



## **Smith Basin Improvement Project**

### **Appendix F**

**OCWD Smith Basin Geotechnical Improvements Project Noise and  
Vibration Technical Memorandum, Vista Environmental, February 2019**

# VISTA ENVIRONMENTAL

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February 6, 2019

Greg Woodside  
Orange County Water District  
18700 Ward Street  
Fountain Valley, CA 92708

**Subject: Orange County Water (OCWD) – Smith Basin Geotechnical Improvements Project  
Noise and Vibration Technical Memorandum.**

Dear Mr. Woodside:

Vista Environmental has conducted an analysis to evaluate whether the proposed Smith Basin Geotechnical Improvements Project (proposed project) would cause significant noise or vibration impacts. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.).

## **Project Description**

The proposed project would involve geotechnical improvements to areas in Smith Basin that have experienced substantial erosion on the basin embankment slopes and the removal of overgrown vegetation and debris from this segment of Santiago Creek that is located within the Smith Basin.

## ***Existing Setting***

Smith Basin is a former OCWD groundwater recharge basin located on the north side of Villa Park Road and adjacent to the intersection of North Hewes Street. Smith Basin is located in the City of Orange. Smith Basin is part of the Santiago Basin complex, which also includes Santiago Basin, Bond Pit and Blue Diamond Pit. Smith Basin is roughly triangular in shape and is bordered by residential uses to the north and west, by Oak Ridge Private School and Santiago Boulevard to the east, and by Villa Park Road and the Blue Diamond and Bond Pits to the south. Santiago Creek flows into Smith Basin at the northeast corner and out of the Basin from a 21-foot diameter corrugated metal pipe that extends under Villa Park Road and into the Blue Diamond Basin.

The embankment slopes vary in height from 50 feet to 80 feet in height and vary in slope ratio from approximately 1:1 to 2:1, except near the southwest corner of the basin where the embankment slope is approximately 1:1. A portion of the north embankment slope has been improved with concrete v-ditch drainage improvements. A maintenance road is present along the top of the eastern embankment slope and the eastern portion of the southern embankment slope. Portions of the basin interior and lower areas of the southern and eastern embankment slopes are covered with dense vegetation. Erosion has resulted in near-vertical scarps in some areas. The locations where significant erosion has occurred are shown in Figure X. The proposed geotechnical improvements would take place in Areas 1, 2, and 5.

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Smith Basin Rehabilitation Project  
Rehab Areas

Figure X





#### Area 1

Area 1 is located on the southern embankment slope adjacent to Villa Park Road. The southern embankment slope was constructed at an approximate slope ratio of 1.7:1 based on the pre-erosion topography. An approximate 450-foot long area along the toe of the embankment slope has been progressively eroding during high water flow events since approximately 1981. The erosion has created a near vertical scarp that is estimated to be up to 25 feet in height.

#### Area 2

Area 2 is located on the eastern embankment slope adjacent to Oak Ridge Private School and the northern end of North Santiago Boulevard. The area of erosion is approximately 700 feet in length. Approximately 200 feet of the area is located outside of OCWD property, owned by the County of Orange. The approximate 700-foot long area along the toe of the embankment slope has been progressively eroding during the high water flow events since 1969. The erosion has created a near vertical scarp that ranges in height from approximately 35 feet at the southwest end.

#### Area 3

Area 3 is located near the northeast corner of the basin. The erosion is within the basin interior and begins at the top of a relatively flat area between the creek flow line and the northern embankment slope. The erosion consists of a relatively narrow erosion gully that has side scarps on the order of 2 to 6 feet deep. Area 3 will be incorporated with the work on Areas 1 and 2.

#### Area 4

The western portion of the northern embankment slope that does not have drainage improvements has experienced erosion rilling. The erosion rills vary in depth, but are generally about a foot deep. The western portion of the slope has more closely spaced rills and less vegetation as a result of the erosion. Area 4 will not be addressed with this project.

#### Area 5

Area 5 is located near the top of the embankment slope near the west corner of the basin. The embankment slope is relatively steep. The erosion was first observed in the 1970 aerial photographs at the same time that the grading for the residential property to the west and north was being performed. Over the years the erosion gully has widened and retreated to the west toward the adjacent residential property. Access to the slope area is restricted due to steepness and vegetation. The erosion gully has relatively steep side slopes that are estimated to be about 6 to 10 feet in height.

### ***Santiago Creek***

#### Proposed Project – Repair Slopes and Re-Establish Santiago Creek to Its Original Alignment

Three areas within Smith Basin would be repaired and/or improved to increase geotechnical stability. As part of the improvements much of the bottom of Smith Basin will be re-graded to repair the existing slope damage and re-establish Santiago Creek to its original alignment.

The project consists of three main repair areas. All of the areas exhibit damage to the slopes of the basin of varying degrees. Repair involves relocating the flow of Santiago Creek to its original location, prior to its southerly migration. Relocating the creek would help to prevent future damage to the slopes from erosion caused by Santiago Creek flowing at the base of the slopes. The project consists of the excavation of soil from the bottom of Smith Basin and placement of fill on the damaged slopes to restore

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them to their original configuration. The repair methods vary by area, and are described in more detail below.

The repair to the failed slopes in Smith Basin will require excavation along the base of the failures and placement of engineered fill. Repairs include using fill excavated from within the bottom of Smith Basin to repair these slopes. During execution of the work, equipment will be staged in the upland areas near the north western quadrant of Smith Basin.

#### Areas 1 and 2

The primary cause of erosion in Area 1 and Area 2 is undercutting of the toe of the embankment from the southerly migration of Santiago Creek. Existing topography in the Basin indicates that the Santiago Creek bed is well defined and incised as it enters through the northeast corner of Smith Basin. The Basin consists of a long narrow vegetated shelf along the north side of the Basin and a long wide relatively flat lowland area throughout the middle and southern area of the Basin. Over time, the creek flow has moved from the northern side of the Basin towards the south to its current alignment along the toe of the southern and eastern slopes. Flows in Santiago Creek are highly variable throughout the year, with the highest flows typically occurring during the rainy season (December – April) and low flows during the remainder of the year. The Creek currently flows in a shallow incision near the base of the failed slopes at the southern and eastern edges of the Basin.

Re-establishing these embankment slopes will require the current low-flow path of Santiago Creek to be moved northward and westward back towards its original location. Since the soil to repair the slopes will be excavated from the bottom of the Basin, construction in the Basin would be completed in one phase. The repair work would include re-grading the bottom of Smith Basin to restore Santiago Creek in its original alignment towards the middle of the Basin; repairing and reconstructing the slopes in the Basin; and constructing buttress fills and upland planting areas along the southern and eastern slopes. As part of the slope reconstruction, the base of the southern and eastern slopes above the buttress fill will be lined with rip rap and backfilled with soil to allow for vegetation to grow after repairs are completed.

### **Proposed Construction Activities**

Construction of the proposed project would require the use of multiple pieces of equipment over two phases of construction. The overall construction of the project would take approximately four (4) months to complete.

#### ***Phase 1 – Basin Site Preparation & Santiago Creek Realignment Rip Rap***

Phase 1 is anticipated to take approximately twelve days to complete and would consist of regrading the bottom of Smith Basin, repairing and reconstructing the Basin slopes, and placing and backfilling rip rap. Bulldozers will be used to remove existing vegetation within the bottom of the Basin. The bottom of the Basin will be graded to establish the path of Santiago Creek in a southwesterly direction from the northeast corner of the Basin to the outlet at the culvert under Villa Park Road in the southwest corner of the Basin. A buttress fill featuring a minimum forty foot wide upland planting shelf and rip rap above the planting shelf along the base of the repaired slopes will be constructed along the eastern and southern Basin slopes to prevent erosion. A bulldozer, scrapers, compactor, and motor grader will be used to grade the bottom of the Basin, buttress fill, planting shelf and repaired/reconstructed slopes. The realigned Creek will vary from 100 feet at the inlet, to 550 feet wide at the middle, and back down to 100 feet wide at the outlet. The depth of the Creek will vary through the basin from a depth of 10 – 20 feet deep. Rip rap will be placed along the base of the repaired slopes at the mouth of the Basin. The Creek regrading

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will be completed concurrent with the excavation of the south and east slope repairs. Approximately 150,000 cubic yards of material will be excavated from within the basin to re-grade the creek alignment and repair the slopes. The equipment mix for the site preparation and Santiago Creek realignment rip rap phase is shown below in Table A.

