
Appendix N

Air Emissions Modeling for the Lower Klamath Project

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for the

Lower Klamath Project

Prepared for:

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N.1 Introduction

This technical report identifies and analyzes the potential air emissions associated with the Lower Klamath Project (Proposed Project) and the alternatives analyzed in the Draft Environmental Impact Report (Draft EIR) in 2018. The overall Proposed Project has remained consistent with what was analyzed in 2018 but there is new and refined information on construction equipment and activities, including changes to equipment estimates.

N.2 Description of Proposed Project and Alternatives

The Proposed Project and alternatives analyzed in this technical report are those described in Section 2 *Proposed Project* and Section 4 *Alternatives* of the Draft EIR, and include: Proposed Project; Partial Removal Alternative; Continued Operations with Fish Passage Alternative; Two Dam Removal Alternative; Three Dam Removal Alternative; and No Hatchery Alternative.

N.3 Methodology

The air quality assessment was based on a detailed list of each piece of construction equipment for each construction phase to be completed under the Proposed Project and each alternative. In addition, proposed work hours; total quantities of material hauled and imported; and information on daily trips for construction workers and material hauling were also included in the assessment.

The proposed construction activity is primarily located in Siskiyou County, within the jurisdiction of the Siskiyou County Air Pollution Control District (SCAPCD), with activity at J.C. Boyle located in Klamath County, Oregon. As such, emissions estimated were conducted in accordance with SCAPCD guidance and approved methods. Emissions of reactive organic gases (ROG)/volatile organic compounds (VOC), oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter with an aerodynamic diameter of 10 microns or less (PM₁₀), and particulate matter with an aerodynamic diameter of 2.5 microns or less (PM_{2.5}) were quantified. Regarding all other criteria air pollutants, including sulfates, lead, hydrogen sulfide, and visibility reducing particles, Siskiyou County is in attainment/unclassified for the California and national ambient air quality standards and; therefore, SCAPCD has not established thresholds of significance for these pollutants and no project on its own (including the Proposed Project) would be anticipated to result in a degradation of the existing attainment status or result in increased health effects from these pollutants. Detailed explanation of methods used for estimate emissions are further explained below and detailed assumptions and calculations are contained in Appendix A.

N.3.1 Emissions Factors

Quantification of air pollutant emissions were conducted using a combination of methods, including the use of emission factors from the U.S. Environmental Protection Agency's (USEPA) published *AP-42: Compilation of Air Emissions Factors*, exhaust emission factors from the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model (RCEM), and the California Emissions Estimator Model (CalEEMod) version 2016.3.2. Although the RCEM model was created by SMAQMD, this model is recommended for use throughout California for CEQA analyses.

Exhaust emissions from construction equipment were estimated using SMAQMD RCEM, version 9.0. Although the model was developed by SMAQMD, emission rates and engine usage factors for construction equipment are based on the same California Air Resources Board (CARB)-approved model (i.e., OFFROAD) used in CalEEMod and statewide for conducting emissions modeling and is therefore appropriate for use in this analysis. Exhaust emissions from supplemental construction equipment such as lawnmowers, chippers, and chainsaws were estimated using OFFROAD 2007, as these equipment types are not included in the SMAQMD's RCEM. Additional supplemental construction equipment including worker boats and helicopters were estimated using USEPA and the Federal Office of Civil Aviation emissions factors, respectively. Rock blasting activity emissions were also estimated using AP-42 emissions factors for explosive detonation. The CARB EMFAC 2017 model was used to estimate emissions from on-road vehicles from worker commute trips and truck hauling trips. Fugitive dust emissions from construction activity (e.g., grading, earthmoving, stockpiling of material), travel on roads for truck haul trips and for worker commute trips were estimated using AP-42.

N.3.1.1 Off-Road Equipment Exhaust Emissions

Construction equipment type, quantity, and hours of use were provided for each pre-dam removal phase including seed collection, IEV control, construction access, road, bridge, and culvert improvements, recreation facilities removal, flood improvements, and the Yreka Water Supply Pipeline Relocation, and the Fall Creek and Iron Gate hatcheries modification phase; the four dam and powerhouse removal phase; and the restoration phase. Horsepower ratings were obtained from online searches of manufacture websites. Where equipment horsepower ratings were not available, they were obtained from similar equipment types or were based on CalEEMod defaults. Exhaust emission rates for each piece of equipment were estimated using SMAQMD's RCEM OFFROAD 2021 emission factors according to each equipment's horsepower rating, anticipated daily operation hours, and equipment quantity. Load factors from CalEEMod were then applied based on equipment type (e.g., cranes, excavators, loaders). Certain equipment types proposed during the pre-dam removal phase such as lawn and garden equipment exhaust emissions were estimated using OFFROAD based on hours of use and quantity. It was conservatively assumed

that all equipment used for each subphase would operate simultaneously for the entire work shift.

N.3.1.2 Off-Road Fugitive Dust Emissions

Off-road fugitive dust emissions would result from the loading/unloading of earth material that would be imported and excavated and from the use of grading and movement of earth. AP-42, Chapter 13.2.4-3, Equation 1 (USEPA 2006a) methodology was used to estimate PM₁₀ emissions factors from stockpiling/loading during the four dam and powerhouse phases. AP-42, Chapter 11.9, Equation 11.9-1 (USEPA 1998) methodology was used to estimate PM₁₀ emissions factors from grading equipment (i.e., graders and bulldozers) during the pre-dam removal and dam and powerhouse removal phases. Like on-road emissions, PM_{2.5} fugitive dust from off-road construction activity was calculated based on a ratio of PM_{2.5}/PM₁₀ as advised by USEPA 2006 AP-42.

N.3.1.3 On-Road Exhaust and Fugitive Dust Emissions

On-Road Exhaust Emissions

On-road exhaust emissions from worker commute trips and truck hauling trips were estimated using EMFAC 2017 emission factors. Vehicle classifications for worker commute trips were assumed to be all Light-Duty gasoline and diesel (i.e., light duty automobile (LDA), light duty truck (LDT1), LDT2) while truck hauling trips were assumed to be all Heavy-Heavy Duty Diesel California International Registration Plan (CAIRP) Construction Trucks (i.e., T7 CAIRP Construction). Worker commute trips exhaust emissions were estimated based on the estimated number of workers per day for each dam and powerhouse removal and the total daily vehicle miles traveled (VMT) from each worker. Table RE-N-1 provides the number of workers, maximum trip length from each worker, and daily VMT.

Table RE-N-1. Summary of Worker Commute VMT.

	Peak # Workers/day¹	Maximum Trip Length²	Daily VMT (miles)
J.C. Boyle	45	58.6	5,274
Copco No. 1	55	58.6	6,446
Copco No. 2	40	58.47	4,678
Iron Gate	80	46.4	7,424

Notes: Daily roundtrip VMT was estimated by applying the maximum trip length to the peak number of workers per day multiplied by 2.

¹ Appendix B: *Definite Plan – Section 5*.

² Maximum trip length is from each dam site to Medford, Oregon.

Under the Proposed Project, hauling would occur from material generated from each of the four dam and powerhouse removals. To estimate the proportion of hauling trips taken on unpaved versus paved roads, total roadway lengths from

the California dam sites to the Pelletier Transfer Station in Siskiyou County, California, and from J.C. Boyle Dam to the Klamath Falls Landfill in Klamath Falls, Oregon, were estimated using geographic information system (GIS) software (M. Singer, Project Manager, Stillwater Sciences, pers. comm., September 2019). Based on the fraction of unpaved roads versus paved roads, 85 percent of the total hauling trips would occur on paved roads, while the remaining trips would occur on unpaved roads. Waste material including earth, concrete, rebar, mechanical and electrical equipment, building waste, powerlines, and treated wood would be hauled to various on-site or off-site disposal sites, including the Pelletier Transfer Station. Total hauling trips and daily VMT were applied to EMFAC 2017 emissions factors to estimate total hauling exhaust emissions according to each dam and powerhouse removal. Table RE-N-2 provides the total hauling amounts and daily VMT for each hauling material type.

Table RE-N-2. Summary of Waste Disposal Hauling VMT.

	J.C. Boyle	Copco No. 1	Copco No. 2	Iron Gate
Earth	130,800 yd ³	-	2,100 yd ³	1,257,000 yd ³
Concrete	51,900 yd ³	104,000 yd ³	16,600 yd ³	20,700 yd ³
Rebar	4,100 tons	1,100 tons	400 tons	1,000 tons
Mechanical and Electrical Equipment	2,500 tons	1,100 tons	2,900 tons	1,200 tons
Building Waste	2,700 yd ³	1,700 yd ³	9,500 yd ³	2,300 yd ³
Power Lines	-	4.3 miles	6.7 miles	0.5 miles
Treated Wood	-	-	700 tons	-
Wood Utility Poles	-	120 poles	100 poles	-
Daily Off-Road VMT (15 percent)	24	9	71	38
Daily On-Road VMT (85 percent)	137	51	400	212

Notes: “yd³” = cubic yards; VMT = Vehicle Miles Traveled

Trips were estimated based on a truck hauling capacity of 22 yd³ for earth and concrete, 10 tons for rebar, 8 tons for mechanical and electrical equipment, and 10 yd³ for building waste. Daily VMT was estimated by applying the number of trips to trip distances (provided in Attachment A) divided by the total number of days during the construction phase.

Source: Appendix B: *Definite Plan – Section 5*

On-Road Fugitive Dust Emissions

Fugitive dust emissions from on-road worker and hauling trips and the handling of waste material were estimated using AP-42, Chapter 13.2.1, Equation 1 (USEPA 2011) emissions factors. Emissions were estimated from on-road mobile sources traveling on paved and unpaved roads. AP-42 emissions factors for fugitive dust PM₁₀ were applied to daily VMT, while fugitive dust PM_{2.5} was calculated based on a 0.1 ratio of PM_{2.5}/PM₁₀ as indicated in USEPA 2006 AP-42 *Background Document for Revisions to Fine Fraction Ratios used for AP-42*

Fugitive Dust Emission Factors. To estimate the remaining 15 percent of hauling trips driven on unpaved roads, a similar methodology was used as on-road trips from AP-42, Section 13.2.2, Equation 1a (USEPA 2006b).

N.3.2 Supporting Activities

After dam and powerhouse removal, restoration of the reservoir footprints would be accomplished using helicopters for reseeded of grasses; helicopters are not included in the RCEM and CalEEMod emissions models. Emissions factors for a Bell 206L engine helicopter with a shaft horsepower (shp) of 450 were provided by the Federal Office of Civil Aviation in Switzerland and were applied to the total hours of use to estimate total helicopter emissions. Restoration activities would also require the use of marine workboats. Emissions factors for work boats were estimated using the USEPA *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data* (2000) emissions factor algorithms. The emissions factors were then applied to the total hours of use to estimate total workboat emissions.

N.3.3 Project Schedule and Phasing

The Proposed Project schedule was used to determine when the maximum construction activity would occur, based on anticipated activity phasing, for comparison of emissions to maximum daily thresholds of significance. Overall, the construction phasing was determined based on Appendix B: *Definite Plan – Section 8.6 Construction Schedule*. Generally, the dates associated with construction phases in the Definite Plan were pushed forward one year to acknowledge the KRRC's recent proposed schedule adjustments (KRRC 2019), and the overall duration of each phase/subphase remained approximately the same.

Equipment activity data (e.g., type, quantity, hours/day) were associated with the appropriate major construction phase (e.g., Pre-Dam Removal, Dam and Powerhouse Removal, Restoration). However, after a review of the anticipated construction phasing presented in the Definite Plan, activity hours were further split into subphases for Copco No. 1 and Iron Gate dams, to isolate activities that would occur prior to the major dam removal activities. For Copco No. 1 Dam demolition, activities were sub-divided into three subphases; Dam Modification, Powerhouse Demolition, and Dam Demolition. For Iron Gate Dam removal, activities were sub-divided into three subphases; Dam Modification, Fish Hatchery at Dam Toe Demolition, and Dam Demolition. For the purpose of this analysis, it was assumed that the supporting construction or pre-dam removal construction phases would occur prior to major dam removal activity, and therefore, the supporting phases were not included in the maximum daily emissions scenario. It was also assumed that the recreational facilities removal phase would occur during the pre-dam removal phase, and therefore, is also excluded from the maximum daily emissions.

The main dam demolition phases for Iron Gate, Copco No. 1, Copco No. 2, and J.C. Boyle, were all assumed to overlap by at least one day. Activities associated with blasting would also potentially occur during each of the main dam demolition phases. Lastly, restoration of all four dams would overlap with the four dam demolitions and blasting activities. Table RE-N-3 provides the overall anticipated construction schedule and general phasing. Maximum daily emissions were estimated by reviewing the overall project schedule in the Definite Plan and determining what phases would overlap to generate the highest emissions associated with peak construction activity. The peak construction activity was informed by KRRC's Definite Plan and refined by Ascent Environmental in coordination with Stillwater Sciences, and it is presented in Table RE-N-4 below.

Table RE-N-3. Construction Schedule Summary.

Construction Phase	Start (Month/Day)	End (Month/Day)	Duration (Days)
Pre-Dam Removal	2/1	5/31	608
Fall Creek Hatchery Modifications	2/1	9/1	153
Access, Road, Bridge, and Culvert Improvements	4/1	10/15	142
Recreational Facilities Removal	4/1	9/15	120
Flood Improvements	4/1	8/1	87
Yreka Water Supply Pipeline Relocation	5/1	10/15	120
Seed Collection	6/1	11/1	110
IEV Control 1	6/1	11/1	110
IEV Control 2	6/1	11/1	110
Iron Gate Hatchery Modifications	7/1	7/31	22
Copco No. 1 Dam Modification	6/15	12/17	134
Copco No. 1 Powerhouse Demolition	11/4	4/14	116
Copco No. 1 Dam Demolition	4/15	10/24	137
Iron Gate Dam Modification	6/22	9/7	56
Fish Hatchery at Dam Toe Demo	1/4	6/7	111
Iron Gate Dam Demolition	6/8	10/18	95
J.C. Boyle Dam Demolition	1/1	9/30	195
Copco No. 2 Dam Demolition	5/1	10/15	120
Restoration	2/1	9/1	414

Source: Modified from Appendix B: *Definite Plan – Section 8.6 Construction Schedule*

Notes: Pre-dam removal schedule dates were provided by Stillwater Sciences in coordination with KRRC, while dam modification, powerhouse demolition, dam demolition, and restoration were taken from Appendix B: *Definite Plan – Section 8.6 Construction Schedule*, pushed forward by one year. Copco No. 1 Dam and Iron Gate Dam demolition phase schedules were determined by estimating the remaining number of days during the two overall dam demolition phases, after subtracting the number of days assigned to the dam modification and powerhouse demolition phases identified in the Definite Plan.

