnut Grove Rd	67	68	1	No
I-5 SB	Twin Cities Rd to Walnut Grove Rd	67	68	1	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
I-5 NB	Walnut Grove Rd to Peltier Rd	67	73	6	Yes
I-5 SB	Walnut Grove Rd to Peltier Rd	67	73	6	Yes
I-5 NB	Peltier Rd to Turner Rd	67	69	2	No
I-5 SB	Peltier Rd to Turner Rd	68	69	1	No
I-5 NB	Turner Rd to SR 12	68	70	2	No
I-5 SB	Turner Rd to SR 12	66	70	4	No
I-5 NB	SR 12 to Eight Mile Rd	68	71	3	No
I-5 SB	SR 12 to Eight Mile Rd	68	70	2	No
I-5 NB	Eight Mile Rd to Hammer Ln	70	71	1	No
I-5 SB	Eight Mile Rd to Hammer Ln	69	70	1	No
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	60	1	No
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	56	1	No
SR 160	Scribner Rd to Hood Franklin Rd	53	55	2	No
SR 160	Hood Franklin Rd to Lambert Rd	55	57	2	No
SR 160	Lambert Rd to Paintersville Bridge	53	56	3	No
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	72	19	Yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	77	24	Yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	77	18	Yes
SR 160	A St (Isleton) to SR 12	58	77	19	Yes
SR 160	SR 12 to Brannan Island Rd	62	78	16	Yes
SR 84	West Sacramento City Limits to Courtland Rd	55	77	22	Yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	52	6	No
I-80 EB	Suisun Valley Rd to SR 12	73	79	6	Yes
I-80 WB	Suisun Valley Rd to SR 12	74	79	5	Yes
SR 12 EB	I-80 to Beck Ave	65	76	11	Yes
SR 12 WB	I-80 to Beck Ave	64	76	12	Yes
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	79	11	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	79	13	Yes
SR 12	Walters Rd/ to SR 113	63	79	16	Yes
SR 12	SR 113 to SR 84 (River Rd)	64	79	15	Yes
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	79	15	Yes
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	68	6	Yes
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	68	5	Yes
I-80 EB	SR 113 to Pedrick Rd	71	78	7	Yes
I-80 WB	SR 113 to Pedrick Rd	71	78	7	Yes
SR 113	I-80 to Dixon City Limits	64	78	14	Yes
SR 113	Dixon City Limits to SR 12	57	78	21	Yes
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	77	16	Yes
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	78	15	Yes
SR 4	Discovery Bay Blvd to Tracy Blvd	61	77	16	Yes
SR 4	Tracy Blvd to I-5	64	77	13	Yes
I-5 NB	SR 4 (Freeway) to SR 4 (Charter Way)	71	78	7	Yes
I-5 SB	SR 4 (Freeway) to SR 4 (Charter Way)	72	78	6	Yes
I-5 NB	SR 4 (Charter Way) to Eighth Street	71	78	7	Yes
I-5 SB	SR 4 (Charter Way) to Eighth Street	72	78	6	Yes
I-205 EB	I-580 to Mountain House Pkwy	69	75	6	Yes
I-205 WB	I-580 to Mountain House Pkwy	69	74	5	Yes
I-205 EB	Mountain House Pkwy to Eleventh St	69	75	6	Yes
I-205 WB	Mountain House Pkwy to Eleventh St	68	74	6	Yes
I-205 EB	Grant Line Rd to Tracy Blvd	68	74	6	Yes
I-205 WB	Grant Line Rd to Tracy Blvd	67	73	6	Yes
I-205 EB	Tracy Blvd to MacArthur Dr	68	74	6	Yes
I-205 WB	Tracy Blvd to MacArthur Dr	68	73	5	Yes