**Table A – Phase 1 Smith Basin Site Preparation & Santiago Creek Realignment Rip Rap Equipment Mix**

Equipment	Pieces of Equipment	Hours of Operation	Total Days	Total Hours of Operation	Horsepower
<b>Phase 1A – Site Preparation Clearing and Grubbing</b>					
Bulldozer	1	8	8	64	250
Tracked Excavator	1	8	8	64	200
Skidder	1	8	8	64	200
Off-Road Haul Truck	1	8	8	64	350
Dump Truck	1	8	8	64	350
Tub Grinder	1	8	8	64	300
Wheel Loader	1	8	8	64	250
Water Truck	1	8	8	64	350
Work Truck	1	8	8	128	300
<b>Phase 1B – Santiago Creek Realignment Rip Rap</b>					
Tracked Excavator	1	8	4	32	200
Wheel Loader	1	8	4	32	250
Off-Road Haul Truck	1	8	4	32	350
Dump Truck	12	8	2	192	350
Water Truck	1	8	4	32	350
Work Truck	1	8	4	32	300

Source: OCWD.

### ***Phase 2 – Reconstruction of Slopes***

Phase 2 is anticipated to take approximately five weeks to complete and would consist of rough grading and excavation to regard the bottom of Smith Basin and reconstruct the slopes in Area 1 and 2. Reconstruction of these slopes would start from the bottom of the slope and proceed upwards to the top. Reconstruction will extend approximately 40 feet beyond both ends of the existing eroded areas. The eroded slump blocks would be removed, and a fill keyway that covers the footprint of the slope and buttress fill would be excavated. Approximately 20,000 cubic yards will be excavated and recompacted in the keyway. After the fill keyway is filled engineered fill will be placed in layers to construct the buttress fill and reconstruct the slope up to the top of the existing slope. Approximately 130,000 cubic yards of fill will be placed to reconstruct the slopes in Areas 1 and 2. After the slope is constructed, rip rap will be placed at the base of the slope and backfilled with soil. The slope would then be trimmed to finished dimensions. The final step of construction would include placement of straw waddle and hydro-seeded with a blend of native seeds. The equipment mix for slope reconstruction is broken up for Area 1 and Area 2 and is shown below in Table B.

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**Table B – Phase 2 Slope Embankment Repair Equipment Mix**

Equipment	Pieces of Equipment	Hours of Operation	Total Days	Total Hours of Operation	Horsepower
<b>Phase 2A – Area 1 Slope Embankment Repair</b>					
Bulldozer	1	8	8	64	250
Motor Grader	1	8	4	32	250
Tracked Excavator	1	8	4	32	200
Scraper	3	8	8	192	490
Compactor	1	8	8	64	200
Water Truck	1	8	8	64	350
Work Truck	1	8	8	128	300
<b>Phase 2B – Area 2 Slope Embankment Repair</b>					
Bulldozer	1	8	16	128	250
Motor Grader	1	8	8	64	250
Tracked Excavator	1	8	8	64	200
Scraper	3	8	16	384	490
Compactor	1	8	16	128	200
Water Truck	1	8	16	128	350
Work Truck	1	8	16	256	300

Source: OCWD.

***Phase 3 – Area 5***

Phase 3 is anticipated to take two days to complete and would consist of reconstruction of the Area 5 embankment slope. The primary cause of erosion in Area 5 is uncontrolled surface water flow on a relatively steep embankment slope. The primary concern is continued widening of the erosion gully and the possible continued westward retreat of the gully. Re-construction of the embankment slope in this area would be completed in one phase. The limits of excavation will extend approximately 10 feet beyond the current edge of the gully. The improvements would include rough grading and excavation to fill the deep gullies to match the slopes immediately adjacent to the area. Reconstructing the embankment slope would start from the bottom of the slope and proceed upwards to the top. The gullied area would be over excavated to create a fill keyway at the bottom of the gully. Approximately 1,000 cubic yards will be over excavated and recompact in the keyway. Engineered fill will then be placed in the fill keyway. After the fill keyway is filled, approximately 4,000 cubic yards of engineered fill will be placed in layers to match the adjacent slopes. After the gullies are filled and trimmed to match adjacent slopes, straw waddle and a native blend of hydro-seed will be placed over the repaired area. The equipment mix for Area 5 slope reconstruction is shown below in Table C.

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**Table C – Phase 3 Area 5 Slope Embankment Repair Equipment Mix**

Equipment	Pieces of Equipment	Hours of Operation	Total Days	Total Hours of Operation	Horsepower
Bulldozer	1	8	2	16	250
Tracked Excavator	1	8	2	16	200
Compactor	1	8	2	16	200
Dump Truck	4	8	2	64	350
Water Truck	1	8	2	16	350
Work Truck	2	8	2	32	300

Source: OCWD.

### Existing Noise Setting

Currently, the primary sources of noise within the study area consists of vehicle traffic on Villa Park Road, from students playing during recess at Oakridge Private School, and from aircraft overflights. In order to determine the existing noise levels, three short-term (15-minute) ambient noise measurements were taken in the vicinity of the proposed project between 3:00 p.m. and 4:01 p.m. on Monday, December 17, 2018. The results of the noise level measurements are presented in Table D and the noise measurement printouts are attached to this letter along with a photo index showing the locations of the noise measurements.

**Table D – Existing (Ambient) Noise Level Measurements**

Site No.	Description	Primary Noise Sources	Start Time of Measurement	Noise Level (dBA $L_{eq}/L_{max}$ )
1	Located approximately 100 feet west of the Santiago Boulevard centerline at the end of the road and approximately 40 feet west of Oakridge Private School.	Kids playing at Oakridge Private School, equipment operating at Blue Ribbon Nursery, vehicles on Villa Park Road, and aircraft	3:00 p.m.	51.4/64.3
2	Located in the front of the single-family home at 10422 Balliet Drive approximately 40 feet east of the Balliet Drive/Marion Way centerline.	Vehicles on Villa Park Road and aircraft	3:26 p.m.	46.7/57.3
3	Located in the center of Santiago Boulevard at the southern edge of the old road and approximately 230 feet south of Stacey Lee Lane.	Vehicles on Villa Park Road and Canon Street, kids playing at Oakridge Private School, and aircraft	3:46	52.8/63.1

Source: Noise measurements taken with a Larson Davis Model 831 Type 1 precision sound level meter on Monday, December 17, 2018.

### Noise and Vibration Standards

The southern and eastern portions of Smith Basin are located within the City of Orange and northern and western portions of Smith Basin are located within the City of Villa Park. The proposed project would be required to conform to the following applicable noise standards from the Cities of Orange and Villa Park.

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### ***City of Orange Municipal Code***

The applicable sections of the City of Orange Municipal Code are detailed below. It should be noted that neither the City of Orange General Plan nor the Municipal Code provide any policies or standards for vibration. However, Section 5.10.3 of the *City of Orange General Plan Program EIR* (General Plan EIR), March 2010, determined that a significant vibration impact would occur if vibration levels would exceed 0.2 inch per second PPV at any nearby building

#### **Section 8.24.020 Definitions.**

The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

A. “Ambient noise level” means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

B. “Adjusted ambient noise level” means the measured ambient noise level plus 3 dB (A). Three (3) dB (A) is the industry-accepted threshold of human perceptibility for a change in noise environment.

#### **Section 8.24.040 Exterior Noise Standards.**

A. The following noise standards [Table E] for fixed noise sources, unless otherwise specifically indicated, shall apply to all residential property:

**Table E – City of Orange Municipal Code Exterior Noise Standards**

<b>Standard</b>	<b>Noise Level</b>	<b>Time Period</b>
Hourly Average ( $L_{eq}$ )	55 dB (A)	7:00 a.m. – 10:00 p.m.
	50 dB (A)	10:00 p.m. – 7:00 a.m.
Maximum Level	70 dB (A)	7:00 a.m. – 10:00 p.m.
	65 dB (A)	10:00 p.m. – 7:00 a.m.

Source: City of Orange Municipal Code Section 8.24.040.