Table RE-N-4. Peak Construction Activity.

Construction Phase	Start	End	Duration (Days)
Copco No. 1 Dam Demolition	4/15	10/24	137
Iron Gate Dam Demolition	6/8	10/18	95
J.C. Boyle Dam Demolition	1/1	9/30	195
Copco No. 2 Dam Demolition	5/1	10/15	120
Restoration	2/1	9/1	414

Notes: Copco No. 1 Dam and Iron Gate Dam demolition phase schedules were determined by estimating the remaining number of days during the two overall dam demolition phases after subtracting the number of days assigned to the dam modification and powerhouse demolition phases identified in the Definite Plan.

N.4 Air Quality Emissions

Using the emissions factors described in Section N.3.1 and the construction phasing assumptions described above in Section N.3, maximum daily emissions were estimated for the Proposed Project and each alternative. The Proposed Project and each alternative include emissions from off-road equipment use, material handling and hauling, and worker commutes. Table RE-N-5 provides a summary of the peak daily emissions for the Proposed Project and each alternative.

Table RE-N-5. Summary of Proposed Project and Alternatives Maximum Daily Emissions (lb/day).

	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Proposed Project and No Hatchery Alternative	196	1,415	1,521	92	272	86
Partial Removal Alternative	170	981	1,320	68	182	67
Continued Operations with Fish Passage Alternative	33	192	284	62	277	45
Two Dam Removal Alternative	109	615	860	71	238	59
Three Dam Removal Alternative	123	1,034	969	82	244	64
SCAPCD Thresholds of Significance	250	2,500	250	250	250	250

Notes: Values shown in bold exceed the SCAPCD thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants). Emissions calculations are provided in Attachment A.

Source: Modeled by Ascent Environmental, Inc. 2019

Table RE-N-4 shows that the Proposed Project, No Hatchery Alternative, Partial Removal Alternative, Two Dam Removal Alternative, and Three Dam Removal Alternative would exceed the significance threshold for NO_x. Table RE-N-4 also

shows that the Proposed Project and No Hatchery Alternative would exceed the significance threshold for PM₁₀. Therefore, the construction emissions from these alternatives would be significant. The following discussion provides more detailed emissions for each construction activity according to either the Proposed Project or the alternatives.

N.4.1 Proposed Project/Full Facilities Removal and No Hatchery Alternative

An emissions summary of the total daily emissions associated with the Proposed Project and No Hatchery Alternative is provided in Table RE-N-6. As indicated above, the Proposed Project involves full facilities removal and would involve pre-dam demolition construction, dam and powerhouse deconstruction and blasting, and restoration of the reservoir footprints and disturbed upland areas. As indicated above, the No Hatchery Alternative is the same as the Proposed Project except that operations at the Iron Gate Hatchery would cease at the time of dam removal and would not continue for eight years following dam removal, and the Fall Creek Hatchery would not reopen with upgraded facilities.

Table RE-N-6. Proposed Project and No Hatchery Alternative Maximum Daily Emissions by Construction Activity (lb/day).

Phase	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Dam and Powerhouse Deconstruction						
Copco No. 1	25	146	205	24	10	14
Iron Gate	44	255	391	11	73	21
J.C. Boyle	62	354	542	14	92	28
Copco No. 2	19	448	159	23	73	13
Blasting	-	13	3	0	-	-
Restoration	45	200	222	19	24	10
Maximum Daily	196	1,415	1,520	92	272	86
Threshold of Significance	250	2,500	250	250	250	250

Notes: Values shown in bold exceed the SCAPCD thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants). Emissions calculations are provided in Attachment A.

Source: Modeled by Ascent Environmental, Inc. 2019

As shown in Table RE-N-6, NO_x and PM₁₀ emissions exceed the threshold for the combined construction phase of dam removal, blasting, and restoration. As mentioned, these three phases were assumed to overlap in time, generating the maximum daily emissions. Pre-dam removal activities (Fall Creek Hatchery modification; access, road, bridge, and culvert improvements; recreation facility removal; flood improvements; Yreka water supply pipeline relocation; seed collection; invasive exotic vegetation control; and Iron Gate Hatchery modification) were assumed to occur before the major dam removal activities, and therefore, emissions associated with these activities did not contribute to the maximum daily emissions.

N.4.2 Partial Removal Alternative

Emissions shown in Table RE-N-7 are the result of the Project alternative to partially remove the four dams and the associated facilities. Like the Proposed Project, the Partial Removal Alternative would involve pre-dam removal, dam and powerhouse deconstruction, blasting, and restoration with modification to reduce activity intensity. The construction equipment used under the Partial Removal Alternative would be the same mix as the Proposed Project, although based on material quantities to be removed at each dam in comparison to the Proposed Project (Appendix B: *Definite Plan* – Tables 5.2-3, 5.3-3, 5.4-3, and 5.5-3), the estimates assume that Copco No. 1 equipment operation time would be reduced by 10 percent, Iron Gate by 20 percent, J.C. Boyle by 30 percent, and Copco No. 2 by 20 percent. In addition, hauling of material would be reduced, lowering the number of on- and off-road truck trips compared to the Proposed Project. Attachment A provides all equipment and hauling assumptions under this alternative.

Table RE-N-7. Partial Removal Alternative Maximum Daily Emissions by Construction Activity (lb/day).

Phase	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Dam and Powerhouse Deconstruction						
Copco No. 1	22	131	183	13	21	10
Iron Gate	35	204	312	1	61	17
J.C. Boyle	52	311	474	14	25	18
Copco No. 2	15	122	127	21	51	12
Blasting	-	13	3	<1	-	-
Restoration	45	200	222	19	24	10
Maximum Daily	170	981	1,320	68	177	67
Threshold of Significance	250	2,500	250	250	250	250

Notes: Values shown in bold exceed the SCAPCD thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants). Emissions calculations are provided in Attachment A.

Source: Modeled by Ascent Environmental, Inc. 2019

As shown in Table RE-N-7, NO_x emissions exceed the threshold for the combined construction phase of dam removal, blasting, and restoration. Like the Proposed Project, these phases are overlapping and therefore are cumulatively considered. As NO_x is exceeding the threshold, the Partial Removal Alternative would have a significant air quality impact.

N.4.3 Continued Operations with Fish Passage Alternative

Under the Continued Operations with Fish Passage Alternative all facilities associated with the four dams would remain, while additional facilities would be constructed or upgraded at each dam to allow for volitional fish passage. This alternative excludes pre-dam removal and restoration construction activities. Construction equipment types, quantity, and hours of operation would differ from the Proposed Project and other Project alternatives as identified in the 2018 Draft EIR. Table RE-N-8 provides the emissions inventory of the Continued Operations with Fish Passage Alternative with the specified equipment.

Table RE-N-8. Continued Operations with Fish Passage Alternative Maximum Daily Emissions by Construction Activity (lb/day).

Phase	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Dam Modification and Fish Ladder Construction						
Copco No. 1	9	50	73	17	33	14
Iron Gate	9	50	72	19	102	13
J.C. Boyle	8	46	71	13	69	9
Copco No. 2	8	47	68	14	72	10
Maximum Daily ¹	9	50	73	19	103	14
Threshold of Significance	250	2,500	250	250	250	250

¹ Fish ladder construction at each dam would not overlap consistent with the KHS 2012 EIS/EIR *Fish Passage at Four Dams Alternative*.

Notes: Emissions calculations are provided in Attachment A.

It can be concluded from Table RE-N-8 that the Continued Operations with Fish Passage Alternative would not exceed SCAPCD thresholds of significance. As this alternative would only include the removal and construction of facilities for fish passage, less construction equipment would be required and therefore less emissions would be emitted than the other Project alternatives. Furthermore, because this alternative does not include construction activities associated with pre-dam removal or restoration, emissions prior to the major construction activities would be less than the other Project alternatives. As the Continued Operations with Fish Passage Alternative emissions do not exceed SCAPCD thresholds, this alternative would have a less than significant impact.

N.4.4 Two Dam Removal Alternative

The emissions associated with the pre-dam removal activities, Copco No. 1 and Iron Gate dam removal activities, and restoration activities under the Two Dam Removal Alternative are provided in Table RE-N-9.

Table RE-N-9. Two Dam Removal Alternative Maximum Daily Emissions by Construction Activity (lb/day).

Phase	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Dam and Powerhouse Deconstruction and Fish Ladder Construction						
Copco No. 1	25	146	205	24	10	13
Iron Gate	44	255	391	11	73	21
J.C. Boyle Fish Ladder Construction	8	46	68	14	72	10
Copco No. 2 Fish Ladder Construction	8	47	71	13	69	9
Blasting	-	13	3	<1	-	-
Restoration	24	108	122	10	13	6
Maximum Daily ¹	109	615	860	71	238	59
Threshold of Significance ²	250	2,500	250	250	250	250

¹ Fish ladder construction at each dam would not overlap consistent with the KHSa 2012 EIS/EIR *Fish Passage at Four Dams Alternative*.

² Values shown in bold exceed the Siskiyou County Air Pollution Control District's (SCAPCD) thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants).

Emissions calculations are provided in Attachment A.

Source: Modeled by Ascent Environmental, Inc. 2019

As shown in Table RE-N-9, the Two Dam Removal Alternative exceeds the threshold for NO_x. The emissions for dam removal, blasting, and restoration are cumulatively considered under this alternative because their schedules overlap. Due to the threshold exceedance, the Two Dam Removal Alternative would have a significant air quality impact.

N.4.5 Three Dam Removal Alternative

The emissions associated with pre-dam removal, Copco No. 1, Copco No. 2, and Iron Gate dam removal, and restoration activities under the Three Dam Removal Alternative are provided in Table RE-N-10.

Table RE-N-10. Three Dam Removal Alternative Maximum Daily Emissions by Construction Activity (lb/day).

Phase	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Dam and Powerhouse Deconstruction and Fish Ladder Construction						
Copco No. 1	25	146	205	24	10	14
Iron Gate	44	255	391	11	73	21
Copco No. 2	19	448	159	23	73	13
J.C. Boyle Fish Ladder Construction	8	46	68	14	72	10
Blasting	-	13	3	<1	-	-
Restoration	27	125	144	10	16	7
Maximum Daily ¹	123	1,034	969	82	244	64
Threshold of Significance ²	250	2,500	250	250	250	250

¹ Fish ladder construction at each dam would not overlap consistent with the KHSR 2012 EIS/EIR *Fish Passage at Four Dams Alternative*.

² Values shown in bold exceed the Siskiyou County Air Pollution Control District's (SCAPCD's) thresholds of significance in Rule 6.1 (Construction Permit Standards for Criteria Air Pollutants).

Emissions calculations are provided in Attachment A.

Source: Modeled by Ascent Environmental, Inc. 2019

As shown in Table RE-N-10, the Three Dam Removal Alternative exceeds the threshold for NO_x. The emissions for dam removal, blasting, and restoration are cumulatively considered under this alternative because their schedules overlap. Due to the threshold exceedance, the Three Dam Removal Alternative would have a significant air quality impact.

N.5 Mitigation

To reduce the amount of NO_x and PM₁₀ emissions from the Proposed Project, KRRRC has proposed and agreed to implement the following mitigation measures. Note, that for NO_x, the incorporated mitigation measures would not fully mitigate impacts.

N.5.1 Air Quality Mitigation Measures

Mitigation Measure AQ-1 – Off-Road Construction Equipment Engine Tier

For the construction activities occurring within California, any off-road construction equipment (e.g., loaders, excavators, etc.) that are 50 horsepower or greater must be equipped with engines that meet the EPA Tier 4 Final emissions standards for off-road compression-ignition (diesel) engines, unless such an engine is not available for a particular item of equipment. To the extent

allowed by CARB Off-Road Diesel Fueled Fleets regulations, Tier 3 and Tier 4 interim engines will be allowed when the contractor has documented, with appropriate evidence, that no Tier 4 Final equipment or emissions equivalent retrofit equipment is available or feasible (CARB 2016c). Documentation may consist of signed statements from at least two construction equipment rental firms.

Mitigation Measure AQ-2 – On-Road Construction Equipment Engine Model Year

Any heavy-duty on-road construction equipment must be equipped with engines that meet the model year (MY) 2010 or newer on-road emission standards.

Mitigation Measure AQ-3 – Heavy-Duty Trucks Engine Model Year

Any heavy-duty trucks used to transport materials to or from the construction sites must be equipped with engines that meet the MY 2010 or later emission standards for on-road heavy-duty engines and vehicles. Older model engines may also be used if they are retrofitted with control devices to reduce emissions to the applicable emission standards.

Mitigation Measure AQ-4 – Blasting-related Dust Control Measures

Dust control measures will be incorporated to the maximum extent feasible during blasting operations at Copco No. 1 Dam. The following control measures will be used during blasting activities as applicable: Conduct blasting on calm days to the extent feasible. Wind direction with respect to nearby residences must be considered. Design blast stemming to minimize dust and to control fly rock.