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	51	3	No
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	76	14	Yes
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	76	15	Yes
Cypress Rd	Main Street to Bethel Island Rd	58	60	2	No
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	57	2	No
Delta Rd	Main Street to Byron Hwy	55	56	1	No
Pocket Rd	I-5 to Freeport Blvd	63	63	0	No
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	58	2	No
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	56	1	No
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	53	2	No
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	50	6	No
Lambert Rd	Herzog Rd to Franklin Blvd	46	50	4	No
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	51	3	No
Twin Cities Rd	River Rd to I-5	53	70	17	Yes
Twin Cities Rd	I-5 to Franklin Blvd	55	62	7	Yes
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	75	25	Yes
River Rd	Paintersville Bridge to Twin Cities Rd	51	70	19	Yes
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	70	15	Yes
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	70	15	Yes
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	67	13	Yes
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	50	5	No
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	50	4	No
Jackson Slough Rd	Isleton City Limits to SR 12	47	51	4	No

Roadway	Segment	Existing Noise Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Adverse Impact due to Traffic Noise?
Jackson Slough Rd	Brannan Island Rd to SR 12	47	51	4	No
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	70	17	Yes
Peltier Rd	Blossom Rd to I-5	44	50	6	No
Tracy Blvd	SR 4 to Clifton Court Rd	53	72	19	Yes
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	72	20	Yes
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	74	15	Yes
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	74	20	Yes
Mountain House Pkwy	Arnaudo Blvd to I-205	58	74	16	Yes
Eight Mile Rd	Stockton City Limits to I-5	58	60	2	No
Tracy Blvd	Tracy City Limits to I-205	58	73	15	Yes
Harbor Blvd	Industrial Blvd to US 50	63	76	13	Yes
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	76	14	Yes
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	75	13	Yes
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	75	24	Yes
River Rd	Freeport Bridge to Courtland Rd	54	55	1	No
River Rd	Courtland Rd to Sacramento Co./ Yolo Co. Line	48	75	27	Yes
Courtland Rd	SR 84 to River Rd	48	75	27	Yes

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~~Roadway~~	~~Segment~~	~~Existing Nois Level, dBA~~	~~Future With-Project Noise Level, dBA~~	~~Noise Level Increase, dB~~	~~Substantial Increase?~~
~~Byron Hwy~~	~~Contra Costa Co./ Alameda Co. Line to Alameda Co./San Joaquin Co. Line~~	~~58~~	~~74~~	~~**16**~~	~~**yes**~~
~~Brentwood Blvd~~	~~Delta Rd (Oakley City Limits) to Balfour Rd~~	~~61~~	~~76~~	~~**15**~~	~~**yes**~~
~~Brentwood Blvd~~	~~Balfour Rd to Brentwood City Limits (South)~~	~~60~~	~~76~~	~~**16**~~	~~**yes**~~

Roadway	Segment	Existing Nois Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
Balfour Rd	Brentwood Blvd to Brentwood City Limits	61	61	0	no
Bethel Island Rd	Oakley City Limits to End	55	55	0	no
Balfour Rd	Brentwood City Limits to Byron Hwy	54	54	0	no
Old SR 41	Brentwood City Limits (South) to Marsh Creek Rd	62	76	14	yes
Byron Hwy	Delta Rd to Old SR 4	53	53	0	no
Byron Hwy	SR 4 to Contra Costa Co./ Alameda Co. Line	59	74	15	yes
SR 160 (Freeport Blvd)	Sacramento City Limits to Freeport Bridge	59	59	0	no
SR 160 (Freeport Blvd/ River Rd)	Freeport Bridge to Scribner Rd	55	55	0	no
SR 160	Scribner Rd to Hood Franklin Rd	53	53	0	no
SR 160	Hood Franklin Rd to Lambert Rd	55	55	0	no
SR 160	Lambert Rd to Paintersville Bridge	53	53	0	no
SR 160 (Paintersville Bridge)	Sutter Slough Bridge Rd to SR 160 (River Rd)	53	77	24	yes
SR 160	Paintersville Bridge to Walnut Grove Bridge	53	77	24	yes
SR 160	Walnut Grove Bridge to A St (Isleton)	59	77	18	yes
SR 160	A St (Isleton) to SR 12	58	77	19	yes
SR 160	SR 12 to Brannan Island Rd	62	78	16	yes
SR 84	West Sacramento City Limits to Courtland Rd	55	77	22	yes
SR 84 (Courtland Rd/ Ryer Ave)	Courtland Rd to Cache Slough Ferry	46	46	0	no
SR 12 EB	I-80 to Beck Ave	65	76	11	no
SR 12 WB	I-80 to Beck Ave	64	76	12	yes
SR 12	Beck Ave to Sunset Ave/ Grizzly Island Rd	68	79	11	no
SR 12	Sunset Ave/ Grizzly Island Rd to Walters Rd/	66	79	13	yes
SR 12	Walters Rd/ to SR 113	63	79	16	yes
SR 12	SR 113 to SR 84 (River Rd)	64	79	15	yes