B. It is unlawful for any person at any location within the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other residential property to exceed the noise standards identified in Table 8.24.040. For multi-family residential or mixed use developments located within the City’s Urban Mixed Use, Neighborhood Mixed Use, Old Towne Mixed Use or Medium Density Residential General Plan land use districts, exterior noise standards shall apply to common recreation areas only and shall not apply to private exterior space (such as a private yard, patio, or balcony)

C. In the event the ambient noise level exceeds the noise standards identified in Table 8.24.040 of this section, the “adjusted ambient noise level” shall be applied as the noise standard. In cases where the noise standard is adjusted due to a high ambient noise level, the noise standard shall not exceed the “adjusted ambient noise level”, or 70 dB (A), whichever is less. In cases where the ambient noise level is already greater than 70 dB (A), the ambient noise level shall be applied as the noise standard.

D. Each of the noise limits specified in Table 8.240.040 shall be reduced by five dB(A) for impact or simple tone noises, recurring impulsive noises, or for noises consisting of speech or music. (Ord. No. 1-4 § I, 8-12-14)

#### **8.24.050 Exemptions from Chapter Provisions.**

The following activities shall be exempted from the provisions of this chapter:

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E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Noise generated outside of the hours specified are subject to the noise standards identified in Table 8.24.040.

### ***City of Villa Park Municipal Code***

The applicable sections of the City of Villa Park Municipal Code are detailed below.

#### Section 6-6.4 Designated Noise Zones.

The residential properties herein described are hereby assigned to the following noise zones.

Noise Zone 1: All residential properties, whether incorporated or unincorporated.

#### Section 6-6.5 Exterior Noise Standards.

A. The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone.

**Table F – City of Villa Park Municipal Code Exterior Noise Standards**

Noise Zone	Noise Level	Time Period
1	55 dB (A)	7:00 a.m. – 10:00 p.m.
	50 dB (A)	10:00 p.m. – 7:00 a.m.

Source: City of Orange Municipal Code Section 8.24.040.

#### Section 6-6.7 Special Provisions - Generally.

The following activities shall be exempted from the provisions of this chapter:

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, or 8:00 p.m. and 8:00 a.m. on Saturday, or any time on Sunday or a Federal Holiday.

## **Project Impacts**

### ***Construction-Related Noise Impacts***

The proposed project would require the use of multiple pieces of equipment over three phases of construction. The overall construction of the proposed project would take approximately four months. All construction activities would occur between 7:00 a.m. and 8:00 p.m. Monday through Friday, 8:00 a.m. and 8:00 p.m. on Saturdays or any time on Sundays and federal holidays, when construction activities are exempt from both the City of Orange noise standards as detailed in Section 8.24.050(E) of the Municipal Code and the City of Villa Park noise standards as detailed in Section 6-6.7(e) of the Municipal Code. However, the Cities construction noise standards do not provide any limits to the noise levels that may be created from construction activities and even with adherence to the Cities standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby students and employees at Oak Ridge Private School that are located adjacent to the southeastern corner of the Basin and residents at single-family homes located on the north and west sides of the Basin.

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The *Transit Noise and Vibration Impact Assessment*, prepared by Federal Transit Administration (FTA), 2006, which is the only agency that has defined what constitutes a significant construction noise impact has been utilized to determine if the proposed construction activities would create a significant substantial temporary noise increase. The FTA determined that an 80 dBA Leq daytime construction noise level at nearby homes and school would constitute a significant construction noise impact.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the FHWA's Roadway Construction Noise Model (RCNM) and the parameters and assumptions detailed above in order to determine if the proposed construction activities would exceed the applicable noise standards. The results are shown below in Table G and the RCNM printouts are provided in Appendix A.

**Table G – Construction Noise Levels at Nearby Sensitive Receptors**

Construction Phase	Homes on the North Side of Smith Basin		Homes on the West Side of Smith Basin		School on the East Side of Smith Basin	
	Distance (feet)	Noise Level (dBA Leq)	Distance (feet)	Noise Level (dBA Leq)	Distance (feet)	Noise Level (dBA Leq)
Phase 1A - Site Preparation Clearing & Grubbing	170	71.9	180	71.5	120	74.0
Phase 1B - Santiago Creek Realignment Rip Rap	170	69.1	180	68.7	120	71.4
Phase 2A - Area 1 Slope Embankment Repair	530	65.2	850	61.7	400	67.2
Phase 2B - Area 2 Slope Embankment Repair	50	78.3	2,100	54.5	40	79.8
Phase 3 - Area 5 Slope Embankment Repair	90	74.7	70	76.5	1,800	52.2
<b>FTA Noise Threshold</b>		<b>80</b>		<b>80</b>		<b>80</b>

Source: RCNM, Federal Highway Administration, 2006

Table G shows that worst-case construction noise levels would occur during Phase 2B with a noise level as high as 79.8 dBA Leq at the school on the east side of Smith Basin. Table G shows that none of the construction phases would exceed the FTA daytime construction noise standard of 80 dBA Leq. Through adherence to the limitation of allowable construction times provided in Section 8.24.050(E) of the City of Orange Municipal Code and Section 6-6.7(e) of the City of Villa Park Municipal Code, the construction-related noise levels would not exceed any standards. Therefore, the construction-related noise impacts created from the proposed project would result in a less than significant impact.

### ***Construction-Related Vibration Impacts***

The proposed project would require the use of multiple pieces of equipment over four phases of construction. The nearest sensitive receptors to the proposed construction activities are students and employees at Oakridge Private School which is located as near as 40 feet east of Area 2 construction activities.

Section 5.10.3 of the *City of Orange General Plan Program EIR* (General Plan EIR), March 2010, determined that a significant vibration impact would occur if vibration levels would exceed 0.2 inch per second PPV at any nearby building. The FTA has compiled vibration level data regarding vibrating generating characteristics of several types of construction equipment that are shown in Table H.

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**Table H – Vibration Source Levels for Construction Equipment**

<b>Equipment</b>	<b>Peak Particle Velocity at 25 feet (inches/second)</b>	<b>Approximate Vibration Level (L<sub>v</sub>) at 25 feet</b>
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Federal Transit Administration, May 2006.

As shown in Table H, a vibratory roller would be the type of equipment that is anticipated to be utilized during construction activities associated with the proposed project that would create the highest vibration level of 0.210 inch-per-second peak particle velocity (PPV) at 25 feet. Based on typical vibration propagation rates, the vibration level at the nearest offsite receptor (Oakridge Private School, located as near as 40 feet from construction activities) would be 0.125 inch-per-second PPV, which is within the 0.2 inch-per-second PPV threshold detailed above. Impacts would be less than significant.

### ***Operational Noise and Vibration Impacts***

The proposed sediment restoration project would consist of three phases that would be completed over an approximately two month period. Annually, OCWD will remove overgrown vegetation and debris and inspect the slopes within Smith Basin. However, the ongoing operation of Smith Basin would primarily be passive and would not typically require the use of any off-road equipment. As such, no operational noise or vibration impacts are anticipated to be created from the proposed project.

### **Analysis Findings for the Proposed Project**

This analysis found that through implementation the applicable City of Orange and City of Villa Park construction noise regulations, all noise and vibration impacts created from the proposed project would be reduced to less than significant levels. As such, no noise or vibration-related mitigation measures are required for the proposed project.

Please let me know if you have any questions or need additional information with regard to the above analysis. I can be reached at (949) 510-5355, or email me at [greg@vistalb.com](mailto:greg@vistalb.com).