Mitigation Measure AQ-5 – General Construction Dust Control Measures

To reduce fugitive dust emissions, the following additional measures shall be implemented:

- Water all exposed surfaces as appropriate to control fugitive dust through sufficient soil moisture. Under normal dry-season conditions this is generally a minimum of two times daily. Watering of exposed surfaces is not necessary when soils are already sufficiently wetted (e.g., during rain). Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads.
- Install stabilized construction entrances where appropriate, to include geotextile fabric and/or coarse rock to manage the amount of soil tracked onto paved roadways by motor vehicle equipment, and suspended in runoff, from the active construction sites.

N.5.2 Mitigation Effectiveness

The use of USEPA Tier 4 engines, as proposed by Air Quality Mitigation Measure AQ-1, can reduce diesel exhaust (i.e., PM₁₀) and NO_x emissions by up to 90 percent over Tier 1 engines (SMAQMD 2016). However, construction fleets in California are comprised of a combination of engines, ranging from Tier

1 to Tier 4, and as older equipment are rebuilt or replaced, the composition of higher tiered engines will increase. At this time, it cannot be determined as to what ratio of Tier 4 or Tier 3 engines the construction fleet will have. Further, certain equipment types/sizes are not always available in Tier 4 engines, so it cannot be guaranteed that the entire fleet can be composed of Tier 4 engines (Appendix N). As shown above in Table RE-N-6, maximum daily emissions of NO_x were estimated to be as high as 1,518 lb/day, and therefore, an 84 percent reduction in emissions would be needed to achieve the 250 lb/day threshold. Considering that statewide average construction fleet emissions continue to improve, and the unlikeliness that Tier 4 engines would be available for all equipment types, the needed 84 percent reduction in NO_x emissions would not be achieved and emissions would remain above the 250 lb/day threshold for NO_x (Appendix N).

The use of on-road construction equipment and heavy duty trucks that meet MY 2010 or newer emissions standards, as proposed by Mitigation Measures AQ-2 and AQ-3, can also reduce diesel exhaust (i.e., PM₁₀) and NO_x emissions. However, due to the uncertainty of the specific model year emissions standards that will be met by the construction fleet for the Proposed Project, providing an accurate quantification of these reductions was not feasible. Therefore, it is estimated that the needed 84 percent reduction in NO_x emissions would not be achieved and emissions would remain above the 250 lb/day threshold for NO_x (Appendix N).

Implementation of the dust control measures in Mitigation Measures AQ-4 and AQ-5 can reduce fugitive dust by up to 50 percent. As noted above, the implementation of Mitigation Measure AQ-1 could also significantly reduce exhaust emissions (i.e., PM₁₀). As shown above in Table RE-N-6, maximum daily emissions of PM₁₀ were estimated to be as high as 272 lb/day, and approximately 77 percent of these emissions would be from fugitive dust and 23 percent would be from exhaust. Therefore, a 50 percent or greater reduction in fugitive dust and exhaust emissions would reduce PM₁₀ emissions well below the 250 lb/day threshold.

With the implementation of Mitigation Measures AQ-1 through AQ-5, construction emissions from the Proposed Project would still result in significant and unavoidable impacts from NO_x.

N.6 Additional Measures

In addition to Mitigation Measures AQ-1 through AQ-5, below are additional fugitive dust reduction measures and exhaust reduction measures that could further reduce emissions of NO_x and PM₁₀ from the Proposed Project. Under the Proposed Project, implementation of the additional measures would not reduce NO_x to a less than significant level.

N.6.1 Additional Fugitive Dust Reduction Measures

To further reduce fugitive dust emissions, the following different and additional measures could be implemented:

- Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered.
- Use wet power vacuum street sweepers to remove any visible track-out mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.
- Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).
- All roadways, driveways, sidewalks, parking lots to be paved should be completed as soon as possible.
- Suspend excavation, grading, and/or demolition activity when wind speeds exceed 20 mph.
- Install wheel washers for all exiting trucks or wash off all trucks and equipment leaving the site.
- Treat site accesses to a distance of 100 feet from the paved road with a 6 to 12-inch layer of wood chips, mulch, or gravel to reduce generation of road dust and road dust carryout onto public roads.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the air district shall also be visible to ensure compliance.

To reduce fugitive dust emissions at all proposed blasting locations, the following different or additional measures could be implemented:

- Conduct blasting on calm days to the extent feasible. Wind direction with respect to nearby residences must be considered.
- Design blast stemming to minimize dust and to control fly rock.
- Install wind fence for control of windblown dust.

N.5.2 Additional Exhaust Reduction Measures

To further reduce exhaust emissions associated with on- and off-road vehicles, the following different and additional measures could be implemented:

- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to five minutes [required by California Code of

Regulations, Title 13, sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the entrances to the site.

- Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set)

N.7 References

KRRC. 2019. FERC Nos. P-2082; P-14803, NATDAM-OR00559, CA00323, CA00234, CA00325; Response to independent Board of Consultants' recommendations. Prepared by PerkinsCoie, Bellevue, Washington (on behalf of KRRC) for Federal Energy Regulatory Commission, Washington, D.C.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2016. CEQA Guide: Chapter 3 – Construction-Generated Criteria Air Pollutant and Precursor Emissions.

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USEPA (U.S. Environmental Protection Agency). 1998. Compilation of Air Pollutant Emission Factors (AP-42). Chapter 11.9: Western Surface Coal Mining

USEPA. 2000. Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data.

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USEPA. 2011. Compilation of Air Pollutant Emission Factors (AP-42). Chapter 13.2.1: Paved Roads.

Attachment A

Emissions and Energy Use Calculations

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Emissions Calculations

Proposed Project Schedule – From Definite Plan

	Start (Month/Day)	End (Month/Day)	Duration (Days)
Pre-Dam Removal	2/1	5/31	608
Fall Creek Hatchery Modification	2/1	9/1	153
Access, road, bridge, and culvert improvements	4/1	10/15	142
Recreational Facility Removal	4/1	9/15	120
Flood Improvements	4/1	8/1	87
Yreka Water Supply Pipeline Relocation	5/1	10/15	120
Seed Collection	6/1	11/1	110
IEV Control 1	6/1	11/1	110
IEV Control 2	6/1	11/1	110
Iron Gate Hatchery Modification	7/1	9/1	45
Copco No. 1 Dam	6/15	10/22	354
J.C. Boyle Dam	1/1	9/30	195
Copco No. 2 Dam	5/1	10/15	120
Iron Gate Dam	6/22	10/14	344
Restoration	2/1	5/31	347

Source: Draft EIR Appendix B: *Definite Plan*

Summary of Proposed Project Emissions

				lb/day													MT			MTCO ₂ e
	Start (Month/ Day)	End (Month/ Day)	Dur- ation	VOC	CO	NO _x	SO _x	PM ₁₀ (total)	PM ₁₀ (exhaust)	PM ₁₀ (fugitive dust)	PM _{2.5} (total)	PM _{2.5} (exhaust)	PM _{2.5} (fugitive dust)	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	
Pre-Dam Removal	2/1	11/1	457	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fall Creek Hatchery Modification	2/1	9/1	153	0.67	2.76	2.36	0.00	0.31	0.12	0.18	0.13	0.11	0.02	285.58	0.10	0.00	19.82	0.01	0.00	20.05
Access, road, bridge, and culvert improvements	4/1	10/15	142	3.70	19.87	26.47	0.20	2.33	1.09	1.24	1.14	1.02	0.12	4,871.51	12.84	0.05	313.77	0.83	0.00	335.36
Recreational Facility Removal	4/1	9/15	120	8.00	31.03	24.24	0.03	3.18	1.35	1.83	1.43	1.24	0.18	2,900.65	1.17	0.03	157.89	0.06	0.00	159.90
Flood Improvements	4/1	8/1	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yreka Water Supply Pipeline Relocation	5/1	10/15	120	1.33	5.46	7.97	0.01	1.09	0.46	0.63	0.49	0.42	0.06	1,034.06	0.22	0.01	56.29	0.01	0.00	56.73
Seed Collection	6/1	11/1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IEV Control Phase 1	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
IEV Control Phase 2	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
Iron Gate Hatchery Modification	7/1	7/31	22	3.02	21.44	22.76	0.04	1.12	1.09	0.03	1.04	1.04	0.00	3,420.63	0.88	0.03	34.13	0.01	0.00	34.44
SUB-TOTAL				17.29	88.16	89.14	0.29	8.31	4.39	3.92	4.49	4.10	0.39	13,634.59	15.59	0.12	637.89	0.94	0.01	663.07
Copco 1 Dam Modification	6/15	12/17	134	15.28	89.48	125.61	14.51	15.70	5.29	10.41	8.57	4.80	3.77	21,489.73	4.78	0.22	1,306.17	0.29	0.01	1,317.51
Copco 1 Powerhouse Demolition	11/4	4/14	116	3.49	20.45	28.71	3.32	3.59	1.21	2.38	1.96	1.10	0.86	4,911.94	1.09	0.05	258.45	0.06	0.00	260.69
Copco 1 Dam Demolition	4/15	10/24	137	24.89	145.73	204.56	23.64	10.01	8.61	1.39	13.95	7.82	6.13	34,997.56	7.78	0.37	2,174.82	0.48	0.02	2,193.69
Iron Gate Dam Modification	6/22	9/7	56	27.12	156.88	239.78	6.95	44.85	9.88	34.97	16.19	12.64	3.55	39,474.72	10.46	0.38	1,002.70	0.27	0.01	1,012.25
Fish Hatchery at Dam Toe Demo	1/4	6/7	111	6.20	35.86	54.81	1.59	10.25	2.26	7.99	2.93	2.12	0.81	9,022.79	2.39	0.09	454.29	0.12	0.00	458.61
Iron Gate Dam Demolition	6/8	10/18	95	44.17	255.49	390.51	11.32	73.04	16.10	56.95	20.86	15.07	5.78	64,287.41	17.03	0.63	2,770.22	0.73	0.03	2,796.61
JC Boyle Dam Demolition	1/8	9/30	190	62.25	353.71	541.76	14.43	91.63	22.43	69.20	28.16	21.14	7.03	87,414.86	21.95	0.93	7,533.63	1.89	0.08	7,604.88
Copco 2 Dam Demolition	5/1	9/25	105	18.95	448.22	158.95	23.26	72.91	6.52	66.39	12.68	5.92	6.76	29,387.50	5.88	0.58	1,399.64	0.28	0.03	1,414.89
Blasting				-	12.56	3.19	0.38	-			-	-	-	-	-	-	-	-	-	-
Restoration	2/1	9/1	414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copco 1 Dam			103.5	5.72	39.43	50.31	0.10	5.42	2.10	3.32	2.29	1.96	0.33	9,520.48	2.82	0.09	446.96	0.13	0.00	451.46
Iron Gate Dam			103.5	18.36	69.02	71.87	9.40	8.03	3.29	4.75	3.27	2.80	0.47	17,815.87	4.03	0.12	836.40	0.19	0.01	842.83
JC Boyle Dam			103.5	18.86	74.41	77.90	9.42	8.23	3.48	4.75	3.45	2.98	0.47	19,399.98	4.56	0.14	910.77	0.21	0.01	918.02
Copco 2 Dam			103.5	2.45	16.90	21.56	0.04	2.32	0.90	1.42	0.98	0.84	0.14	4,080.20	1.21	0.04	191.55	0.06	0.00	193.48
SUB-TOTAL				195.64	1,415.48	1,520.61	92.00	271.60	63.43	208.17	85.65	58.52	27.13	341,803.04	83.98	3.63	19,285.60	4.72	0.21	19,464.93
Maximum Daily				195.64	1,415.48	1,520.61	92.00	271.60	63.43	208.17	85.65	58.52	27.13	-	-	-			TOTAL	20,128.01

