

# **Appendix B**

---

## Air Quality Calculations

# Littlerock Reservoir Sediment Removal Project

## Emission Calculation Assumptions

### Proposed Project General Assumptions

- 1) Work occurs as noted in the Construction Schedule, with no work assumed to occur during the wet season.
- 2) The soil cement batch plant and sand screening plant will be placed on the paved parking area on the west side of the lake adjacent to the boat ramp.
- 3) The soil cement batch plant and sand screening plants will require 150 hp and 100 hp diesel engine/generators, respectively, to run the various motors associated with the batch plants.
- 4) Silt content testing of the sediment to be removed ranges from 0.1% to 5% with an average less than 2%. As a worst case assumption 4%, which represents SCAQMD factor for gravel roads, will be used in the emission calculations.
- 5) Total sediment removal and monthly removal values are provided in the Construction Schedule
- 6) Emissions for sediment use after delivery to the sediment storage site are not considered part of the project and have not been estimated. However, beneficial use of this sediment would displace other sand/aggregate mining and transportation which could reduce emissions that would otherwise occur.

### Offroad Equipment Emission Calculation Assumptions

- 1) Emission factors are derived from the CARB OFFROAD model, interpolating the horsepower between the two nearest horsepower sized equipment given in that database.
- 2) Emission factors from 2016 are conservatively assumed to calculate the emissions for all activities, including those starting in 2017 or later.
- 3) Equipment type, number, and usage estimates are used as estimated in consultation with the project design engineer.

### Onroad Equipment Emission Calculations Assumptions

- 1) Emission factors are derived from the CARB EMFAC2011 database, where the vehicles have been assigned three classes, passenger (i.e. employee vehicles and pickups), delivery (all nonpassenger vehicles smaller than heavy-heavy duty trucks), and heavy-heavy duty trucks.
- 2) Emission factors from 2016 are conservatively assumed to calculate the emissions for all activities, including those starting in 2017 or later.
- 3) Trip estimates are based on import/export quantities, equipment and worker trips estimated in consultation with the project design engineer.
- 4) As a worst case assumption all vehicle trips are assumed to start and end in AVAQMD jurisdiction, even though some worker and materials will likely come from other jurisdictions, such as SCAQMD.

### Fugitive Dust Emission Calculations Assumptions

- 1) Unpaved road distances are estimated by assuming travel routes conducted at the site and the sediment storage area.
- 2) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt content is assumed to be 4% on average (Site soil classification test summary actually suggests less but 4% is SCAQMD assumption for gravel roads); 2) average vehicle weight based on VMT estimate for unpaved roads
- 3) Paved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt loading is assumed to be reduced to 0.02 g/m<sup>3</sup> when street sweeper is assumed (downstream excavation and O&M excavation) and 0.06 g/m<sup>3</sup> when not (GCS construction); 2) average vehicle weight is calculated based on VMT average basis.
- 4) Earthmoving emission factors are calculated using the recent version of USEPA AP-42 Section 11.9 for Dozing and Grading, and Section 13.2.4 for soil handling (drop emissions).
- 5) Due to working with very coarse materials and work areas being in depressions wind erosion potential is considered negligible.

### Equipment/Truck Assumptions

- 1) Sediment truck load volume is assumed to be 12 cubic yards per truckload.
- 2) Short duration clean, grub, staging and cleanup phases needed, cleanup needed after each season of work.
- 3) A grader is required for the duration of the primary excavation at the project site and the disposal site to maintain access roads.

# Littlerock Reservoir Sediment Removal Project

## Project Construction Emission Totals

Average Daily Emissions (lbs/day)

### GROUND CONTROL STRUCTURE

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.64	5.46	3.20	0.01	0.21	0.13
Offroad Vehicles/Equipment	9.58	33.64	114.83	0.11	5.42	4.99
Fugitive Dust	---	---	---	---	27.71	6.28
<b>Totals</b>	<b>10.21</b>	<b>39.10</b>	<b>118.03</b>	<b>0.12</b>	<b>33.34</b>	<b>11.41</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	Yes	No

### DOWNSTREAM EXCAVATION

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	5.82	28.44	40.26	0.13	2.30	1.68
Offroad Vehicles/Equipment	12.90	25.26	84.77	7.89	10.76	9.90
Fugitive Dust	---	---	---	---	129.26	27.61
<b>Totals</b>	<b>18.72</b>	<b>53.70</b>	<b>125.03</b>	<b>8.02</b>	<b>142.32</b>	<b>39.19</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	Yes	No

### DOWNSTREAM EXCAVATION w/Alternate Sediment Storage Site

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	4.19	22.06	28.13	0.09	1.63	1.17
Offroad Vehicles/Equipment	12.90	25.26	84.77	7.89	10.76	9.90
Fugitive Dust	---	---	---	---	106.34	22.11
<b>Totals</b>	<b>17.09</b>	<b>47.32</b>	<b>112.90</b>	<b>7.98</b>	<b>118.73</b>	<b>33.19</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	Yes	No