Sincerely,



Greg Tonkovich, INCE  
Senior Analyst  
Vista Environmental

Encl.: Photo Index of Noise Measurements  
Noise Measurement Printouts  
RCNM Model Printouts

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Noise Measurement Site 1 - looking north



Noise Measurement Site 1 - looking northeast



Noise Measurement Site 1 - looking east



Noise Measurement Site 1 - looking southeast



Noise Measurement Site 1 - looking south



Noise Measurement Site 1 - looking southwest

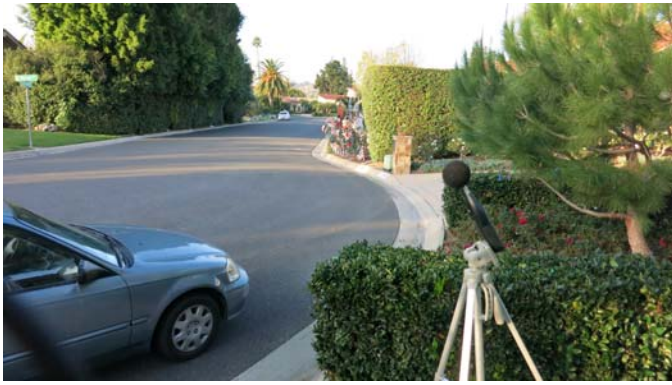


Noise Measurement Site 1 - looking west



Noise Measurement Site 1 - looking northwest





Noise Measurement Site 2 - looking north



Noise Measurement Site 2 - looking northeast



Noise Measurement Site 2 - looking east



Noise Measurement Site 2 - looking southeast



Noise Measurement Site 2 - looking south



Noise Measurement Site 2 - looking southwest



Noise Measurement Site 2 - looking west



Noise Measurement Site 2 - looking northwest

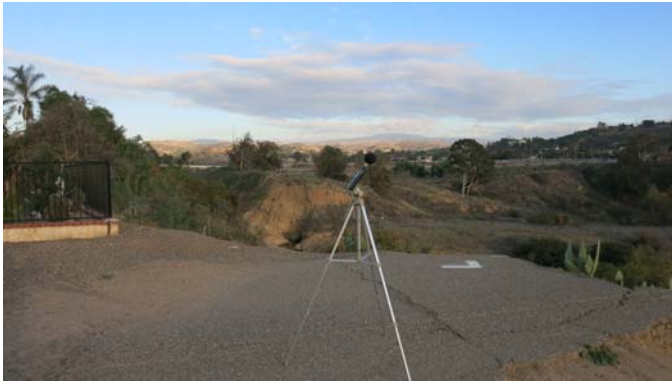




Noise Measurement Site 3 - looking north



Noise Measurement Site 3 - looking northeast



Noise Measurement Site 3 - looking east



Noise Measurement Site 3 - looking southeast



Noise Measurement Site 3 - looking south



Noise Measurement Site 3 - looking southwest



Noise Measurement Site 3 - looking west



Noise Measurement Site 3 - looking northwest

General Information				
Serial Number				02509
Model				831
Firmware Version				2.314
Filename				831_Data.001
User				GT
Job Description	Smith Basin Rehabilitation Project			
Location	East Side of Smith Basin			
Measurement Description				
Start Time	Monday, 2018 December 17 15:00:25			
Stop Time	Monday, 2018 December 17 15:15:25			
Duration	00:15:00.0			
Run Time	00:15:00.0			
Pause	00:00:00.0			
Pre Calibration	Monday, 2018 December 17 14:56:07			
Post Calibration	None			
Calibration Deviation	---			
Note				
Approx 100 ft west of Santiago Bl CL at end of Road and approx 40 ft west of Oakridge Private School				
Noise from kids playing at School, equipment operating at Blue Ribbon Nursery, vehicles on Villa Park Rd and Aircraft				
67 F, 29.69 in Hg, 57% Hu, no wind, partly cloudy				
Overall Data				
LAeq			51.4	dB
LASmax	2018 Dec 17 15:00:25		64.3	dB
LApeak (max)	2018 Dec 17 15:13:58		89.9	dB
LASmin	2018 Dec 17 15:08:27		43.6	dB
LCeq			62.1	dB
LAeq			51.4	dB
LCeq - LAeq			10.7	dB
LA1eq			55.2	dB
LAeq			51.4	dB
LA1eq - LAeq			3.8	dB
Ldn			51.4	dB
LDay 07:00-22:00			51.4	dB
LNight 22:00-07:00			---	dB
Lden			51.4	dB
LDay 07:00-19:00			51.4	dB
LEvening 19:00-22:00			---	dB
LNight 22:00-07:00			---	dB
LAE			81.0	dB
# Overloads			0	
Overload Duration			0.0	s
# OBA Overloads			0	
OBA Overload Duration			0.0	s
Statistics				
LAS5.00			56.8	dBA
LAS10.00			54.3	dBA
LAS33.30			50.4	dBA
LAS50.00			49.5	dBA
LAS66.60			48.6	dBA
LAS90.00			47.0	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)		0 /	0.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)		0 /	0.0	s
LApeak > 135.0 dB (Exceedence Counts / Duration)		0 /	0.0	s
LApeak > 137.0 dB (Exceedence Counts / Duration)		0 /	0.0	s
LApeak > 140.0 dB (Exceedence Counts / Duration)		0 /	0.0	s
Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRM831			
Integration Method	Linear			
OBA Range	Low			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	Z Weighting			
OBA Max Spectrum	Bin Max			
Gain	+0			dB
Under Range Limit	26.3			dB
Under Range Peak	76.1			dB
Noise Floor	17.1			dB
Overload	143.7			dB

1/1 Spectra												
Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	60.4	55.4	58.7	58.3	55.7	50.6	48.9	47.7	41.3	30.7	26.6	22.3
LZSmax	89.6	84.4	84.7	86.1	74.9	66.4	61.9	57.5	49.3	48.9	51.4	43.3
LZSmin	45.4	49.9	53.8	52.8	47.2	39.9	38.7	39.6	33.8	24.2	13.5	13.6
1/3 Spectra												
Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	53.7	59.9	57.3	55.2	55.5	51.2	51.6	55.1	54.4	53.0	54.0	53.6
LZSmax	77.0	86.9	84.5	82.5	85.0	78.6	80.3	78.8	81.5	82.6	83.6	78.0
LZSmin	38.0	37.2	38.4	41.1	43.7	45.3	45.6	47.3	46.8	46.7	46.4	45.9
Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	51.9	51.9	48.0	46.9	45.6	44.9	44.9	43.9	43.6	43.9	43.2	41.4
LZSmax	71.0	69.3	68.3	65.0	62.4	57.1	59.9	56.7	55.3	54.1	53.1	50.7
LZSmin	44.3	40.8	37.8	36.1	34.8	33.4	33.2	32.7	34.9	35.4	34.7	32.9
Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	39.3	35.4	31.7	27.5	25.9	23.0	23.6	21.5	20.0	18.8	18.3	14.6
LZSmax	47.4	43.7	43.3	41.4	43.3	45.6	50.0	45.2	43.5	41.0	40.1	35.3
LZSmin	31.7	27.9	23.6	20.8	19.7	14.9	9.6	8.2	7.4	7.4	9.5	9.2

Calibration History												
Preamp	Date										dB re. 1V/Pa	
PRM831	17 Dec 2018 14:56:06										-26.1	
PRM831	04 Dec 2018 09:35:01										-25.5	
PRM831	16 Nov 2018 13:58:18										-25.8	
PRM831	24 Oct 2018 13:08:44										-26.1	
PRM831	12 Oct 2018 09:55:27										-25.9	
PRM831	26 Sep 2018 15:49:25										-26.2	
PRM831	21 Sep 2018 08:51:56										-25.6	
PRM831	05 Sep 2018 11:51:21										-25.9	
PRM831	13 Jun 2018 13:02:21										-25.7	
PRM831	30 Mar 2018 23:00:57										-25.2	
PRM831	30 Mar 2018 12:23:25										-25.8	