Summary of Partial Removal Alternative Emissions

				lb/day													MT			MTCO ₂ e
	Start (Month/ Day)	End (Month/ Day)		VOC	CO	NO _x	SO _x	PM (total)	PM ₁₀ (exhaust)	PM ₁₀ (fugitive dust)	PM _{2.5} (total)	PM _{2.5} (exhaust)	PM _{2.5} (fugitive dust)	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	
Pre-Dam Removal	2/1	11/1	457	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fall Creek Hatchery Modification	2/1	9/1	153	0.67	2.76	2.36	0.00	0.31	0.12	0.18	0.13	0.11	0.02	285.58	0.10	0.00	19.82	0.01	0.00	20.05
Access, road, bridge, and culvert improvements	4/1	10/15	142	3.70	19.87	26.47	0.20	2.33	1.09	1.24	1.14	1.02	0.12	4,871.51	12.84	0.05	313.77	0.83	0.00	335.36
Recreational Facility Removal	4/1	9/15	120	8.00	31.03	24.24	0.03	3.18	1.35	1.83	1.43	1.24	0.18	2,900.65	1.17	0.03	157.89	0.06	0.00	159.90
Flood Improvements	4/1	8/1	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yreka Water Supply Pipeline Relocation	5/1	10/15	120	1.33	5.46	7.97	0.01	1.09	0.46	0.63	0.49	0.42	0.06	1,034.06	0.22	0.01	56.29	0.01	0.00	56.73
Seed Collection	6/1	11/1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IEV Control 1	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
IEV Control 2	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
Iron Gate Hatchery Modification	7/1	7/31	22	3.02	21.44	22.76	0.04	1.12	1.09	0.03	1.04	1.04	0.00	3,420.63	0.88	0.03	34.13	0.01	0.00	34.44
SUB-TOTAL				17.29	88.16	89.14	0.29	8.31	4.39	3.92	4.49	4.10	0.39	13,634.59	15.59	0.12	637.89	0.94	0.01	663.07
Copco 1 Dam Modification	6/15	12/17	134	13.63	80.52	112.35	7.92	12.83	4.76	8.07	6.19	4.32	1.87	17,854.25	4.27	0.16	1,085.21	0.26	0.01	1,094.54
Copco 1 Powerhouse Demolition	11/4	4/14	116	3.12	18.40	25.68	1.81	2.93	1.09	1.84	1.41	0.99	0.43	4,080.97	0.98	0.04	214.73	0.05	0.00	216.57
Copco 1 Dam Demolition	4/15	10/24	137	22.20	131.13	182.98	12.89	20.90	7.75	13.14	10.08	7.04	3.04	29,076.92	6.96	0.26	1,806.90	0.43	0.02	1,822.44
Iron Gate Dam Modification	6/22	9/7	56	21.55	125.49	191.32	0.32	37.76	7.91	29.85	10.46	7.42	3.04	30,101.59	8.34	0.27	764.62	0.21	0.01	19.42
Fish Hatchery at Dam Toe Demo	1/4	6/7	111	4.93	28.68	43.73	0.07	8.63	1.81	6.82	2.39	1.70	0.69	6,880.36	1.91	0.06	346.42	0.10	0.00	17.44
Iron Gate Dam Demolition	6/8	10/18	95	35.10	204.37	311.58	0.53	61.49	12.88	48.61	17.03	12.08	4.95	49,022.59	13.58	0.44	2,112.44	0.59	0.02	91.03
JC Boyle Dam Demolition	1/8	9/30	190	51.68	311.13	473.76	14.28	24.71	18.41	40.11	18.23	17.29	4.11	61,287.65	0.07	25.01	5,281.92	0.01	2.16	5,924.41
Copco 2 Dam Demolition	5/1	9/25	105	15.21	122.34	127.32	20.96	51.07	4.75	52.70	11.62	4.74	5.38	24,150.95	4.72	0.48	1,150.24	0.22	0.02	1,162.66
Blasting				-	12.56	3.19	0.38	-	-	-	-			-	-	-	-	-	-	-
Restoration	2/1	9/1	414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copco 1 Dam			103.5	5.72	39.43	50.31	0.10	5.42	2.10	3.32	2.29	1.96	0.33	9,520.48	2.82	0.09	446.96	0.13	0.00	451.46
Iron Gate Dam			103.5	18.36	69.02	71.87	9.40	8.03	3.29	4.75	3.27	2.80	0.47	17,815.87	4.03	0.12	836.40	0.19	0.01	842.83
JC Boyle Dam			103.5	18.86	74.41	77.90	9.42	8.23	3.48	3.32	3.45	2.98	0.33	19,399.98	4.56	0.14	910.77	0.21	0.01	918.02
Copco 2 Dam			103.5	2.45	16.90	21.56	0.04	2.32	0.90	1.42	0.98	0.84	0.14	4,080.20	1.21	0.04	191.55	0.06	0.00	193.48
SUB-TOTAL				169.59	981.28	1,320.46	68.00	182.18	53.55	167.38	66.95	49.72	18.76	273,271.83	53.44	27.08	15,148.15	2.46	2.25	12,754.31
Maximum Daily				169.59	981.28	1,320.46	68.00	182.18	53.55	167.38	66.95	49.72	18.76						TOTAL	13,417.38

Summary of Continued Operation with Fish Passage Alternative Emissions

				lb/day													MT			MTCO ₂ e
				VOC	CO	NO _x	SO _x	PM ₁₀ (total)	PM ₁₀ (exhaust)	PM ₁₀ (fugitive dust)	PM _{2.5} (total)	PM _{2.5} (exhaust)	PM _{2.5} (fugitive dust)	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	
Copco No. 1 Fish Ladder Construction				8.66	49.66	72.63	16.50	32.65	2.92	29.73	13.52	2.76	10.76	20,253.00	2.44	0.29	3,057.76	0.21	0.02	3,070.08
Iron Gate Dam Fish Ladder Construction				8.76	49.66	72.23	18.87	102.83	2.92	99.91	12.91	2.76	10.15	20,715.38	2.46	0.27	2,769.09	0.23	0.02	2,781.19
JC Boyle Fish Ladder Construction				8.01	46.49	68.01	13.68	71.92	2.77	69.20	9.60	2.61	7.03	18,063.88	2.38	0.20	1,556.79	0.20	0.02	1,567.01
Copco No. 2 Fish Ladder Construction				8.06	46.50	71.12	12.64	69.12	2.79	66.39	9.33	2.63	6.76	18,831.04	2.37	0.49	896.87	0.11	0.02	906.62
Maximum Daily				8.76	49.66	72.63	18.87	102.83	2.92	99.91	13.52	2.76	10.76	-	-	-			TOTAL	7,058.42
SCAPCD Threshold				250	2,500	250	250	250			250									
Threshold Exceeded				No	No	No	No	No			No									

Summary of Two Dam Removal Alternative Emissions

				lb/day													MT			MTCO ₂ e
	Start (Month/ Day)	End (Month/ Day)		VOC	CO	NO _x	SO _x	PM (total)	PM ₁₀ (exhaust)	PM ₁₀ (fugitive dust)	PM _{2.5} (total)	PM _{2.5} (exhaust)	PM _{2.5} (fugitive dust)	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	
Pre-Dam Removal	2/1	11/1	457	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fall Creek Hatchery Modification	2/1	9/1	153	0.67	2.76	2.36	0.00	0.31	0.12	0.18	0.13	0.11	0.02	285.58	0.10	0.00	19.82	0.01	0.00	20.05
Access, road, bridge, and culvert improvements	4/1	10/15	142	3.70	19.87	26.47	0.20	2.33	1.09	1.24	1.14	1.02	0.12	4,871.51	12.84	0.05	313.77	0.83	0.00	335.36
Recreational Facility Removal	4/1	9/15	120	8.00	31.03	24.24	0.03	3.18	1.35	1.83	1.43	1.24	0.18	2,900.65	1.17	0.03	157.89	0.06	0.00	159.90
Flood Improvements	4/1	8/1	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yreka Water Supply Pipeline Relocation	5/1	10/15	120	1.33	5.46	7.97	0.01	1.09	0.46	0.63	0.49	0.42	0.06	1,034.06	0.22	0.01	56.29	0.01	0.00	56.73
Seed Collection	6/1	11/1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IEV Control Phase 1	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
IEV Control Phase 2	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
Iron Gate Hatchery Modification	7/1	7/31	22	3.02	21.44	22.76	0.04	1.12	1.09	0.03	1.04	1.04	0.00	3,420.63	0.88	0.03	34.13	0.01	0.00	34.44
SUB-TOTAL				17.29	88.16	89.14	0.29	8.31	4.39	3.92	4.49	4.10	0.39	13,634.59	15.59	0.12	637.89	0.94	0.01	663.07
Copco 1 Dam Modification	6/15	12/17	134	15.28	89.48	125.61	14.51	15.70	5.29	10.41	8.57	4.80	3.77	21,489.73	4.78	0.22	1,306.17	0.29	0.01	1,317.51
Copco 1 Powerhouse Demolition	11/4	4/14	116	3.49	20.45	28.71	3.32	3.59	1.21	2.38	1.96	1.10	0.86	4,911.94	1.09	0.05	258.45	0.06	0.00	260.69
Copco 1 Dam Demolition	4/15	10/24	137	24.89	145.73	204.56	23.64	10.01	8.61	1.39	13.95	7.82	6.13	34,997.56	7.78	0.37	2,174.82	0.48	0.02	2,193.69
Iron Gate Dam Modification	6/22	9/7	56	27.12	156.88	239.78	6.95	44.85	9.88	34.97	16.19	12.64	3.55	39,474.72	10.46	0.38	1,002.70	0.27	0.01	1,012.25
Fish Hatchery at Dam Toe Demo	1/4	6/7	111	6.20	35.86	54.81	1.59	10.25	2.26	7.99	2.93	2.12	0.81	9,022.79	2.39	0.09	454.29	0.12	0.00	458.61
Iron Gate Dam Demolition	6/8	10/18	95	44.17	255.49	390.51	11.32	73.04	16.10	56.95	20.86	15.07	5.78	64,287.41	17.03	0.63	2,770.22	0.73	0.03	2,796.61
J.C. Boyle Fish Ladder Construction	-	-	-	8.01	46.49	68.01	13.68	71.92	2.77	69.20	9.60	2.61	7.03	18,063.88	2.38	0.20	823.08	0.08	0.01	827.14
Copco No. 2 Fish Ladder Construction	-	-	-	8.06	46.50	71.12	12.64	69.12	2.79	66.39	9.33	2.63	6.76	18,831.04	2.37	0.49	378.14	0.04	0.00	380.01

				lb/day													MT			MTCO ₂ e
	Start (Month/ Day)	End (Month/ Day)		VOC	CO	NO _x	SO _x	PM (total)	PM ₁₀ (exhaust)	PM ₁₀ (fugitive dust)	PM _{2.5} (total)	PM _{2.5} (exhaust)	PM _{2.5} (fugitive dust)	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	
Blasting				-	12.56	3.19	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-
Restoration	2/1	9/1	414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copco 1 Dam			103.5	5.72	39.43	50.31	0.10	5.42	2.10	3.32	2.29	1.96	0.33	9,520.48	2.82	0.09	446.96	0.13	0.00	451.46
Iron Gate Dam			103.5	18.36	69.02	71.87	9.40	8.03	3.29	4.75	3.27	2.80	0.47	17,815.87	4.03	0.12	836.40	0.19	0.01	842.83
SUB-TOTAL				109.20	615.22	859.56	71.15	237.55	35.65	202.00	59.30	32.88	26.51	163,516.23	36.41	1.89	10,451.24	2.40	0.10	10,540.81
Maximum Daily				109.20	615.22	859.56	71.15	237.55	35.65	202.00	59.30	32.88	26.51	-	-	-			TOTAL	11,203.88

Summary of Three Dam Removal Alternative Emissions

	Start (Month/Day)	End (Month/Day)	Duration (Days)	VOC lb/day	CO lb/day	NOx lb/day	SOx lb/day	PM ₁₀ (total) lb/day	PM ₁₀ (exhaust) lb/day	PM ₁₀ (fugitive dust) lb/day	PM _{2.5} (total) lb/day	PM _{2.5} (exhaust) lb/day	PM _{2.5} (fugitive dust) lb/day	CO ₂ lb/day	CH ₄ lb/day	N ₂ O lb/day	CO ₂ MT	CH ₄ MT	N ₂ O MT	MTCO _{2e} MT
Pre-Dam Removal	2/1	11/1	457	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fall Creek Hatchery Modification	2/1	9/1	153	0.67	2.76	2.36	0.00	0.31	0.12	0.18	0.13	0.11	0.02	285.58	0.10	0.00	19.82	0.01	0.00	20.05
Access, road, bridge, and culvert improvements	4/1	10/15	142	3.70	19.87	26.47	0.20	2.33	1.09	1.24	1.14	1.02	0.12	4,871.51	12.84	0.05	313.77	0.83	0.00	335.36
Recreational Facility Removal	4/1	9/15	120	8.00	31.03	24.24	0.03	3.18	1.35	1.83	1.43	1.24	0.18	2,900.65	1.17	0.03	157.89	0.06	0.00	159.90
Flood Improvements	4/1	8/1	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yreka Water Supply Pipeline Relocation	5/1	10/15	120	1.33	5.46	7.97	0.01	1.09	0.46	0.63	0.49	0.42	0.06	1,034.06	0.22	0.01	56.29	0.01	0.00	56.73
Seed Collection	6/1	11/1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IEV Control Phase 1	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
IEV Control Phase 2	6/1	11/1	110	0.28	3.80	2.68	0.01	0.14	0.14	0.00	0.13	0.13	0.00	561.08	0.18	0.01	27.99	0.01	0.00	28.30
Iron Gate Hatchery Modification	7/1	7/31	22	3.02	21.44	22.76	0.04	1.12	1.09	0.03	1.04	1.04	0.00	3,420.63	0.88	0.03	34.13	0.01	0.00	34.44
SUB-TOTAL				17.29	88.16	89.14	0.29	8.31	4.39	3.92	4.49	4.10	0.39	13,634.59	15.59	0.12	637.89	0.94	0.01	663.07
Copco No. 1 Dam Modification	6/15	12/17	134	15.28	89.48	125.61	14.51	15.70	5.29	10.41	8.57	4.80	3.77	21,489.73	4.78	0.22	1,306.17	0.29	0.01	1,317.51
Copco No. 1 Powerhouse Demolition	11/4	4/14	116	3.49	20.45	28.71	3.32	3.59	1.21	2.38	1.96	1.10	0.86	4,911.94	1.09	0.05	258.45	0.06	0.00	260.69

	Start (Month/Day)	End (Month/Day)	Duration (Days)	VOC lb/day	CO lb/day	NOx lb/day	SOx lb/day	PM ₁₀ (total) lb/day	PM ₁₀ (exhaust) lb/day	PM ₁₀ (fugitive dust) lb/day	PM _{2.5} (total) lb/day	PM _{2.5} (exhaust) lb/day	PM _{2.5} (fugitive dust) lb/day	CO ₂ lb/day	CH ₄ lb/day	N ₂ O lb/day	CO ₂ MT	CH ₄ MT	N ₂ O MT	MTCO _{2e} MT
Copco No. 1 Dam Demolition	4/15	10/24	137	24.89	145.73	204.56	23.64	10.01	8.61	1.39	13.95	7.82	6.13	34,997.56	7.78	0.37	2,174.82	0.48	0.02	2,193.69
Iron Gate Dam Modification	6/22	9/7	56	27.12	156.88	239.78	6.95	44.85	9.88	34.97	16.19	12.64	3.55	39,474.72	10.46	0.38	1,002.70	0.27	0.01	1,012.25
Fish Hatchery at Dam Toe Demo	1/4	6/7	111	6.20	35.86	54.81	1.59	10.25	2.26	7.99	2.93	2.12	0.81	9,022.79	2.39	0.09	454.29	0.12	0.00	458.61
Iron Gate Dam Demolition	6/8	10/18	95	44.17	255.49	390.51	11.32	73.04	16.10	56.95	20.86	15.07	5.78	64,287.41	17.03	0.63	2,770.22	0.73	0.03	2,796.61
JC Boyle Fish Ladder Construction				8.01	46.49	68.01	13.68	71.92	2.77	69.20	9.60	2.61	7.03	18,063.88	2.38	0.20	823.08	0.08	0.01	827.14
Copco No. 2 Dam Demolition	5/1	9/25	105	18.95	448.22	158.95	23.26	72.91	6.52	66.39	12.68	5.92	6.76	29,387.50	5.88	0.58	1,399.64	0.28	0.03	1,414.89
Blasting				-	12.56	3.19	0.38	-			-	-	-	-	-	-	-	-	-	-
Restoration	2/1	9/1	414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copco No. 1 Dam			103.5	5.72	39.43	50.31	0.10	5.42	2.10	3.32	2.29	1.96	0.33	9,520.48	2.82	0.09	446.96	0.13	0.00	451.46
Iron Gate Dam			103.5	18.36	69.02	71.87	9.40	8.03	3.29	4.75	3.27	2.80	0.47	17,815.87	4.03	0.12	836.40	0.19	0.01	842.83
J.C. Boyle Dam			103.5	18.86	74.41	77.90	9.42	8.23	3.48	4.75	3.45	2.98	0.47	19,399.98	4.56	0.14	910.77	0.21	0.01	918.02
Copco No. 2 Dam			103.5	2.45	16.90	21.56	0.04	2.32	0.90	1.42	0.98	0.84	0.14	4,080.20	1.21	0.04	191.55	0.06	0.00	193.48
SUB-TOTAL				122.55	1,033.84	968.95	81.82	243.66	40.28	203.42	63.63	37.02	26.65	253,052.08	59.85	2.76	11,664.29	2.69	0.13	11,769.18
Maximum Daily				122.55	1,033.84	968.95	81.82	243.66	40.28	203.42	63.63	37.02	26.65	-	-	-			TOTAL	12,432.25
SCAPCD Threshold				250	2,500	250	250	250			250									
Threshold Exceeded				No	No	Yes	No	No			No									