### Alternative 1 Excavation

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	2.45	13.76	16.04	0.05	0.94	0.67
Offroad Vehicles/Equipment	8.95	15.85	49.78	6.00	7.73	7.11
Fugitive Dust	---	---	---	---	50.65	10.31
<b>Totals</b>	<b>11.40</b>	<b>29.61</b>	<b>65.81</b>	<b>6.06</b>	<b>59.32</b>	<b>18.09</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	No	No

### Alternative 1 Excavation w/Alternative Sediment Storage Site

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.82	11.30	11.37	0.04	0.68	0.48
Offroad Vehicles/Equipment	8.95	15.85	49.78	6.00	7.73	7.11
Fugitive Dust	---	---	---	---	42.30	8.31
<b>Totals</b>	<b>10.77</b>	<b>27.15</b>	<b>61.14</b>	<b>6.04</b>	<b>50.71</b>	<b>15.90</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	No	No

Annual Emissions (tons/year)

### GROUND CONTROL STRUCTURE

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.02	0.20	0.12	0.00	0.01	0.00
Offroad Vehicles/Equipment	0.35	1.24	4.25	0.00	0.20	0.18
Fugitive Dust	---	---	---	---	1.03	0.23
<b>Totals</b>	<b>0.38</b>	<b>1.45</b>	<b>4.37</b>	<b>0.00</b>	<b>1.23</b>	<b>0.42</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	Yes	No

### DOWNSTREAM EXCAVATION

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.19	0.91	1.29	0.00	0.07	0.05
Offroad Vehicles/Equipment	0.41	0.81	2.71	0.25	0.34	0.32
Fugitive Dust	---	---	---	---	4.14	0.88
<b>Totals</b>	<b>0.60</b>	<b>1.72</b>	<b>4.00</b>	<b>0.26</b>	<b>4.55</b>	<b>1.25</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	No	No

### DOWNSTREAM EXCAVATION w/Alternate Sediment Storage Site

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.13	0.71	0.90	0.00	0.05	0.04
Offroad Vehicles/Equipment	0.41	0.81	2.71	0.25	0.34	0.32
Fugitive Dust	---	---	---	---	3.40	0.71
<b>Totals</b>	<b>0.55</b>	<b>1.51</b>	<b>3.61</b>	<b>0.26</b>	<b>3.80</b>	<b>1.06</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	No	No

### Alternative 1 Excavation

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.13	0.72	0.84	0.00	0.05	0.04
Offroad Vehicles/Equipment	0.47	0.83	2.61	0.32	0.41	0.37
Fugitive Dust	---	---	---	---	2.66	0.54
<b>Totals</b>	<b>0.60</b>	<b>1.55</b>	<b>3.46</b>	<b>0.32</b>	<b>3.11</b>	<b>0.95</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	No	No

### Alternative 1 Excavation w/Alternative Sediment Storage Site

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.10	0.59	0.60	0.00	0.04	0.02
Offroad Vehicles/Equipment	0.47	0.83	2.61	0.32	0.41	0.37
Fugitive Dust	---	---	---	---	2.22	0.44
<b>Totals</b>	<b>0.57</b>	<b>1.43</b>	<b>3.21</b>	<b>0.32</b>	<b>2.66</b>	<b>0.83</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	No	No

ANNUAL MAINTENANCE

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	2.34	13.15	15.27	0.05	0.89	0.64
Offroad Vehicles/Equipment	8.99	16.18	49.02	5.94	7.65	7.04
Fugitive Dust	---	---	---	---	49.05	10.03
<b>Totals</b>	<b>11.33</b>	<b>29.34</b>	<b>64.29</b>	<b>5.99</b>	<b>57.60</b>	<b>17.71</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	No	No

ANNUAL MAINTENANCE w/Alternate Sediment Storage Site

Average Daily (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.75	10.86	10.90	0.04	0.65	0.46
Offroad Vehicles/Equipment	8.99	16.18	49.02	5.94	7.65	7.04
Fugitive Dust	---	---	---	---	40.32	7.94
<b>Totals</b>	<b>10.74</b>	<b>27.04</b>	<b>59.92</b>	<b>5.98</b>	<b>48.62</b>	<b>15.44</b>
AVAQMD Significance Thresholds	137	548	137	137	82	82
Exceeds Thresholds?	No	No	No	No	No	No

ANNUAL MAINTENANCE

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.05	0.26	0.31	0.00	0.02	0.01
Offroad Vehicles/Equipment	0.18	0.32	0.98	0.12	0.15	0.14
Fugitive Dust	---	---	---	---	0.98	0.20
<b>Totals</b>	<b>0.23</b>	<b>0.59</b>	<b>1.29</b>	<b>0.12</b>	<b>1.15</b>	<b>0.35</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	No	No

ANNUAL MAINTENANCE w/Alternate Sediment Storage Site

Annual (Offroad: No Engine Mitigation; Onroad: No Engine Mitigation)

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.03	0.22	0.22	0.00	0.01	0.01
Offroad Vehicles/Equipment	0.18	0.32	0.98	0.12	0.15	0.14
Fugitive Dust	---	---	---	---	0.81	0.16
<b>Totals</b>	<b>0.21</b>	<b>0.54</b>	<b>1.20</b>	<b>0.12</b>	<b>0.97</b>	<b>0.31</b>
AVAQMD Significance Thresholds	25	100	25	25	15	15
Exceeds Thresholds?	No	No	No	No	No	No