General Information													
Serial Number	02509												
Model	831												
Firmware Version	2.314												
Filename	831_Data.002												
User	GT												
Job Description	Smith Basin Rehabilitation Project												
Location	West of Smith Basin												
Measurement Description													
Start Time	Monday, 2018 December 17 15:26:51												
Stop Time	Monday, 2018 December 17 15:41:51												
Duration	00:15:00.0												
Run Time	00:15:00.0												
Pause	00:00:00.0												
Pre Calibration	Monday, 2018 December 17 14:56:06												
Post Calibration	None												
Calibration Deviation	---												
Note													
In front yard of home at 10422 Ballier Dr, approx 40 ft east of the CP of Ballier Dr and Marion Way													
67 F 29.69 in Hg, 60% hu, no wind, partly cloudy													
Overall Data													
LAeq												46.7	dB
LASmax	2018 Dec 17 15:38:57											57.3	dB
LApeak (max)	2018 Dec 17 15:38:57											81.8	dB
LASmin	2018 Dec 17 15:30:24											37.0	dB
LCeq												61.9	dB
LAeq												46.7	dB
LCeq - LAeq												15.2	dB
LA1eq												49.1	dB
LAeq												46.7	dB
LA1eq - LAeq												2.4	dB
Ldn												46.7	dB
LDay 07:00-22:00												46.7	dB
LNight 22:00-07:00												---	dB
Lden												46.7	dB
LDay 07:00-19:00												46.7	dB
LEvening 19:00-22:00												---	dB
LNight 22:00-07:00												---	dB
LAE												76.3	dB
# Overloads												0	
Overload Duration												0.0	s
# OBA Overloads												0	
OBA Overload Duration												0.0	s
Statistics													
LAS5.00												51.4	dBA
LAS10.00												50.0	dBA
LAS33.30												46.5	dBA
LAS50.00												44.9	dBA
LAS66.60												43.7	dBA
LAS90.00												42.0	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)											0 /	0.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)											0 /	0.0	s
LApeak > 135.0 dB (Exceedence Counts / Duration)											0 /	0.0	s
LApeak > 137.0 dB (Exceedence Counts / Duration)											0 /	0.0	s
LApeak > 140.0 dB (Exceedence Counts / Duration)											0 /	0.0	s
Settings													
RMS Weight												A Weighting	
Peak Weight												A Weighting	
Detector												Slow	
Preamp												PRM831	
Integration Method												Linear	
OBA Range												Low	
OBA Bandwidth												1/1 and 1/3	
OBA Freq. Weighting												Z Weighting	
OBA Max Spectrum												Bin Max	
Gain												+0	dB
Under Range Limit											26.3	dB	
Under Range Peak											76.1	dB	
Noise Floor											17.1	dB	
Overload											143.7	dB	
1/1 Spectra													
Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k	
LZeq	54.1	57.5	58.6	59.7	53.8	44.0	43.1	42.4	37.9	28.4	20.1	15.5	
LZSmax	77.2	75.0	70.3	76.8	67.0	59.2	57.8	50.0	44.8	37.5	36.8	30.7	
LZSmin	45.6	51.2	51.2	50.0	41.8	33.7	31.5	32.8	28.1	19.3	13.2	13.6	

## 1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	48.0	49.5	50.4	51.5	53.5	53.2	53.5	53.8	54.3	54.9	54.8	55.3
LZSmax	70.2	73.2	73.3	66.5	69.5	72.9	65.1	67.6	69.6	73.1	67.1	76.7
LZSmin	36.1	37.3	39.6	43.8	34.4	45.4	47.1	45.2	45.6	45.4	44.5	43.2
Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	50.9	48.8	45.4	39.9	39.2	38.2	38.4	38.5	38.1	38.3	37.8	36.8
LZSmax	64.9	65.8	64.0	52.4	54.1	56.0	54.1	55.0	53.2	47.5	45.6	43.1
LZSmin	38.7	36.8	31.4	27.9	25.7	26.1	25.9	26.3	27.5	28.3	28.4	27.3
Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	35.3	32.8	29.3	26.1	22.9	19.2	17.3	15.2	12.3	10.7	11.4	9.9
LZSmax	41.4	41.4	37.0	35.9	35.3	32.2	34.6	32.6	29.4	26.9	25.7	23.7
LZSmin	25.6	22.7	19.4	16.2	13.7	11.0	9.1	8.1	7.5	7.5	9.4	9.1

## Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	17 Dec 2018 14:56:06	-26.1
PRM831	04 Dec 2018 09:35:01	-25.5
PRM831	16 Nov 2018 13:58:18	-25.8
PRM831	24 Oct 2018 13:08:44	-26.1
PRM831	12 Oct 2018 09:55:27	-25.9
PRM831	26 Sep 2018 15:49:25	-26.2
PRM831	21 Sep 2018 08:51:56	-25.6
PRM831	05 Sep 2018 11:51:21	-25.9
PRM831	13 Jun 2018 13:02:21	-25.7
PRM831	30 Mar 2018 23:00:57	-25.2
PRM831	30 Mar 2018 12:23:25	-25.8

General Information													
Serial Number												02509	
Model												831	
Firmware Version												2.314	
Filename												831_Data.003	
User												GT	
Job Description	Smith Basin Rehabilitation Project												
Location	Northeast Side of Basin												
Measurement Description													
Start Time	Monday, 2018 December 17 15:46:38												
Stop Time	Monday, 2018 December 17 16:01:38												
Duration	00:15:00.0												
Run Time	00:15:00.0												
Pause	00:00:00.0												
Pre Calibration	Monday, 2018 December 17 14:56:06												
Post Calibration												None	
Calibration Deviation												---	
Note													
Located in center of Santiago Bl at southern edge of old road, approx 230 ft south of Stacey Lee Ln													
Noise from Villa Park Rd and Cannon St, kids playing at School, and Aircraft													
67 F, 29.69 in Hg, 63% Hu, no wind, partly cloudy													
Overall Data													
L <sub>Aeq</sub>												52.8	dB
L <sub>ASmax</sub>	2018 Dec 17 15:57:13											63.1	dB
L <sub>Apeak</sub> (max)	2018 Dec 17 15:46:51											80.5	dB
L <sub>ASmin</sub>	2018 Dec 17 15:56:47											46.4	dB
L <sub>Ceq</sub>												61.6	dB
L <sub>Aeq</sub>												52.8	dB
L <sub>Ceq</sub> - L <sub>Aeq</sub>												8.8	dB
L <sub>A<sub>I</sub>eq</sub>												54.6	dB
L <sub>Aeq</sub>												52.8	dB
L <sub>A<sub>I</sub>eq</sub> - L <sub>Aeq</sub>												1.8	dB
L <sub>dn</sub>												52.8	dB
L <sub>Day</sub> 07:00-22:00												52.8	dB
L <sub>Night</sub> 22:00-07:00												---	dB
L <sub>den</sub>												52.8	dB
L <sub>Day</sub> 07:00-19:00												52.8	dB
L <sub>Evening</sub> 19:00-22:00												---	dB
L <sub>Night</sub> 22:00-07:00												---	dB
L <sub>AE</sub>												82.3	dB
# Overloads												0	
Overload Duration												0.0	s
# OBA Overloads												0	
OBA Overload Duration												0.0	s
Statistics													
L <sub>AS5.00</sub>												57.7	dBA
L <sub>AS10.00</sub>												55.0	dBA
L <sub>AS33.30</sub>												52.3	dBA
L <sub>AS50.00</sub>												51.3	dBA
L <sub>AS66.60</sub>												50.4	dBA
L <sub>AS90.00</sub>												48.8	dBA
L <sub>AS</sub> > 65.0 dB (Exceedence Counts / Duration)												0 / 0.0	s
L <sub>AS</sub> > 85.0 dB (Exceedence Counts / Duration)												0 / 0.0	s
L <sub>Apeak</sub> > 135.0 dB (Exceedence Counts / Duration)												0 / 0.0	s
L <sub>Apeak</sub> > 137.0 dB (Exceedence Counts / Duration)												0 / 0.0	s
L <sub>Apeak</sub> > 140.0 dB (Exceedence Counts / Duration)												0 / 0.0	s
Settings													
RMS Weight												A Weighting	
Peak Weight												A Weighting	
Detector												Slow	
Preamp												PRM831	
Integration Method												Linear	
OBA Range												Low	
OBA Bandwidth												1/1 and 1/3	
OBA Freq. Weighting												Z Weighting	
OBA Max Spectrum												Bin Max	
Gain												+0	dB
Under Range Limit												26.3	dB
Under Range Peak												76.1	dB
Noise Floor												17.1	dB
Overload												143.7	dB
1/1 Spectra													
Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k	
L <sub>Zeq</sub>	58.5	55.8	54.2	57.3	56.3	53.1	49.9	49.0	42.8	33.8	24.2	14.8	
L <sub>ZSmax</sub>	78.2	70.6	63.4	67.1	70.6	69.8	62.1	59.3	50.0	43.4	37.5	25.8	
L <sub>ZSmin</sub>	46.1	50.8	49.8	49.8	46.9	43.4	42.3	42.1	37.2	30.2	20.0	13.5	