Roadway	Segment	Existing Nois Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
SR 12 (Rio Vista Bridge)	SR 84 (River Rd) to SR 160 (River Rd)	64	79	**15**	**yes**
SR 12	SR 160 (River Rd) to Sacramento Co./ SJ Co. Line	62	68	**6**	**no**
SR 12	Sacramento Co./ SJ Co. Line to I-5	63	68	**5**	**no**
SR 113	I-80 to Dixon City Limits	64	79	**15**	**yes**
SR 113	Dixon City Limits to SR 12	57	78	**21**	**yes**
SR 4 (Marsh Creek Rd)	Vasco Rd to Byron Hwy	61	77	**16**	**yes**
SR 4	Marsh Creek Rd to Discovery Bay Blvd	63	78	**15**	**yes**
SR 4	Discovery Bay Blvd to Tracy Blvd	61	77	**16**	**yes**
SR 4	Tracy Blvd to I-5	64	78	**14**	**yes**
A St/4th St/ Jackson Blvd.	SR 160 to Isleton City Limits	48	48	**0**	**no**
Main Street (Old SR 4)	SR 160 to Cypress Rd	62	76	**14**	**yes**
Main Street (Old SR 4)	Cypress Rd to Delta Rd (Oakley City Limits)	61	76	**15**	**yes**
Cypress Rd	Main Street to Bethel Island Rd	58	58	**0**	**no**
Bethel Island Rd	Cypress Rd to Oakley City Limits	55	55	**0**	**no**
Delta Rd	Main Street to Byron Hwy	55	55	**0**	**no**
Pocket Rd	I-5 to Freeport Blvd	63	63	**0**	**no**
Freeport Blvd (Old SR 160)	Pocket Rd to Sacramento City Limits	56	56	**0**	**no**
Freeport Bridge	River Rd to SR 160 (Freeport Blvd)	55	55	**0**	**no**
Hood Franklin Rd	SR 160 (River Rd) to I-5	51	51	**0**	**no**
Lambert Rd	SR 160 (River Rd) to Herzog Rd	44	44	**0**	**no**
Lambert Rd	Herzog Rd to Franklin Blvd	46	46	**0**	**no**
Franklin Blvd	Lambert Rd to Twin Cities Rd	48	48	**0**	**no**
Twin Cities Rd	River Rd to I-5	53	70	**17**	**yes**
Twin Cities Rd	I-5 to Franklin Blvd	55	62	**7**	**no**
Sutter Slough Bridge Rd	Sacramento Co./ Yolo Co. Line to Paintersville Bridge	50	75	**25**	**yes**