Off-Road Dust Emissions for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative, and No Hatchery Alternative

Truck Hauling (Dust)

Emission factor used is equation for travel on paved roads shown on worksheet "EF Fugitive Dust"

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
J.C. Boyle											
Earth	123,000	-	22	CY	5,590	0.5	2,795	419	2.21	1.73	0.26
	7,800	-	22	CY	350	4.0	1,400	210	1.11	0.87	0.13
Concrete	6,100	-	22	CY	280	2.0	560	84	0.44	0.35	0.05
	43,200	-	22	CY	1,960	1.0	1,960	294	1.55	1.22	0.18
	2,600	-	22	CY	120	2.0	240	36	0.19	0.15	0.02
Rebar	-	200	10	Ton	20	22.0	440	66	0.35	0.27	0.04
	-	3,800	10	Ton	380	24.0	9,120	1,368	7.20	5.66	0.85
	-	100	10	Ton	10	26.0	260	39	0.21	0.16	0.02
Mech. and Elec Equip	-	700	8	Ton	90	22.0	1,980	297	1.56	1.23	0.18
	-	300	8	Ton	40	24.0	960	144	0.76	0.60	0.09
	-	1,500	8	Ton	190	26.0	4,940	741	3.90	3.06	0.46
Building Waste	2,700	-	10	CY	270	22.0	5,940	891	4.69	3.68	0.55
Power Lines	-	-	-	-				0	0.00	0.00	0.00

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road milage (15%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Treated wood	-	-	-	-				0	0.00	0.00	0.00
Wood Utility Poles	-	-	-	-						0.00	0.00
Total					9,300	14.6			24.15	18.97	2.85
Copco No. 1											
Earth		-	-	-	-	-		0	0.00	0.00	0.00
		-	-	-	-	-		0	0.00	0.00	0.00
Concrete	104,000	-	22	CY	4,730	1	4,730	710	1.83	1.44	0.28
		-	22	CY	-	-		0	0.00	0.00	0.00
		-	22	CY	-	-		0	0.00	0.00	0.00
Rebar		1,100	10	Ton	110	31	3,410	512	1.32	1.04	0.20
		-	10	Ton	-	-		0	0.00	0.00	0.00
		-	10	Ton	-	-		0	0.00	0.00	0.00
Mech. and Elec Equip		1,100	8	Ton	140	70	9,800	1,470	3.80	2.98	0.57
		-	8	Ton	-	-		0	0.00	0.00	0.00
		-	8	Ton	-	-		0	0.00	0.00	0.00
Building Waste	1,700	-	10	CY	170	31	5,270	791	2.04	1.60	0.31

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Power Lines		-	-	-				0	0.00	0.00	0.00
Treated wood		-	-	-	5	31	155	23	0.12	0.10	0.01
Wood Utility Poles					8	31	248	37	0.20	0.15	0.02
Total					5,163	32.5			9.31	7.32	1.39
Copco No. 2											
Earth	2,100	-	22	CY	100	1	100	15	0.14	0.11	0.02
		-	22	CY				0	0.00	0.00	0.00
Concrete	16,600		22	CY	750	1	750	113	1.07	0.84	0.13
		-	22	CY				0	0.00	0.00	0.00
		-	22	CY				0	0.00	0.00	0.00
Rebar		300	10	Ton	30	31	930	140	1.33	1.04	0.16
		100	10	Ton	10	28	280	42	0.40	0.31	0.05
		-	10	Ton				0	0.00	0.00	0.00
Mech. and Elec Equip		300	8	Ton	40	31	1,240	186	1.77	1.39	0.21
		2,600	8	Ton	330	28	9,240	1,386	13.20	10.37	1.56
		-	8	Ton				0	0.00	0.00	0.00

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Building Waste	9,500	-	10	CY	950	28	26,600	3,990	38.00	29.85	4.48
Power Lines		-	-	-	7	31	217	33	0.31	0.24	0.04
Treated wood		700	10	Ton	70	140	9,800	1,470	14.00	11.00	1.65
Wood Utility Poles		-	-	-	7	31	217	33	0.31	0.24	0.04
Total					2,294	35.0			70.53	55.40	8.31
Iron Gate											
Earth	170,000	-	22	CY	7,730	0.25	1,933	290	1.11	0.87	0.13
	1,087,000	-	22	CY	49,410	1	49,410	7,412	28.29	22.22	3.33
Concrete	20,700	-	20	CY	1,040	1	1,040	156	0.60	0.47	0.07
		-	20	CY				0	0.00	0.00	0.00
		-	20	CY				0	0.00	0.00	0.00
Rebar		1,000	10	Ton	100	27	2,700	405	1.55	1.21	0.18
		-	10	Ton				0	0.00	0.00	0.00
		-	10	Ton				0	0.00	0.00	0.00

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road milage (15%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Mech. and Elec Equip		1,200	8	Ton	150	27	4,050	608	2.32	1.82	0.27
		-	8	Ton				0	0.00	0.00	0.00
		-	8	Ton				0	0.00	0.00	0.00
Building Waste	2,300	-	10	CY	230	27	6,210	932	3.56	2.79	0.42
Power Lines		-	-	-	1	54	54	8	0.03	0.02	0.00
Treated wood		-	-	-				0	0.00	0.00	0.00
Wood Utility Poles		-	-	-							
Total					58,661	19.6			37.44	29.41	4.41

Truck Hauling (Exhaust) for the PP = Proposed Project; CO = Continued Operations with Fish Passage;
2R = Two Dam Removal Alternative; 3R = Three Dam Removal Alternative; NH = No Hatchery Alternative
Exhaust emission rates shown on "EF Haul Truck Exhaust" worksheet

Alternative	Dam	Daily VMT	ROG (lbs/day)	NO _x (lbs/day)	PM ₁₀ (lbs/day) ¹	PM _{2.5} (lbs/day)	SO _x (lbs/day)	CO (lbs/day)	CO ₂ (lbs/day)	CH ₄ (lbs/day)	N ₂ O (lbs/day)
PP, CO, 2R, 3R, NH	J.C. Boyle	24.15394737	0.006654017	0.254244515	0.002046416	0.001957889	0.036203515	0.000879165	93.05786842	0.000309062	0.014627401
CO	Copco No. 1	9.314281926	0.002565932	0.098042156	0.000789142	0.000755004	0.013960855	0.000339025	35.88511677	0.000119181	0.005640641
PP, 2R, 3R, NH	Copco No. 1 (35%)	3.259998674	0.000898076	0.034314755	0.0002762	0.000264251	0.004886299	0.000118659	12.55979087	4.17133E-05	0.001974224
	Copco No. 1 (8%)	0.745142554	0.000205275	0.007843373	6.31314E-05	6.04003E-05	0.001116868	2.7122E-05	2.870809342	9.53447E-06	0.000451251
	Copco No. 1 (57%)	5.309140698	0.001462581	0.055884029	0.000449811	0.000430352	0.007957687	0.000193244	20.45451656	6.79331E-05	0.003215165
PP, CO, 2R, 3R, NH	Copco No. 2	70.53428571	0.01943104	0.74244408	0.005975938	0.005717422	0.105721398	0.002567334	271.7473123	0.000902521	0.042714893
CO	Iron Gate	37.44074427	0.010314312	0.000108568	9.19834E-09	7.45606E-13	1.11756E-15	4.06775E-20	1.56718E-19	2.00529E-24	1.21438E-27
PP, 2R, 3R, NH	Iron Gate (35%)	13.1042605	0.003610009	3.7999E-05	3.21942E-09	2.60962E-13	3.91147E-16	1.42371E-20	5.48513E-20	7.0185E-25	4.25034E-28
	Iron Gate (8%)	2.995259542	0.000825145	8.68548E-06	7.35867E-10	5.96485E-14	8.94051E-17	3.2542E-21	1.25374E-20	1.60423E-25	9.71506E-29
	Iron Gate (57%)	21.34122424	0.005879158	6.1884E-05	5.24305E-09	4.24996E-13	6.37011E-16	2.31862E-20	8.93293E-20	1.14301E-24	6.92198E-28

Aggregate Storage Piles² for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative, and No Hatchery Alternative

Imported Fill (CY)	Imported Fill (tons)	Aggregate (lbs)	Aggregate (tons)	Excavation (CY)	Excavation (tons)	Activity Total (tons)	Material (Tons/day)	PM ₁₀ (lbs/day) ¹
J.C. Boyle								
1,750.00	2,800.00		0.00	123,000.00	196,800.00	199,600.00	1,050.53	0.56
Copco No. 1								
10,400.00	16,640.00		0.00		0.00	16,640.00	43.00	0.02
Copco No. 2								
	0.00		0.00	2,100.00	3,360.00	3,360.00	32.00	0.02
Iron Gate								
3,312.50	5,300.00		0.00	278,700.00	445,920.00	451,220.00	1,722.21	0.92

Notes

- ¹ Calculation using emission factor for PM10 shown on "Fugitive Dust Emission Factors" worksheet.
- ² Emission estimates for fugitive dust from material movement were based on the material totals for all material import, aggregate, and waste exported. These are the activities that would result in on-site fugitive dust emissions. Values of 0.0 indicate that no material import/export would be required for that particular construction activity. Values of NA indicate that a particulate construction activity is Not Applicable to the respective CP.
- ³ Equipment activity data was provided for the entire phase of dam demolition for four dams. For Copco No. 1 and for Iron Gate, equipment activity data was broken down proportionally into subphases of early demo, powerhouse demo, and the remaining for primary dam demolition. This assumption is conservative and applies to all emissions calculations associated with dam demolition.

Construction Activity (grading and earthmoving) for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative, and No Hatchery Alternative

Grading Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Grading Equipment																											
	Equipment Hours	Dust Emissions	Equipment Hours			Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions
	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)
Dozer, 80 H.P.										1.61	1	0.77															
Dozer (235hp)(CATD7)																											
D6 DOZER													20	2	19.00	20	0.7	6.65	20	0.30	2.85	20	2.00	19.00			
D8 DOZER												1.34	1.00	0.63	20	2	19.00	20	0.7	6.65	20	0.30	2.85	20	3.00	28.50	
Dozer Total			0.05			0.01			1.24			1.83			0.63			38.00			13.30			5.70			47.50
Articulated Frame Grader Cat 12H 140HP	0.28	1.00	0.13	0.05	1	0.02																					
CAT 14H MOTORGRADER															20	1	9.50	20	0.7	6.65	20	0.30	2.85	20	2.00	19.00	

Grading Equipment	Fall Creek Hatchery		Iron Gate Hatchery				Construction access, road, bridge, and culvert improvements			Recreation Facilities Removal			Yreka Water Supply Pipeline Relocation			J.C. Boyle			Copco No. 1			Copco No. 2			Iron Gate		
	Equipment Hours	Dust Emissions	Equipment Hours			Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions	Equipment Hours		Dust Emissions
	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)	Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)
Grader Total			0.13			0.02			0.00			0.00			0.00			9.50			6.65			2.85			19.00
PRE-DAM AND DAM DEMO TOTAL			0.18			0.03			1.24			1.83			0.63			47.50			19.95			8.55			66.49
Restoration																											
CAT D6 DOZER																10.0	1	4.75	10.0	0.7	3.32	10.0	0.3	1.42	10.0	1	4.75
Dozer Total			0.00			0.00			0.00			0.00			0.00			4.75			3.32			1.42			4.75
NA																											
Grader Total			0.00			0.00			0.00			0.00			0.00			0.00			0.00			0.00			0.00
RESTORATION TOTAL			0.00			0.00			0.00			0.00			0.00			4.75			3.32			1.42			4.75

Summary of Off-Road Fugitive Dust Emissions (lbs/day) for the PP = Proposed Project; CO = Continued Operations with Fish Passage;
2R = Two Dam Removal Alternative; 3R = Three Dam Removal Alternative

						PP,CO, 2R, 3R	CO	PP, 2R, 3R Only			PP,CO, 2R, 3R	CO	PP, 2R, 3R Only		
	Fall Creek Hatchery	Iron Gate Hatchery	Construction access, road, bridge, and culvert improvements	Recreation Facilities Removal	Yreka Water Supply Pipeline Relocation	J.C. Boyle	Copco No. 1	Copco No. 1 (35%) ²	Copco No. 1 (8%)	Copco No. 1 (57%)	Copco No. 2	Iron Gate	Iron Gate (35%)	Iron Gate (8%)	Iron Gate (57%)
Construction Activity PM ₁₀ Fugitive Dust (lbs/day)															
Dam Demolition	0.18	0.03	1.24	1.83	0.63	67.0	27.3	9.6	2.2	15.6	64.0	96.8	33.9	7.7	55.2
Restoration	0.00	0.00	0.00	0.00	0.00	4.7	3.3				1.4	4.7			
PM _{2.5} Fugitive Dust (lbs/day) ¹															
Dam Demolition	0.02	0.00	0.12	0.18	0.06	6.70	2.7	1.0	0.2	1.6	6.40	9.68	3.4	0.8	5.5
Restoration	0.00	0.00	0.00	0.00	0.00	0.47	0.3				0.14	0.47			

Activity Work Days (used for above calculations)

Activity	J.C. Boyle	Copco No. 1	Copco No. 2	Iron Gate	Restoration
Demolition	190	387	105	262	
Restoration					414

¹ Fugitive Dust PM_{2.5} was calculated based on a 0.1 ratio of PM_{2.5}/PM¹⁰ as indicated in EPA 2006 AP-42 Background Document for Revisions to Fine Fraction Ratios used for AP-42 Fugitive Dust Emission Factors

² Equipment activity data was provided for the entire phase of dam demolition for four dams. For Copco No. 1 and for Iron Gate, equipment activity data was broken down proportionally into subphases of early demo, powerhouse demo, and the remaining for primary dam demolition. This assumption is conservative and applies to all emissions calculations associated with dam demolition.