1/3 Spectra												
Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	55.8	53.0	52.2	51.2	51.4	50.5	49.7	49.2	49.8	51.3	53.3	52.8
LZSmax	74.9	69.4	74.0	67.5	65.5	67.9	60.5	58.8	63.2	63.6	65.6	65.8
LZSmin	37.3	40.1	40.0	42.8	44.2	44.5	44.7	44.0	43.6	43.6	42.9	43.1
Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	50.6	51.7	52.1	50.4	47.5	46.1	45.7	45.1	44.5	44.8	44.8	42.9
LZSmax	60.9	66.4	69.8	69.1	60.9	60.2	59.2	56.9	57.2	55.9	54.7	53.7
LZSmin	42.0	41.6	40.2	38.9	38.3	32.2	37.1	36.4	36.2	37.2	37.4	36.5
Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	40.4	37.4	33.8	31.2	28.5	25.3	22.4	18.3	13.2	10.2	10.2	9.6
LZSmax	48.3	45.0	42.6	40.7	39.8	36.7	35.2	32.6	27.7	24.2	20.7	18.3
LZSmin	34.2	32.0	29.3	27.5	24.5	21.9	18.1	13.3	9.4	7.8	9.1	9.1

Calibration History												
Preamp	Date						dB re. 1V/Pa					
PRM831	17	Dec	2018	14:56:06				-26.1				
PRM831	04	Dec	2018	09:35:01				-25.5				
PRM831	16	Nov	2018	13:58:18				-25.8				
PRM831	24	Oct	2018	13:08:44				-26.1				
PRM831	12	Oct	2018	09:55:27				-25.9				
PRM831	26	Sep	2018	15:49:25				-26.2				
PRM831	21	Sep	2018	08:51:56				-25.6				
PRM831	05	Sep	2018	11:51:21				-25.9				
PRM831	13	Jun	2018	13:02:21				-25.7				
PRM831	30	Mar	2018	23:00:57				-25.2				
PRM831	30	Mar	2018	12:23:25				-25.8				

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Site Preparation Clearing & Grubbing

### ---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to North	Residential	52.8	52.8	52.8

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	170	0
Excavator	No	40		80.7	220	0
Gradall	No	40		83.4	270	0
Dump Truck	No	40		76.5	320	0
Grapple (on backhoe)	No	40		87	370	0
Front End Loader	No	40		79.1	420	0
Pickup Truck	No	40		75	470	0
Pickup Truck	No	40		75	520	0
Pickup Truck	No	40		75	570	0

### Results

Equipment	Calculated (dBA)		Day	Noise Limits (dBA)		
	*Lmax	Leq		Leq	Evening	Leq
Dozer	71.0	67.1	N/A	N/A	N/A	N/A
Excavator	67.8	63.9	N/A	N/A	N/A	N/A
Gradall	68.8	64.8	N/A	N/A	N/A	N/A
Dump Truck	60.3	56.3	N/A	N/A	N/A	N/A
Grapple (on backhoe)	69.6	65.6	N/A	N/A	N/A	N/A
Front End Loader	60.6	56.6	N/A	N/A	N/A	N/A
Pickup Truck	55.5	51.6	N/A	N/A	N/A	N/A
Pickup Truck	54.7	50.7	N/A	N/A	N/A	N/A
Pickup Truck	53.9	49.9	N/A	N/A	N/A	N/A
Total	<b>71.0</b>	<b>71.9</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Site Preparation Clearing & Grubbing

### ---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	47	47	46.7

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	180	0
Excavator	No	40		80.7	230	0
Gradall	No	40		83.4	280	0
Dump Truck	No	40		76.5	330	0
Grapple (on backhoe)	No	40		87	380	0
Front End Loader	No	40		79.1	430	0
Pickup Truck	No	40		75	480	0
Pickup Truck	No	40		75	530	0
Pickup Truck	No	40		75	580	0

### Results

Equipment	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Dozer	70.5	66.6	N/A	N/A	N/A	N/A
Excavator	67.5	63.5	N/A	N/A	N/A	N/A
Gradall	68.4	64.5	N/A	N/A	N/A	N/A
Dump Truck	60.1	56.1	N/A	N/A	N/A	N/A
Grapple (on backhoe)	69.4	65.4	N/A	N/A	N/A	N/A
Front End Loader	60.4	56.4	N/A	N/A	N/A	N/A
Pickup Truck	55.4	51.4	N/A	N/A	N/A	N/A
Pickup Truck	54.5	50.5	N/A	N/A	N/A	N/A
Pickup Truck	53.7	49.7	N/A	N/A	N/A	N/A
Total	<b>70.5</b>	<b>71.5</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Site Preparation Clearing & Grubbing

### ---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
School to Southeast	Residential	51	51	51.4

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	120	0
Excavator	No	40		80.7	170	0
Gradall	No	40		83.4	220	0
Dump Truck	No	40		76.5	270	0
Grapple (on backhoe)	No	40		87	320	0
Front End Loader	No	40		79.1	370	0
Pickup Truck	No	40		75	420	0
Pickup Truck	No	40		75	470	0
Pickup Truck	No	40		75	520	0

### Results

Equipment	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Dozer	74.1	70.1	N/A	N/A	N/A	N/A
Excavator	70.1	66.1	N/A	N/A	N/A	N/A
Gradall	70.5	66.6	N/A	N/A	N/A	N/A
Dump Truck	61.8	57.8	N/A	N/A	N/A	N/A
Grapple (on backhoe)	70.9	66.9	N/A	N/A	N/A	N/A
Front End Loader	61.7	57.7	N/A	N/A	N/A	N/A
Pickup Truck	56.5	52.5	N/A	N/A	N/A	N/A
Pickup Truck	55.5	51.6	N/A	N/A	N/A	N/A
Pickup Truck	54.7	50.7	N/A	N/A	N/A	N/A
Total	<b>74.1</b>	<b>74.0</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.



## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Santiago Creek Realignment Rip Rap

### ---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to North	Residential	52.8	52.8	52.8

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	170	0
Front End Loader	No	40		79.1	220	0
Pickup Truck	No	40		75.0	270	0
Pickup Truck	No	40		75.0	320	0
Pickup Truck	No	40		75.0	370	0
Dump Truck	No	40		76.5	420	0
Dump Truck	No	40		76.5	470	0
Dump Truck	No	40		76.5	520	0
Dump Truck	No	40		76.5	570	0
Dump Truck	No	40		76.5	620	0
Dump Truck	No	40		76.5	670	0
Dump Truck	No	40		76.5	720	0
Dump Truck	No	40		76.5	770	0
Dump Truck	No	40		76.5	820	0
Dump Truck	No	40		76.5	870	0
Dump Truck	No	40		76.5	920	0
Dump Truck	No	40		76.5	970	0

Equipment	Results				Noise Limits (dBA)	
	Calculated (dBA)		Day Lmax	Evening Leq	Day Leq	Evening Lmax
	*Lmax	Leq				
Excavator	70.1	66.1	N/A	N/A	N/A	N/A
Front End Loader	66.2	62.3	N/A	N/A	N/A	N/A
Pickup Truck	60.4	56.4	N/A	N/A	N/A	N/A
Pickup Truck	58.9	54.9	N/A	N/A	N/A	N/A
Pickup Truck	57.6	53.6	N/A	N/A	N/A	N/A
Dump Truck	58.0	54.0	N/A	N/A	N/A	N/A
Dump Truck	57.0	53.0	N/A	N/A	N/A	N/A
Dump Truck	56.1	52.1	N/A	N/A	N/A	N/A
Dump Truck	55.3	51.3	N/A	N/A	N/A	N/A
Dump Truck	54.6	50.6	N/A	N/A	N/A	N/A
Dump Truck	53.9	49.9	N/A	N/A	N/A	N/A
Dump Truck	53.3	49.3	N/A	N/A	N/A	N/A
Dump Truck	52.7	48.7	N/A	N/A	N/A	N/A
Dump Truck	52.2	48.2	N/A	N/A	N/A	N/A
Dump Truck	51.6	47.7	N/A	N/A	N/A	N/A
Dump Truck	51.2	47.2	N/A	N/A	N/A	N/A
Dump Truck	50.7	46.7	N/A	N/A	N/A	N/A
Total	<b>70.1</b>	<b>69.1</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Santiago Creek Realignment Rip Rap