# Littlerock Reservoir Sediment Removal Project

## Construction Schedule

2016

Grade Control Structure	Employees	July	Aug	Sep	Oct	Notes
Clear and Grub, Cofferdam	9	10				Schedule for all phases assumes 5 days per week 8 hours per day work schedule
Excavation	12	12	10			
Soil Cement Application	14		12	12		
Filling and Cleanup	12			8	10	
Available Work Days		22	22	20	22	

Vehicle Trips Estimate		July	Aug	Sep	Oct	Trip Dist	Unpaved	Veh. Class	Notes
Construction Employee Trips		234	288	264	120	40	0.00	Passenger	
Equipment Delivery/Misc		39	37	35	27	60	0.00	HHDT	Added one misc trip per day
Cement Delivery Trips			45	45		60	0.00	HHDT	9500 cubic yards soil cement (cement at 20 percent volume and truck load is 25 tons with dry cement at 94 lbs/yd)
Dump Truck Trips - Excavation		2,273	2,290			0.23	0.23	HHDT	50000 cubic yards at 12 yds per trip and 600 feet per trip one way
Dump Truck Trips - Soil cement			396	396		0.23	0.11	HHDT	9500 cubic yards soil cement at 12 yds per trip and 600 feet per trip one way
Dump Truck Trips Filling				1,500	1,875	0.23	0.23	HHDT	40,500 cubic yards at 12 yds per trip and 600 feet per trip one way
Non-sediment waste trips		10	2	2		60	0.13	HHDT	
Fueling		22	22	20	10	30	1.00	Delivery	One per day
Construction Management		22	22	20	10	60	1.00	Passenger	One per day
Crew Truck		44	44	40	20	40	1.00	Delivery	Two per day

Proposed Project		2017-2023			Notes
Downstream Excavation	Employees	Sep	Oct	Nov	
Clear and Grub	6	2			Schedule for excavation phase assumes 6 days per week and 11 active hours per day work schedule
Excavation/Removal	30	21	26	13	
Clean up	6			2	
Available Work Days		23	26	23	

	Total	Sep	Oct	Nov	Cubic yards
Excavation by Month	172,800	60,480	74,880	37,440	

Vehicle Trips Estimate		Sep	Oct	Nov	Trip Dist	Unpaved	Veh. Class	Notes
Construction Employee Trips		642	780	402	40	0	Passenger	
Offsite Dump Truck Trips		5,040	6,240	3,120	13.62	0.5	HHDT	Distance to alternate sediment storage site is 9.34 miles with 0.5 miles assumed unpaved
Equipment Delivery		10		10	60	0	HHDT	
Fueling		23	26	15	30	1	Delivery	
Construction Management		23	26	15	60	1	Passenger	
Crew Truck		46	52	26	40	1	Delivery	

**Alternative 1**

		2017-2029				
Downstream Excavation	Employees	July	Aug	Sep	Oct	Nov
Clear and Grub	6	2				
Excavation/Removal	20	19	22	20	21	19
Clean up	6					2
Available Work Days		21	22	23	26	21

Notes

Schedule for excavation phase assumes 5 days per week and 8 active hours per day work schedule

	Total	July	Aug	Sep	Oct	Nov
Excavation by Month	109,080	20,520	23,760	21,600	22,680	20,520

Cubic yards

Vehicle Trips Estimate	July	Aug	Sep	Oct	Nov	Trip Dist	Unpaved	Veh. Class
Construction Employee Trips	392	440	400	420	392	40	0	Passenger
Offsite Dump Truck Trips	1,710	1,980	1,800	1,890	1,710	13.62	0.50	HHDT
Equipment Delivery	10				10	60	0	HHDT
Fueling	21	22	20	21	21	30	1	Delivery
Construction Management	21	22	20	21	21	60	1	Passenger
Crew Truck	42	44	40	42	38	40	1	Delivery

Notes

Distance to alternate sediment storage site is 9.34 miles with 0.5 miles assumed unpaved

**Annual O&M - 38,000 cy per year**

Downstream Excavation	Employees	Sep	Oct
Clear and Grub	6	2	
Excavation/Removal	20	21	15
Clean up	6		2
Available Work Days		23	26

Notes

Schedule for excavation phase assumes 6 days per week and 11 active hours per day work schedule

	Total	Sep	Oct
Excavation by Month	38,880	22,680	16,200

Vehicle Trips Estimate	Sep	Oct	Trip Dist	Unpaved	Veh. Class
Construction Employee Trips	432	312	40	0	Passenger
Offsite Dump Truck Trips	1,890	1,350	13.62	0.5	HHDT
Equipment Delivery	10	10	60	0	HHDT
Fueling	23	17	30	1	Delivery
Construction Management	23	17	60	1	Passenger
Crew Truck	46	30	40	1	Delivery

Notes

Distance to alternate sediment storage site is 9.34 miles with 0.5 miles assumed unpaved