On-Road Emissions for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, and Three Dam Removal Alternative

Truck Hauling (Dust)^{1,2}

Emission factor used is equation for travel on paved roads shown on worksheet "EF Fugitive Dust"

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
J.C. Boyle											
Earth	123,000	-	22	CY	5,590	0.5	2,795	2,376	12.50	0.02	0.00
	7,800	-	22	CY	350	4.0	1,400	1,190	6.26	0.01	0.00
Concrete	6,100	-	22	CY	280	2.0	560	476	2.51	0.00	0.00
	43,200	-	22	CY	1,960	1.0	1,960	1,666	8.77	0.02	0.00
	2,600	-	22	CY	120	2.0	240	204	1.07	0.00	0.00
Rebar	-	200	10	Ton	20	22.0	440	374	1.97	0.00	0.00
	-	3,800	10	Ton	380	24.0	9,120	7,752	40.80	0.07	0.01
	-	100	10	Ton	10	26.0	260	221	1.16	0.00	0.00
Mech. and Elec Equip	-	700	8	Ton	90	22.0	1,980	1,683	8.86	0.02	0.00
	-	300	8	Ton	40	24.0	960	816	4.29	0.01	0.00
	-	1,500	8	Ton	190	26.0	4,940	4,199	22.10	0.04	0.01
Building Waste	2,700	-	10	CY	270	22.0	5,940	5,049	26.57	0.05	0.01

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Power Lines	-	-	-	-				0	0.00	0.00	0.00
Treated Wood	-	-	-	-				0	0.00	0.00	0.00
Wood Utility Poles	-	-	-	-				0	0.00	0.00	0.00
Total									136.87	0.24	0.04
Copco No. 1											
Earth		-	-	-	-	-		0	0.00	0.00	0.00
		-	-	-	-	-		0	0.00	0.00	0.00
Concrete	104,000	-	22	CY	4,730	1	4,730	4,021	10.39	0.02	1.56
		-	22	CY	-	-		0	0.00	0.00	0.00
		-	22	CY	-	-		0	0.00	0.00	0.00
Rebar		1,000	10	Ton	100	31	3,100	2,635	6.81	0.01	1.02
		-	10	Ton	-	-		0	0.00	0.00	0.00
		-	10	Ton	-	-		0	0.00	0.00	0.00

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Mech. and Elec Equip		1100	8	Ton	140	70	9,800	8,330	21.52	0.04	3.23
		-	8	Ton	-	-		0	0.00	0.00	0.00
		-	8	Ton	-	-		0	0.00	0.00	0.00
Building Waste	1,700	-	10	CY	170	31	5,270	4,480	11.57	0.02	1.74
Power Lines		-	-	-				0	0.00	0.00	0.00
Treated Wood		-	-	-	5	31	155	132	0.34	0.00	0.05
Wood Utility Poles		-	-	-	8	31	248	211	0.54	0.00	0.08
Total									51.18	0.09	7.68
Copco No. 2											
Earth	2,100	-	22	CY	100	1	100	85	0.81	0.00	0.00
	-	-	22	CY				0	0.00	0.00	0.00
Concrete	16,600	-	22	CY	750	1	750	638	6.07	0.01	0.00
	-	-	22	CY				0	0.00	0.00	0.00
	-	-	22	CY				0	0.00	0.00	0.00

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Rebar	-	300	10	Ton	30	31	930	791	7.53	0.01	0.00
	-	100	10	Ton	10	28	280	238	2.27	0.00	0.00
	-	-	10	Ton				0	0.00	0.00	0.00
Mech. and Elec Equip	-	300	8	Ton	40	31	1,240	1,054	10.04	0.02	0.00
	-	2,600	8	Ton	330	28	9,240	7,854	74.80	0.13	0.02
	-	-	8	Ton				0	0.00	0.00	0.00
Building Waste	9,500	-	10	CY	950	28	26,600	22,610	215.33	0.38	0.06
Power Lines	-	-	-	-	7	31	217	184	1.76	0.00	0.00
Treated Wood	-	700	10	Ton	70	140	9,800	8,330	79.33	0.14	0.02
Wood Utility Poles	-	-	-	-	7	31	217	184	1.76	0.00	0.00
Total									399.69	0.71	0.11
Iron Gate											
Earth	170,000	-	22	CY	7,730	0.25	1,933	1,643	6.27	0.01	0.00
	1,087,000	-	22	CY	49,410	1	49,410	41,999	160.30	0.29	0.04

	CY	Ton	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Concrete	20,700	-	20	CY	1,040	1	1,040	884	3.37	0.01	0.00
	-	-	20	CY				0	0.00	0.00	0.00
	-	-	20	CY				0	0.00	0.00	0.00
Rebar	-	1,000	10	Ton	100	27	2,700	2,295	8.76	0.02	0.00
	-	-	10	Ton				0	0.00	0.00	0.00
	-	-	10	Ton				0	0.00	0.00	0.00
Mech. and Elec Equip	-	1,200	8	Ton	150	27	4,050	3,443	13.14	0.02	0.00
	-	-	8	Ton				0	0.00	0.00	0.00
	-	-	8	Ton				0	0.00	0.00	0.00
Building Waste	2,300	-	10	CY	230	27	6,210	5,279	20.15	0.04	0.01
Power Lines	-	-	-	-	1	54	54	46	0.18	0.00	0.00
Treated Wood	-	-	-	-				0	0.00	0.00	0.00
Wood Utility Poles	-	-	-	-					0.00	0.00	0.00
Total									212.16	0.38	0.06

Truck Hauling (Exhaust) for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative

Exhaust emission rates shown on "EF Haul Truck Exhaust" worksheet

	Daily VMT	ROG (lbs/day)	NO _x (lbs/day)	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)	SO _x (lbs/day)	CO (lbs/day)	CO ₂ (lbs/day)	CH ₄ (lbs/day)	N ₂ O (lbs/day)
J.C. Boyle	136.8723684	0.037706095	1.440718917	0.011596358	0.011094705	0.205153253	0.004981933	527.327921	0.00175135	0.082888606
Copco No. 1	51.18229974	0.014099885	0.538745024	0.004336363	0.004148774	0.076715377	0.001862953	197.1899517	0.000654903	0.030995514
Copco No. 2	399.6942857	0.110109228	4.207183122	0.03386365	0.032398723	0.599087924	0.014548225	1539.901436	0.005114288	0.242051061
Iron Gate	212.1642176	0.058447766	0.000615221	5.21239E-08	4.2251E-12	6.33286E-15	2.30506E-19	8.88069E-19	1.13633E-23	6.8815E-27

Worker Commute Trip (Dust) for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative

Exhaust emission rates shown on "EF Worker Trip Exhaust" worksheet

	# Workers/day	Maximum Trip Length ⁴	Daily VMT (miles) ⁵	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
J.C. Boyle	45	58.6	5,274	1.925293849	0.3
Copco No. 1	55	58.6	6,446	2.353136926	0.4
Copco No. 2	40	58.47	4,678	1.70757575	0.3
Iron Gate	80	46.4	7,424	2.710159563	0.4

Notes:

- ¹ Daily Truck Hauling trips based on total material import/export required for each dam
- ² Eighty-five percent of truck hauling mileage would occur on paved roads
- ⁴ Maximum trip length obtained from client
- ⁵ Daily VMT by workers = # workers * trips per worker * trip length

Worker Commute Trips (Exhaust) for the Proposed Project, Continued Operations with Fish Passage Alternative, Two Dam Removal Alternative, and Three Dam Removal Alternative
Exhaust emission rates shown on "EF Worker Trip Exhaust" worksheet

	# Workers/day	Daily VMT (miles)	ROG (lbs/day)	NO _x (lbs/day)	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)	SO _x (lbs/day)	CO (lbs/day)	CO ₂ (lbs/day)	CH ₄ (lbs/day)	N ₂ O (lbs/day)
J.C. Boyle	45	5,274	0.312043351	1.281980242	0.027923365	0.025745531	13.29082984	0.037100187	3750.36178	0.069707224	0.101133903
Copco No. 1	55	6,446	0.381386318	1.56686474	0.034128558	0.03146676	16.24434758	0.045344673	4583.775508	0.085197718	0.123608104
Copco No. 2	40	4,678	0.276756538	1.137010007	0.024765706	0.022834148	11.78786228	0.032904785	3326.259435	0.061824519	0.089697373
Iron Gate	80	7,424	0.439251013	1.804592589	0.039306611	0.03624096	18.70897246	0.052224458	5279.235088	0.098124086	0.142362173

**Summary of On-Road Fugitive Dust Emissions (lbs/day) for the PP = Proposed Project; CO = Continued Operations with Fish Passage;
2R = Two Dam Removal Alternative; 3R = Three Dam Removal Alternative**

		PM ₁₀ Fugitive Dust (lbs/day)	PM _{2.5} Fugitive Dust (lbs/day) ¹
PP, CO, 2R, 3R	J.C. Boyle	2.17	0.33
CO	Copco No. 1	2.44	8.03
PP, 2R, 3R	Copco No. 1 (35%)	0.86	2.81
	Copco No. 1 (8%)	0.20	0.64
	Copco No. 1 (57%)	1.39	4.58
PP, CO, 2R, 3R	Copco No. 2	2.42	0.36
CO	Iron Gate	3.09	0.46
PP, 2R, 3R	Iron Gate (35%)	1.08	0.16
	Iron Gate (8%)	0.25	0.04
	Iron Gate (57%)	1.76	0.26

Summary of On-Road Exhaust Emissions (lbs/day) PP = Proposed Project; CO = Continued Operations with Fish Passage; 2R = Two Dam Removal Alternative; 3R = Three Dam Removal Alternative

		ROG (lbs/day)	NO_x (lbs/day)	PM₁₀ (lbs/day)	PM_{2.5} (lbs/day)	SO_x (lbs/day)	CO (lbs/day)	CO₂ (lbs/day)	CH₄ (lbs/day)	N₂O (lbs/day)
PP, CO, 2R, 3R	J.C. Boyle	0.35	2.72	0.04	0.04	13.50	0.04	4277.69	0.07	0.18
CO	Copco No. 1	0.40	2.11	0.04	0.04	16.32	0.05	4780.97	0.09	0.15
PP, 2R, 3R	Copco No. 1 (35%)	0.14	0.74	0.01	0.01	5.71	0.02	1673.34	0.03	0.05
	Copco No. 1 (8%)	0.03	0.17	0.00	0.00	1.31	0.00	382.48	0.01	0.01
	Copco No. 1 (57%)	0.23	1.20	0.02	0.02	9.30	0.03	2725.15	0.05	0.09
PP, CO, 2R, 3R	Copco No. 2	0.39	5.34	0.06	0.06	12.39	0.05	4866.16	0.07	0.33
CO	Iron Gate	0.50	1.81	0.04	0.04	18.71	0.05	5279.24	0.10	0.14
PP, 2R, 3R	Iron Gate (35%)	0.17	0.63	0.01	0.01	6.55	0.02	1847.73	0.03	0.05
	Iron Gate (8%)	0.04	0.14	0.00	0.00	1.50	0.00	422.34	0.01	0.01
	Iron Gate (57%)	0.28	1.03	0.02	0.02	10.66	0.03	3009.16	0.06	0.08

On- and Off-Road Emissions for Partial Removal Alternative

Off-Road Dust Emissions

Truck Hauling (Dust)

Emission factor used is equation for travel on paved roads shown on worksheet "EF Fugitive Dust"

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM10 (lbs/day)	PM2.5 (lbs/day)
J.C. Boyle														
Earth	123,000	-	1.0	123,000	CY	22	CY	5,590	0.5	2,795	419	2.21	1.73	0.26
	7,800	-	1.0	7,800	CY	22	CY	350	4.0	1,400	210	1.11	0.87	0.13
Concrete	6,100	-	0.1	719	CY	22	CY	30	2.0	60	9	0.05	0.04	0.01
	43,200	-	0.1	5,089	CY	22	CY	230	1.0	230	35	0.18	0.14	0.02
	2,600	-	0.1	306	CY	22	CY	10	2.0	20	3	0.02	0.01	0.00
Rebar	-	200	0	0	Ton	10	Ton	0	22.0	0	0	0.00	0.00	0.00
	-	3,800	0	0	Ton	10	Ton	0	24.0	0	0	0.00	0.00	0.00
	-	100	0	0	Ton	10	Ton	0	26.0	0	0	0.00	0.00	0.00
Mech. and Elec Equip	-	700	0.3	210	Ton	8	Ton	30	22.0	660	99	0.52	0.41	0.06
	-	300	0.3	90	Ton	8	Ton	10	24.0	240	36	0.19	0.15	0.02
	-	1,500	0.3	450	Ton	8	Ton	60	26.0	1,560	234	1.23	0.97	0.15
Building Waste	2,700		0.0	0	CY	10	CY	0	22.0	0	0	0.00	0.00	0.00
Power Lines	-	-	1.0	-	-	-	-				0	0.00	0.00	0.00