### ---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	46.7	46.7	46.7

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40.0		80.7	180	0
Front End Loader	No	40		79.1	230	0
Pickup Truck	No	40		75.0	280	0
Pickup Truck	No	40		75.0	330	0
Pickup Truck	No	40		75.0	380	0
Dump Truck	No	40		76.5	430	0
Dump Truck	No	40		76.5	480	0
Dump Truck	No	40		76.5	530	0
Dump Truck	No	40		76.5	580	0
Dump Truck	No	40		76.5	630	0
Dump Truck	No	40		76.5	680	0
Dump Truck	No	40		76.5	730	0
Dump Truck	No	40		76.5	780	0
Dump Truck	No	40		76.5	830	0
Dump Truck	No	40		76.5	880	0
Dump Truck	No	40		76.5	930	0
Dump Truck	No	40		76.5	980	0

### Results

Equipment	Calculated (dBA)		Day Lmax	Noise Limits (dBA)		
	*Lmax	Leq		Leq	Evening Lmax	Evening Leq
Excavator	69.6	65.6	N/A	N/A	N/A	N/A
Front End Loader	65.9	61.9	N/A	N/A	N/A	N/A
Pickup Truck	60.0	56.1	N/A	N/A	N/A	N/A
Pickup Truck	58.6	54.6	N/A	N/A	N/A	N/A
Pickup Truck	57.4	53.4	N/A	N/A	N/A	N/A
Dump Truck	57.8	53.8	N/A	N/A	N/A	N/A
Dump Truck	56.8	52.8	N/A	N/A	N/A	N/A
Dump Truck	55.9	52.0	N/A	N/A	N/A	N/A
Dump Truck	55.2	51.2	N/A	N/A	N/A	N/A
Dump Truck	54.4	50.5	N/A	N/A	N/A	N/A
Dump Truck	53.8	49.8	N/A	N/A	N/A	N/A
Dump Truck	53.2	49.2	N/A	N/A	N/A	N/A
Dump Truck	52.6	48.6	N/A	N/A	N/A	N/A
Dump Truck	52.0	48.1	N/A	N/A	N/A	N/A
Dump Truck	51.5	47.6	N/A	N/A	N/A	N/A
Dump Truck	51.1	47.1	N/A	N/A	N/A	N/A
Dump Truck	50.6	46.6	N/A	N/A	N/A	N/A
Total	<b>69.6</b>	<b>68.7</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Santiago Creek Realignment Rip Rap

### ---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
School to Southeast	Residential	51.4	51	51.4

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	120	0
Front End Loader	No	40		79.1	170	0
Pickup Truck	No	40		75.0	220	0
Pickup Truck	No	40		75.0	270	0
Pickup Truck	No	40		75.0	320	0
Dump Truck	No	40		76.5	370	0
Dump Truck	No	40		76.5	420	0
Dump Truck	No	40		76.5	470	0
Dump Truck	No	40		76.5	520	0
Dump Truck	No	40		76.5	570	0
Dump Truck	No	40		76.5	620	0
Dump Truck	No	40		76.5	670	0
Dump Truck	No	40		76.5	820	0
Dump Truck	No	40		76.5	870	0
Dump Truck	No	40		76.5	920	0
Dump Truck	No	40		76.5	970	0
Dump Truck	No	40		76.5	1020	0

Equipment	Results				Noise Limits (dBA)	
	Calculated (dBA)		Day Lmax	Evening Leq	Lmax	Leq
	*Lmax	Leq				
Excavator	73.1	69.1	N/A	N/A	N/A	N/A
Front End Loader	68.5	64.5	N/A	N/A	N/A	N/A
Pickup Truck	62.1	58.2	N/A	N/A	N/A	N/A
Pickup Truck	60.4	56.4	N/A	N/A	N/A	N/A
Pickup Truck	58.9	54.9	N/A	N/A	N/A	N/A
Dump Truck	59.1	55.1	N/A	N/A	N/A	N/A
Dump Truck	58.0	54.0	N/A	N/A	N/A	N/A
Dump Truck	57.0	53.0	N/A	N/A	N/A	N/A
Dump Truck	56.1	52.1	N/A	N/A	N/A	N/A
Dump Truck	55.3	51.3	N/A	N/A	N/A	N/A
Dump Truck	54.6	50.6	N/A	N/A	N/A	N/A
Dump Truck	53.9	49.9	N/A	N/A	N/A	N/A
Dump Truck	52.2	48.2	N/A	N/A	N/A	N/A
Dump Truck	51.6	47.7	N/A	N/A	N/A	N/A
Dump Truck	51.2	47.2	N/A	N/A	N/A	N/A
Dump Truck	50.7	46.7	N/A	N/A	N/A	N/A
Dump Truck	50.3	46.3	N/A	N/A	N/A	N/A
Total	<b>73.1</b>	<b>71.4</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Area 1 Slope Embankment

### ---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to North	Residential	52.8	52.8	52.8

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	530	0
Grader	No	40		85	580	0
Excavator	No	40		80.7	630	0
Scraper	No	40		83.6	680	0
Scraper	No	40		83.6	730	0
Scraper	No	40		83.6	780	0
Compactor (ground)	No	20		83.2	830	0
Pickup Truck	No	40		75	880	0
Pickup Truck	No	40		75	930	0

### Results

Equipment	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Dozer	61.2	57.2	N/A	N/A	N/A	N/A
Grader	63.7	59.7	N/A	N/A	N/A	N/A
Excavator	58.7	54.7	N/A	N/A	N/A	N/A
Scraper	60.9	56.9	N/A	N/A	N/A	N/A
Scraper	60.3	56.3	N/A	N/A	N/A	N/A
Scraper	59.7	55.7	N/A	N/A	N/A	N/A
Compactor (ground)	58.8	51.8	N/A	N/A	N/A	N/A
Pickup Truck	50.1	46.1	N/A	N/A	N/A	N/A
Pickup Truck	49.6	45.6	N/A	N/A	N/A	N/A
Total	<b>63.7</b>	<b>65.2</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.



## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Area 1 Slope Embankment

### ---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	47	47	46.7

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	850	0
Grader	No	40		85	900	0
Excavator	No	40		80.7	950	0
Scraper	No	40		83.6	1000	0
Scraper	No	40		83.6	1050	0
Scraper	No	40		83.6	1100	0
Compactor (ground)	No	20		83.2	1150	0
Pickup Truck	No	40		75	1200	0
Pickup Truck	No	40		75	1250	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	
Dozer	57.1	53.1	N/A	N/A	N/A	N/A	
Grader	59.9	55.9	N/A	N/A	N/A	N/A	
Excavator	55.1	51.2	N/A	N/A	N/A	N/A	
Scraper	57.6	53.6	N/A	N/A	N/A	N/A	
Scraper	57.1	53.2	N/A	N/A	N/A	N/A	
Scraper	56.7	52.8	N/A	N/A	N/A	N/A	
Compactor (ground)	56.0	49.0	N/A	N/A	N/A	N/A	
Pickup Truck	47.4	43.4	N/A	N/A	N/A	N/A	
Pickup Truck	47.0	43.1	N/A	N/A	N/A	N/A	
Total	<b>59.9</b>	<b>61.7</b>	N/A	N/A	N/A	N/A	

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018

Case Description: OCWD Smith Basin - Area 1 Slope Embankment

### ---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
School to Southeast	Residential	51	51	51.4

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	400	0
Grader	No	40		85	450	0
Excavator	No	40		80.7	500	0
Scraper	No	40		83.6	550	0
Scraper	No	40		83.6	600	0
Scraper	No	40		83.6	650	0
Compactor (ground)	No	20		83.2	700	0
Pickup Truck	No	40		75	750	0
Pickup Truck	No	40		75	800	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	
Dozer	63.6	59.6	N/A	N/A	N/A	N/A	
Grader	65.9	61.9	N/A	N/A	N/A	N/A	
Excavator	60.7	56.7	N/A	N/A	N/A	N/A	
Scraper	62.8	58.8	N/A	N/A	N/A	N/A	
Scraper	62.0	58.0	N/A	N/A	N/A	N/A	
Scraper	61.3	57.3	N/A	N/A	N/A	N/A	
Compactor (ground)	60.3	53.3	N/A	N/A	N/A	N/A	
Pickup Truck	51.5	47.5	N/A	N/A	N/A	N/A	
Pickup Truck	50.9	46.9	N/A	N/A	N/A	N/A	
Total	<b>65.9</b>	<b>67.2</b>	N/A	N/A	N/A	N/A	