Roadway	Segment	Existing Nois Level, dBA	Future With-Project Noise Level, dBA	Noise Level Increase, dB	Substantial Increase?
River Rd	Paintersville Bridge to Twin Cities Rd	51	70	**19**	**yes**
River Rd	Twin Cities Rd to Walnut Grove Bridge	55	70	**15**	**yes**
Walnut Grove Rd/River Rd	Walnut Grove Bridge to Sacramento Co./ SJ Co. Line	55	70	**15**	**yes**
Isleton Rd	River Rd (Walnut Grove)/Isleton Rd Bridge to 1.5 miles west of Isleton Rd Bridge	54	67	**13**	**yes**
Race Track Rd/ Tyler Island Rd	Walnut Grove Rd to Southern End of Tyler Island	45	45	**0**	**no**
Tyler Island Rd	Southern End of Tyler Island to SR 160 (River Rd)	46	46	**0**	**no**
Jackson Slough Rd	Isleton City Limits to SR 12	47	47	**0**	**no**
Jackson Slough Rd	Brannan Island Rd to SR 12	47	47	**0**	**no**
Walnut Grove Rd	Sacramento Co./ SJ Co. Line to I-5	53	70	**17**	**yes**
Peltier Rd	Blossom Rd to I-5	44	44	**0**	**no**
Tracy Blvd	SR 4 to Clifton Court Rd	53	73	**20**	**yes**
Tracy Blvd	Clifton Court Rd to Tracy City Limits	52	73	**21**	**yes**
Byron Hwy	Alameda Co./San Joaquin Co. Line to Mountain House Pkwy	59	74	**15**	**yes**
Mountain House Pkwy	Byron Hwy to Arnaudo Blvd	54	74	**20**	**yes**
Mountain House Pkwy	Arnaudo Blvd to I-205	58	74	**16**	**yes**
Eight Mile Rd	Stockton City Limits to I-5	58	58	**0**	**no**
Tracy Blvd	Tracy City Limits to I-205	58	73	**15**	**yes**
Harbor Blvd	Industrial Blvd to US 50	63	75	**12**	**yes**
Industrial Blvd/ Lake Washington Blvd	Harbor Blvd to Jefferson Blvd	62	75	**13**	**yes**
Jefferson Blvd (Old SR 84)	Lake Washington Blvd to Southport Pkwy	62	75	**13**	**yes**
Jefferson Blvd (Old SR 84)	Southport Pkwy to West Sacramento City Limits	51	75	**24**	**yes**
River Rd	Freeport Bridge to Courtland Rd	54	54	**0**	**no**

~~Roadway~~	~~Segment~~	~~Existing Nois Level, dBA~~	~~Future With-Project Noise Level, dBA~~	~~Noise Level Increase, dB~~	~~Substantial Increase?~~
~~River Rd~~	~~Courtland Rd to Sacramento Co./ Yolo Co. Line~~	~~48~~	~~75~~	~~**27**~~	~~**yes**~~
~~Courtland Rd~~	~~SR 84 to River Rd~~	~~48~~	~~75~~	~~**27**~~	~~**yes**~~

As shown in Table 23-82, predicted future loudest-hour traffic noise levels from project-generated worker commutes and truck trips would result in a noise level of 60 dBA Leq or more, and an increase of 5 dB or more compared to existing traffic noise levels along 68 project roadway segments.~~predicted future traffic noise levels from project-generated worker commutes and truck trips would result in an increase of 12 dB or more compared to existing traffic noise levels along 43 project roadway segments.~~

Traffic noise from haul trucks and commuter vehicles on public roads is predicted to exceed daytime traffic noise thresholds at nearby residences, parks and other uses at affected parcels indicated in Table 23-82A. Traffic noise contours are shown in Appendix 23A.

Table 23-82A. Land Use Zones Adjacent to Project Haul Routes Affected by Increases in Traffic Noise, Separate Corridors Option

Location	Zoning	Total Affected Parcels, Daytime Threshold (60 dBA L_{eq} [1h]) and a 5 dB increase over existing levels
Alameda County	Agricultural/Other [a]	10
Contra Costa County	Agricultural/Other [a]	363
	Residential	3
Sacramento County – including River Road near the community of Hood; neighborhoods in the community of Hood; Lambert Road; Vorden Road.	Residential	48
	Natural/Recreational	139
	Agricultural/Other [a]	426
San Joaquin County	Residential	120
	Natural/Recreational	3
	Agricultural/Other [a]	455
City of Stockton		88
City of Tracy		110
Solano County	Natural/Recreational	9
	Agricultural/Other [a]	680
Yolo County – including County Road E9 near the community of Clarksburg; neighborhoods in the community of Clarksburg.	Agricultural/Other [a]	90
City of West Sacramento		199
Other Jurisdictions		538

[a] Includes agricultural or unclassified use that permits residential use.

Mitigation Measure NOI-1b: Prior to Construction, Initiate a Complaint/Response Tracking Program

Please see Mitigation Measure NOI-1b under Impact NOI-1 in the discussion of Alternative 1A.

Achievable noise reduction varies by measure. Shutting off a piece of equipment would eliminate its contribution to ambient noise. Noise barriers and enclosures would provide noise reduction within the discrete area shielding noise from surrounding noise sensitive receptors. Barriers can provide 5 to 15 dB of noise reduction depending configuration relative to surrounding terrain. Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.

23.4 References

23.4.1 Printed Communication

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