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM10 (lbs/day)	PM2.5 (lbs/day)
Treated Wood	-	-	0	-	-	-	-				0	0.00	0.00	0.00
Wood Utility Poles	-	-	0	-	-	-	-				0	0.00	0.00	0.00
Total								6,310	14.6			5.50	4.32	0.65
Copco No. 1														
Earth	-	-	0.00	-	-	-	-	-	-		0	0.00	0.00	0.00
	-	-	0.00	-	-	-	-	-	-		0	0.00	0.00	0.00
Concrete	104,000	-	1.00	104,000	CY	22	CY	4,730	1	4,730	710	1.83	1.44	0.28
	-	-	1.00	-	CY	22	CY	-	-		0	0.00	0.00	0.00
	-	-	1.00	-	CY	22	CY	-	-		0	0.00	0.00	0.00
Rebar	-	1,100	1.00	1,100	Ton	10	Ton	110	31	3,410	512	1.32	1.04	0.20
	-	-	1.00	-	Ton	10	Ton	-	-		0	0.00	0.00	0.00
	-	-	1.00	-	Ton	10	Ton	-	-		0	0.00	0.00	0.00
Mech. and Elec Equip	-	1,100	0.10	110	Ton	8	Ton	10	70	700	105	0.27	0.21	0.04
	-	-	0.10	-	Ton	8	Ton	-	-		0	0.00	0.00	0.00
	-	-	0.10	-	Ton	8	Ton	-	-		0	0.00	0.00	0.00

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM10 (lbs/day)	PM2.5 (lbs/day)
Building Waste	1,700	-	0.00	0	CY	10	CY	0	31	0	0	0.00	0.00	0.00
Power Lines	-	-	1.00	-	-	-	-	-	-		0	0.00	0.00	0.00
Treated Wood	-	-	0.00	-	-	-	-	-	-		0	0.00	0.00	0.00
Wood Utility Poles	-	-	0.00	-	-	-	-				0	0.00	0.00	0.00
Total								4,850	33.3			3.43	2.69	0.51
Copco No. 2														
Earth	2,100	-	1.0	2,100	CY	22	CY	100	1	100	15	0.14	0.11	0.02
	-	-	1.0	-	CY	22	CY				0	0.00	0.00	0.00
Concrete	16,600	-	0.5	8,300	CY	22	CY	380	1	380	57	0.54	0.43	0.06
	-	-	0.5	-	CY	22	CY				0	0.00	0.00	0.00
	-	-	0.5	-	CY	22	CY				0	0.00	0.00	0.00
Rebar	-	300	0.8	240	Ton	10	Ton	20	31	620	93	0.89	0.70	0.10
	-	100	0.8	80	Ton	10	Ton	10	28	280	42	0.40	0.31	0.05
	-	-	0.8	-	Ton	10	Ton				0	0.00	0.00	0.00

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM10 (lbs/day)	PM2.5 (lbs/day)
Mech. and Elec Equip	-	300	0.1	30	Ton	8	Ton	0	31	0	0	0.00	0.00	0.00
	-	2,600	0.1	260	Ton	8	Ton	30	28	840	126	1.20	0.94	0.14
	-	-	0.1	-	Ton	8	Ton				0	0.00	0.00	0.00
Building Waste	9,500	-	1.0	9,500	CY	10	CY	950	28	26,600	3,990	38.00	29.85	4.48
Power Lines	-	-	1.0	-	-	-	-	7	31	217	33	0.31	0.24	0.04
Treated Wood	-	700	1.0	700	Ton	10	Ton	70	140	9,800	1,470	14.00	11.00	1.65
Wood Utility Poles	-	-	0.0	-	-	-	-		31			0.00	0.00	0.00
Total								1,567	35.0			55.48	43.58	6.54
Iron Gate														
Earth	170,000	-	1.0	170,000	CY	22	CY	7,730	0.25	1,933	290	1.11	0.87	0.13
	1,087,000	-	1.0	1,087,000	CY	22	CY	49,410	1	49,410	7,412	28.29	22.22	3.33
Concrete	20,700	-	0.8	16,560	CY	20	CY	830	1	830	125	0.48	0.37	0.06
	-	-	0.8	-	CY	20	CY				0	0.00	0.00	0.00
	-	-	0.8	-	CY	20	CY				0	0.00	0.00	0.00

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (15%/total)	Daily VMT	PM10 (lbs/day)	PM2.5 (lbs/day)
Rebar	-	1,000	0.8	800	Ton	10	Ton	80	27	2,160	324	1.24	0.97	0.15
	-	-	0.8	-	Ton	10	Ton				0	0.00	0.00	0.00
	-	-	0.8	-	Ton	10	Ton				0	0.00	0.00	0.00
Mech. and Elec Equip	-	1,200	0.8	960	Ton	8	Ton	120	27	3,240	486	1.85	1.46	0.22
	-	-	0.8	-	Ton	8	Ton				0	0.00	0.00	0.00
	-	-	0.8	-	Ton	8	Ton				0	0.00	0.00	0.00
Building Waste	2,300	-	0.8	1,840	CY	10	CY	180	27	4,860	729	2.78	2.19	0.33
Power Lines	-	-	1.0	-	-	-	-	1	54	54	8	0.03	0.02	0.00
Treated Wood	-	-	0.0	-	-	-	-	-	-		0	0.00	0.00	0.00
Wood Utility Poles	-	-	0.0	-	-	-	-					0.00	0.00	0.00
Total								58,351	19.6			35.77	28.10	4.21

Off-Road Exhaust Emissions for the Partial Removal Alternative
Truck Hauling (Exhaust)
Exhaust emission rates shown on "EF Haul Truck Exhaust" worksheet

	Daily VMT	ROG (lbs/day)	NO _x (lbs/day)	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)	SO _x (lbs/day)	CO (lbs/day)	CO ₂ (lbs/day)	CH ₄ (lbs/day)	N ₂ O (lbs/day)
J.C. Boyle	5.498684211	0.001514797	0.057879165	0.00046587	0.000445717	0.008241787	0.000200143	21.1847705	7.03584E-05	0.003329951
Copco No. 1	3.426356589	0.000943905	0.036065839	0.000290294	0.000277736	0.005135647	0.000124714	13.2007177	4.38419E-05	0.002074969
Copco No. 1 (35%) ¹	1.199224806	0.000330367	0.012623044	0.000101603	9.72077E-05	0.001797477	4.36498E-05	4.620251196	1.53447E-05	0.000726239
Copco No. 1 (8%)	0.274108527	7.55124E-05	0.002885267	2.32235E-05	2.22189E-05	0.000410852	9.97711E-06	1.056057416	3.50736E-06	0.000165998
Copco No. 1 (57%)	1.953023256	0.000538026	0.020557528	0.000165468	0.00015831	0.002927319	7.10869E-05	7.524409091	2.49899E-05	0.001182732
Copco No. 2	55.48142857	0.015284225	0.583997666	0.004700602	0.004497256	0.083159192	0.002019434	213.7531974	0.000709913	0.033599026
Iron Gate	35.77471374	0.009855348	0.000103737	8.78904E-09	7.12428E-13	1.06783E-15	3.88674E-20	1.49745E-19	1.91606E-24	1.16035E-27
Iron Gate (35%)	12.52114981	0.003449372	3.63081E-05	3.07616E-09	2.4935E-13	3.73742E-16	1.36036E-20	5.24106E-20	6.7062E-25	4.06121E-28
Iron Gate (8%)	2.861977099	0.000788428	8.29899E-06	7.03123E-10	5.69943E-14	8.54267E-17	3.10939E-21	1.19796E-20	1.53284E-25	9.28276E-29
Iron Gate (57%)	20.39158683	0.005617548	5.91303E-05	5.00975E-09	4.06084E-13	6.08666E-16	2.21544E-20	8.53544E-20	1.09215E-24	6.61397E-28

¹ Equipment activity data was provided for the entire phase of dam demolition for four dams. For Copco No. 1 and for Iron Gate, equipment activity data was broken down proportionally into subphases of early demo, powerhouse demo, and the remaining for primary dam demolition. This assumption is conservative and applies to all emissions calculations associated with dam demolition.

Aggregate Storage Piles for the Partial Removal Alternative

	Imported Fill (CY)	Imported Fill (tons)	Aggregate (lbs)	Aggregate (tons)	Excavation (CY)	Excavation (tons)	Activity Total (tons)	Material (Tons/day)	PM ₁₀ (lbs/day) ¹
J.C. Boyle									
Construction Activity ²	1,750.00	2,800.00		0.00	123,000.00	196,800.00	199,600.00	1,050.53	0.56
Copco No. 1									
Construction Activity ²	10,400.00	16,640.00		0.00		0.00	16,640.00	43.00	0.02
Copco No. 2									
Construction Activity ²		0.00		0.00	2,100.00	3,360.00	3,360.00	32.00	0.02
Iron Gate									
Construction Activity ²	3,312.50	5,300.00		0.00	278,700.00	445,920.00	451,220.00	1,722.21	0.92

Conversion Rates	Source
2000 lbs/ton	google.com
1.6 cy/ton	calculatorsoup.com

- Notes
- ¹ Calculation using emission factor for PM10 shown on "Fugitive Dust Emission Factors" worksheet.
 - ² Emission estimates for fugitive dust from material movement were based on the material totals for all material import, aggregate, and waste exported. These are the activities that would result in on-site fugitive dust emissions. Values of 0.0 indicate that no material import/export would be required for that particular construction activity. Values of NA indicate that a particulate construction activity is Not Applicable to the respective CP.

Off-Road Construction Activity (grading and earthmoving) for the Partial Removal Alternative

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours	Equipment Hours	Dust Emissions
		Daily Hours (avg)	Equip Quantity	PM₁₀ (lbs/day)
Fall Creek Hatchery				
	Standard Crawler Dozer Cat. D6R 165HP	0.11	1	0.05
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER			
Dozer Total				0.05
	Articulated Frame Grader Cat 12H 140HP	0.28	1.00	0.13
	CAT 14H MOTORGRADER			
Grader Total				0.13
PRE-DAM AND DAM DEMO TOTAL				0.18
Restoration				
	CAT D6 DOZER			
Dozer Total				0.00
	NA			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
Grader Total				0.00
RESTORATION TOTAL				0.00
Iron Gate Hatchery				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP	0.01	1	0.00
	Standard Crawler Dozer Cat. D6R 165HP	0.01	1	0.00
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER			
Dozer Total				0.01
	Articulated Frame Grader Cat 12H 140HP	0.05	1	0.02
	CAT 14H MOTORGRADER			
Grader Total				0.02
PRE-DAM AND DAM DEMO TOTAL				0.03
Restoration				
	CAT D6 DOZER			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
Dozer Total				0.00
	NA			
Grader Total				0.00
RESTORATION TOTAL				0.00
Construction access, road, bridge, and culvert improvements				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.	2.61	1	1.24
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours	Equipment Hours	Dust Emissions
		Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)
Dozer Total				
	Articulated Frame Grader Cat 12H 140HP			1.24
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP			
Grader Total				0.00
PRE-DAM AND DAM DEMO TOTAL				1.24
Restoration				
	CAT D6 DOZER			
Dozer Total				0.00
	NA			
Grader Total				0.00
RESTORATION TOTAL				0.00

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
Recreation Facilities Removal				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.	1.86	1	0.88
	Dozer, 80 H.P.	0.39	1	0.19
	Dozer (235hp)(CATD7)	1.61	1	0.77
	D6 DOZER			
	D8 DOZER			
Dozer Total				
	Articulated Frame Grader Cat 12H 140HP			1.83
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours	Equipment Hours	Dust Emissions
		Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)
Grader Total				0.00
PRE-DAM AND DAM DEMO TOTAL				1.83
Restoration				
	CAT D6 DOZER			
Dozer Total				0.00
	NA			
Grader Total				0.00
RESTORATION TOTAL				0.00
Yreka Water Supply Pipeline Relocation				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
	D6 DOZER			
	D8 DOZER			
Dozer Total		1.34	1.00	0.63
	Articulated Frame Grader Cat 12H 140HP			0.63
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP			
Grader Total				0.00
PRE-DAM AND DAM DEMO TOTAL				0.63
Restoration				
	CAT D6 DOZER			
Dozer Total				0.00
	NA			
Grader Total				0.00
RESTORATION TOTAL				0.00
J.C. Boyle				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER	14	2	13.30
Dozer Total		14	2	13.30
	Articulated Frame Grader Cat 12H 140HP			26.60
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP	14	1	6.65
Grader Total				6.65
PRE-DAM AND DAM DEMO TOTAL				33.25
Restoration				
	CAT D6 DOZER	10.0	0.7	3.32
Dozer Total				3.32
	NA			
Grader Total				0.00
RESTORATION TOTAL				3.32

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
Copco No. 1				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER	18	0.7	5.98
Dozer Total		18	0.7	5.98
	Articulated Frame Grader Cat 12H 140HP			11.97
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP	18	0.7	5.98
Grader Total				5.98
PRE-DAM AND DAM DEMO TOTAL				17.95

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
Restoration				
	CAT D6 DOZER	10.0	0.7	3.32
Dozer Total				3.32
	NA			
Grader Total				0.00
RESTORATION TOTAL				3.32
Copco No. 2				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER	16	0.30	2.28
Dozer Total		16	0.30	2.28

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours Daily Hours (avg)	Equipment Hours Equip Quantity	Dust Emissions PM ₁₀ (lbs/day)
	Articulated Frame Grader Cat 12H 140HP			4.56
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP	16	0.30	2.28
Grader Total				2.28
PRE-DAM AND DAM DEMO TOTAL				6.84
Restoration				
	CAT D6 DOZER	10.0	0.3	1.42
Dozer Total				1.42
	NA			
Grader Total				0.00
RESTORATION TOTAL				1.42
Iron Gate				
	Standard Crawler Dozer Cat. D6R 165HP			
	Standard Crawler Dozer Cat. D4C 81HP			
	Standard Crawler Dozer Cat. D6R 165HP			
	Dozer, 105 H.P.			
	Dozer, 200 H.P.			
	Dozer, 300 H.P.			
	Dozer, 80 H.P.			