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018  
Case Description: OCWD Smith Basin - Area 2 Slope Embankment

### ---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to North	Residential	52.8	52.8	52.8

Description	Impact Device	Usage(%)	Equipment			Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	
Excavator	No	40		80.7	50	0
Pickup Truck	No	40		75	100	0
Pickup Truck	No	40		75	150	0
Scraper	No	40		83.6	200	0
Scraper	No	40		83.6	250	0
Scraper	No	40		83.6	300	0
Scraper	No	40		83.6	350	0
Dozer	No	40		81.7	400	0
Excavator	No	40		80.7	450	0

### Results

Equipment	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A
Pickup Truck	69.0	65.0	N/A	N/A	N/A	N/A
Pickup Truck	65.5	61.5	N/A	N/A	N/A	N/A
Scraper	71.5	67.6	N/A	N/A	N/A	N/A
Scraper	69.6	65.6	N/A	N/A	N/A	N/A
Scraper	68.0	64.0	N/A	N/A	N/A	N/A
Scraper	66.7	62.7	N/A	N/A	N/A	N/A
Dozer	63.6	59.6	N/A	N/A	N/A	N/A
Excavator	61.6	57.6	N/A	N/A	N/A	N/A
Total	<b>80.7</b>	<b>78.3</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018  
Case Description: OCWD Smith Basin - Area 2 Slope Embankment

### ---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	47	47	46.7

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	2100	0
Pickup Truck	No	40		75	2150	0
Pickup Truck	No	40		75	2200	0
Scraper	No	40		83.6	2250	0
Scraper	No	40		83.6	2300	0
Scraper	No	40		83.6	2350	0
Scraper	No	40		83.6	2400	0
Dozer	No	40		81.7	2450	0
Excavator	No	40		80.7	2500	0

### Results

Equipment	Calculated (dBA)		Day Lmax	Noise Limits (dBA)		
	*Lmax	Leq		Leq	Evening Lmax	Evening Leq
Excavator	49.2	45.2	N/A	N/A	N/A	N/A
Pickup Truck	52.3	48.4	N/A	N/A	N/A	N/A
Pickup Truck	47.8	43.9	N/A	N/A	N/A	N/A
Scraper	50.5	46.5	N/A	N/A	N/A	N/A
Scraper	50.3	46.3	N/A	N/A	N/A	N/A
Scraper	50.1	46.2	N/A	N/A	N/A	N/A
Scraper	49.6	42.6	N/A	N/A	N/A	N/A
Dozer	41.2	37.2	N/A	N/A	N/A	N/A
Excavator	41.0	37.0	N/A	N/A	N/A	N/A
Total	<b>52.3</b>	<b>54.5</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.



## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018  
Case Description: OCWD Smith Basin - Area 2 Slope Embankment

### ---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
School to Southeast	Residential	51	51	51.4

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	40	0
Pickup Truck	No	40		75	90	0
Pickup Truck	No	40		75	140	0
Scraper	No	40		83.6	190	0
Scraper	No	40		83.6	240	0
Scraper	No	40		83.6	290	0
Scraper	No	40		83.6	340	0
Dozer	No	40		81.7	390	0
Excavator	No	40		80.7	440	0

### Results

Equipment	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Excavator	82.6	78.7	N/A	N/A	N/A	N/A
Pickup Truck	69.9	65.9	N/A	N/A	N/A	N/A
Pickup Truck	66.1	62.1	N/A	N/A	N/A	N/A
Scraper	72.0	68.0	N/A	N/A	N/A	N/A
Scraper	70.0	66.0	N/A	N/A	N/A	N/A
Scraper	68.3	64.3	N/A	N/A	N/A	N/A
Scraper	66.9	63.0	N/A	N/A	N/A	N/A
Dozer	63.8	59.8	N/A	N/A	N/A	N/A
Excavator	61.8	57.8	N/A	N/A	N/A	N/A
Total	<b>82.6</b>	<b>79.8</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018  
Case Description: OCWD Smith Basin - Area 5 Slope Embankment

### ---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to North	Residential	52.8	52.8	52.8

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Dozer	No	40		81.7	90	0
Excavator	No	40		80.7	140	0
Compactor (ground)	No	20		83.2	190	0
Dump Truck	No	40		76.5	240	0
Dump Truck	No	40		76.5	290	0
Dump Truck	No	40		76.5	340	0
Dump Truck	No	40		76.5	390	0
Pickup Truck	No	40		75	440	0
Pickup Truck	No	40		75	490	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Noise Limits (dBA)		Lmax	Leq
			Day	Evening		
Dozer	76.6	72.6	N/A	N/A	N/A	N/A
Excavator	71.8	67.8	N/A	N/A	N/A	N/A
Compactor (ground)	71.6	64.6	N/A	N/A	N/A	N/A
Dump Truck	62.8	58.8	N/A	N/A	N/A	N/A
Dump Truck	61.2	57.2	N/A	N/A	N/A	N/A
Dump Truck	59.8	55.8	N/A	N/A	N/A	N/A
Dump Truck	58.6	54.6	N/A	N/A	N/A	N/A
Pickup Truck	56.1	52.1	N/A	N/A	N/A	N/A
Pickup Truck	55.2	51.2	N/A	N/A	N/A	N/A
Total	<b>76.6</b>	<b>74.7</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018  
Case Description: OCWD Smith Basin - Area 5 Slope Embankment

### ---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	47	47	46.7

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Dozer	No	40		81.7	70	0
Excavator	No	40		80.7	120	0
Compactor (ground)	No	20		83.2	170	0
Dump Truck	No	40		76.5	220	0
Dump Truck	No	40		76.5	270	0
Dump Truck	No	40		76.5	320	0
Dump Truck	No	40		76.5	370	0
Pickup Truck	No	40		75	420	0
Pickup Truck	No	40		75	470	0

Equipment	Results			Noise Limits (dBA)		
	Calculated (dBA)		Day Lmax			
	*Lmax	Leq		Leq	Evening Lmax	Leq
Dozer	78.7	74.8	N/A	N/A	N/A	N/A
Excavator	73.1	69.1	N/A	N/A	N/A	N/A
Compactor (ground)	72.6	65.6	N/A	N/A	N/A	N/A
Dump Truck	63.6	59.6	N/A	N/A	N/A	N/A
Dump Truck	61.8	57.8	N/A	N/A	N/A	N/A
Dump Truck	60.3	56.3	N/A	N/A	N/A	N/A
Dump Truck	59.1	55.1	N/A	N/A	N/A	N/A
Pickup Truck	56.5	52.5	N/A	N/A	N/A	N/A
Pickup Truck	55.5	51.6	N/A	N/A	N/A	N/A
Total	<b>78.7</b>	<b>76.5</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.

## Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/18/2018  
Case Description: OCWD Smith Basin - Area 5 Slope Embankment

### ---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
School to Southeast	Residential	51.4	51	51.4

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Dozer	No	40		81.7	1800	0
Excavator	No	40		80.7	1850	0
Compactor (ground)	No	20		83.2	1900	0
Dump Truck	No	40		76.5	1950	0
Dump Truck	No	40		76.5	2000	0
Dump Truck	No	40		76.5	2050	0
Dump Truck	No	40		76.5	2100	0
Pickup Truck	No	40		75	2150	0
Pickup Truck	No	40		75	2200	0

Equipment	Results			Noise Limits (dBA)		
	Calculated (dBA)		Day Lmax			
	*Lmax	Leq		Leq	Evening Lmax	Leq
Dozer	50.5	46.6	N/A	N/A	N/A	N/A
Excavator	49.3	45.4	N/A	N/A	N/A	N/A
Compactor (ground)	51.6	44.6	N/A	N/A	N/A	N/A
Dump Truck	44.6	40.6	N/A	N/A	N/A	N/A
Dump Truck	44.4	40.4	N/A	N/A	N/A	N/A
Dump Truck	44.2	40.2	N/A	N/A	N/A	N/A
Dump Truck	44.0	40.0	N/A	N/A	N/A	N/A
Pickup Truck	42.3	38.4	N/A	N/A	N/A	N/A
Pickup Truck	42.1	38.2	N/A	N/A	N/A	N/A
Total	<b>51.6</b>	<b>52.2</b>	N/A	N/A	N/A	N/A

\*Calculated Lmax is the Loudest value.