Pre-Dam and Dam Demolition	Grading Equipment	Equipment Hours	Equipment Hours	Dust Emissions
		Daily Hours (avg)	Equip Quantity	PM ₁₀ (lbs/day)
	Dozer (235hp)(CATD7)			
	D6 DOZER			
	D8 DOZER	16	2.00	15.20
Dozer Total		16	3.00	22.80
	Articulated Frame Grader Cat 12H 140HP			38.00
	CAT 14H MOTORGRADER			
	Standard Crawler Dozer Cat. D6R 165HP	16	2.00	15.20
Grader Total				15.20
PRE-DAM AND DAM DEMO TOTAL				53.20
Restoration				
	CAT D6 DOZER	10.0	1	4.75
Dozer Total				4.75
	NA			
Grader Total				0.00
RESTORATION TOTAL				4.75

Summary of Off-Road Fugitive Dust Emissions (lbs/day) for the Partial Removal Alternative
Construction Activity

	Fall Creek Hatchery	Iron Gate Hatchery	Construction access, road, bridge, and culvert improvements	Recreation Facilities Removal	Yreka Water Supply Pipeline Relocation	J.C. Boyle	Copco No. 1	Copco No. 1 (35%)	Copco No. 1 (8%)	Copco No. 1 (57%)	Copco No. 2	Iron Gate	Iron Gate (35%)	Iron Gate (8%)	Iron Gate (57%)
PM ₁₀ Fugitive Dust (lbs/day)															
Dam Demolition	0.18	0.03	1.24	1.83	0.63	38.1	20.7	7.2	1.7	11.8	50.4	82.2	28.8	6.6	46.9
Restoration	0.00	0.00	0.00	0.00	0.00	3.3	3.3				1.4	4.7			
PM _{2.5} Fugitive Dust (lbs/day) ¹															
Dam Demolition	0.02	0.00	0.12	0.18	0.06	3.81	2.1	0.7	0.2	1.2	5.04	8.22	2.9	0.7	4.7
Restoration	0.00	0.00	0.00	0.00	0.00	0.33	0.3				0.14	0.47			

On-Road Dust Emissions for the Partial Removal AlternativeTruck Hauling (Dust) ^{1,2}

Emission factor used is equation for travel on paved roads shown on worksheet "EF Fugitive Dust"

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
J.C. Boyle														
Earth	123,000	-	1.0	123,000	CY	22	CY	5,590	0.5	2,795	2,376	12.50	0.02	0.00
	7,800	-	1.0	7,800	CY	22	CY	350	4.0	1,400	1,190	6.26	0.01	0.00
Concrete	6,100	-	0.1	719	CY	22	CY	30	2.0	60	51	0.27	0.00	0.00
	43,200	-	0.1	5,089	CY	22	CY	230	1.0	230	196	1.03	0.00	0.00
	2,600	-	0.1	306	CY	22	CY	10	2.0	20	17	0.09	0.00	0.00
Rebar	-	200	0	0	Ton	10	Ton	0	22.0	0	0	0.00	0.00	0.00
	-	3,800	0	0	Ton	10	Ton	0	24.0	0	0	0.00	0.00	0.00
	-	100	0	0	Ton	10	Ton	0	26.0	0	0	0.00	0.00	0.00
Mech. and Elec Equip	-	700	0.3	210	Ton	8	Ton	30	22.0	660	561	2.95	0.01	0.00
	-	300	0.3	90	Ton	8	Ton	10	24.0	240	204	1.07	0.00	0.00
	-	1,500	0.3	450	Ton	8	Ton	60	26.0	1,560	1,326	6.98	0.01	0.00
Building Waste	2,700	-	0.0	0	CY	10	CY	0	22.0	0	0	0.00	0.00	0.00
Power Lines	-	-	1.0	-	-	-	-				0	0.00	0.00	0.00
Treated Wood	-	-	0	-	-	-	-				0	0.00	0.00	0.00

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Wood Utility Poles	-	-	0	-	-	-	-				0	0.00	0.00	0.00
Total												31.16	0.06	0.01
Copo No. 1														
Earth	-	-	0.00	-	-	-	-	-	-		0	0.00	0.00	0.00
	-	-	0.00	-	-	-	-	-	-		0	0.00	0.00	0.00
Concrete	104,000	-	1.00	104,000	CY	22	CY	4,730	1	4,730	4,021	10.39	0.02	1.56
	-	-	1.00	-	CY	22	CY	-	-		0	0.00	0.00	0.00
	-	-	1.00	-	CY	22	CY	-	-		0	0.00	0.00	0.00
Rebar	-	1,100	1.00	1,100	Ton	10	Ton	110	31	3,410	2,899	7.49	0.01	1.12
	-	-	1.00	-	Ton	10	Ton	-	-		0	0.00	0.00	0.00
	-	-	1.00	-	Ton	10	Ton	-	-		0	0.00	0.00	0.00
Mech. and Elec Equip	-	1100	0.10	110	Ton	8	Ton	10	70	700	595	1.54	0.00	0.23
	-	-	0.10	-	Ton	8	Ton	-	-		0	0.00	0.00	0.00
	-	-	0.10	-	Ton	8	Ton	-	-		0	0.00	0.00	0.00
Building Waste	1700	-	0.00	0	CY	10	CY	0	31	0	0	0.00	0.00	0.00
Power Lines	-	-	1.00	-	-						0	0.00	0.00	0.00
Treated Wood	-	-	0.00	-	-	-	-		31		0	0.00	0.00	0.00
Wood Utility Poles	-	-	0.00	-	-	-	-		31			0.00	0.00	0.00

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Total												19.42	0.03	2.91
Copo No. 2														
Earth	2,100	-	1.0	2,100	CY	22	CY	100	1	100	85	0.81	0.00	0.00
	-	-	1.0	-	CY	22	CY				0	0.00	0.00	0.00
Concrete	16,600	-	0.5	8,300	CY	22	CY	380	1	380	323	3.08	0.01	0.00
	-	-	0.5	-	CY	22	CY				0	0.00	0.00	0.00
	-	-	0.5	-	CY	22	CY				0	0.00	0.00	0.00
Rebar	-	300	0.8	240	Ton	10	Ton	20	31	620	527	5.02	0.01	0.00
	-	100	0.8	80	Ton	10	Ton	10	28	280	238	2.27	0.00	0.00
	-	-	0.8	-	Ton	10	Ton				0	0.00	0.00	0.00
Mech. and Elec Equip	-	300	0.1	30	Ton	8	Ton	0	31	0	0	0.00	0.00	0.00
	-	2,600	0.1	260	Ton	8	Ton	30	28	840	714	6.80	0.01	0.00
	-	-	0.1	-	Ton	8	Ton				0	0.00	0.00	0.00
Building Waste	9,500	-	1.0	9,500	CY	10	CY	950	28	26,600	22,610	215.33	0.38	0.06
Power Lines	-	-	1.0	-	-	-	-	7	31	217	184	1.76	0.00	0.00
Treated Wood	-	700	1.0	700	Ton	10	CY	70	140	9,800	8,330	79.33	0.14	0.02
Wood Utility Poles	-	-	0.0	-	-	-	-		31			0.00	0.00	0.00
Total												314.39	0.56	0.08
Iron Gate														

	CY	Ton	Partial Removal Proportion	Partial Removal Quantity	Unit	Capacity	Unit	Total Trips	Miles (OW)	Total VMT	Off-road mileage (85%/total)	Daily VMT	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
Earth	170,000	-	1.0	170,000	CY	22	CY	7,730	0.25	1,933	1,643	6.27	0.01	0.00
	1,087,000	-	1.0	1,087,000	CY	22	CY	49,410	1	49,410	41,999	160.30	0.29	0.04
Concrete	20,700	-	0.8	16,560	CY	20	CY	830	1	830	706	2.69	0.00	0.00
	-	-	0.8	-	CY	20	CY				0	0.00	0.00	0.00
	-	-	0.8	-	CY	20	CY				0	0.00	0.00	0.00
Rebar	-	1,000	0.8	800	Ton	10	Ton	80	27	2,160	1,836	7.01	0.01	0.00
	-	-	0.8	-	Ton	10	Ton				0	0.00	0.00	0.00
	-	-	0.8	-	Ton	10	Ton				0	0.00	0.00	0.00
Mech. and Elec Equip	-	1,200	0.8	960	Ton	8	Ton	120	27	3,240	2,754	10.51	0.02	0.00
	-	-	0.8	-	Ton	8	Ton				0	0.00	0.00	0.00
	-	-	0.8	-	Ton	8	Ton				0	0.00	0.00	0.00
Building Waste	2,300	-	0.8	1,840	CY	10	CY	180	27	4,860	4,131	15.77	0.03	0.00
Power Lines	-	-	1.0	-	-	-	-	1	54	54	46	0.18	0.00	0.00
Treated Wood	-	-	0.0	-	-	-	-				0	0.00	0.00	0.00
Wood Utility Poles	-	-	0.0	-	-	-	-				0	0.00	0.00	0.00
Total												202.72	0.36	0.05

On-Road Exhaust Emissions for the Partial Removal Alternative
Truck Hauling (Exhaust)
Exhaust emission rates shown on "EF Haul Truck Exhaust" worksheet

	Daily VMT	ROG (lbs/day)	NO _x (lbs/day)	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)	SO _x (lbs/day)	CO (lbs/day)	CO ₂ (lbs/day)	CH ₄ (lbs/day)	N ₂ O (lbs/day)
J.C. Boyle	31.15921053	0.008583852	0.327981933	0.002639929	0.002525727	0.046703462	0.001134145	120.0470328	0.000398698	0.018869722
Copco No. 1	19.41602067	0.005348796	0.204373086	0.001645001	0.001573839	0.029102001	0.000706712	74.80406698	0.000248438	0.011758158
Copco No. 1 (35%) ¹	6.795607235	0.001872078	0.07153058	0.00057575	0.000550843	0.0101857	0.000247349	26.18142344	8.69532E-05	0.004115355
Copco No. 1 (8%)	1.553281654	0.000427904	0.016349847	0.0001316	0.000125907	0.00232816	5.65369E-05	5.984325359	1.9875E-05	0.000940653
Copco No. 1 (57%)	11.06713178	0.003048814	0.116492659	0.00093765	0.000897088	0.016588141	0.000402826	42.63831818	0.000141609	0.00670215
Copco No. 2	314.3947619	0.086610607	3.309320106	0.026636743	0.02548445	0.471235422	0.011443461	1211.268119	0.004022838	0.19039448
Iron Gate	202.7233779	0.05584697	0.000587845	4.98045E-08	4.03709E-12	6.05106E-15	2.20249E-19	8.48552E-19	1.08577E-23	6.57529E-27
Iron Gate (35%)	70.95318225	0.019546439	0.000205746	1.74316E-08	1.41298E-12	2.11787E-15	7.70871E-20	2.96993E-19	3.80018E-24	2.30135E-27
Iron Gate (8%)	16.21787023	0.004467758	4.70276E-05	3.98436E-09	3.22968E-13	4.84085E-16	1.76199E-20	6.78842E-20	8.68612E-25	5.26023E-28
Iron Gate (57%)	115.5523254	0.031832773	0.000335072	2.83886E-08	2.30114E-12	3.4491E-15	1.25542E-19	4.83675E-19	6.18886E-24	3.74792E-27

¹ Equipment activity data was provided for the entire phase of dam demolition for four dams. For Copco No. 1 and for Iron Gate, equipment activity data was broken down proportionally into subphases of early demo, powerhouse demo, and the remaining for primaru dam demolition. This assumption is conservative and applies to all emissions calculations associated with dam demolition.

On-Road Worker Commute Trips (Dust) for the Partial Removal Alternative
Emission factor used is equation for travel on paved roads shown on worksheet "EF Fugitive Dust"

	# Workers/day	Maximum Trip Length ⁴	Daily VMT (miles) ⁵	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)
J.C. Boyle	45	58.6	5,274	1.925293849	0.3
Copco No. 1	55	58.6	6,446	2.353136926	0.4
Copco No. 2	40	58.47	4,678	1.70757575	0.3
Iron Gate	80	46.4	7,424	2.710159563	0.4

On-Road Worker Commute Trips (Exhaust) for the Partial Removal Alternative
Exhaust emission rates shown on "EF Worker Trip Exhaust" worksheet

	# Workers/day	Daily VMT (miles)	ROG (lbs/day)	NO _x (lbs/day)	PM ₁₀ (lbs/day)	PM _{2.5} (lbs/day)	SO _x (lbs/day)	CO (lbs/day)	CO ₂ (lbs/day)	CH ₄ (lbs/day)	N ₂ O (lbs/day)
J.C. Boyle	45	5,274	0.312043351	1.281980242	0.027923365	0.025745531	13.29082984	0.037100187	3750.36178	0.069707224	0.101133903
Copco No. 1	55	6,446	0.381386318	1.56686474	0.034128558	0.03146676	16.24434758	0.045344673	4583.775508	0.085197718	0.123608104
Copco No. 2	40	4,678	0.276756538	1.137010007	0.024765706	0.022834148	11.78786228	0.032904785	3326.259435	0.061824519	0.089697373
Iron Gate	80	7,424	0.439251013	1.804592589	0.039306611	0.03624096	18.70897246	0.052224458	5279.235088	0.098124086	0.142362173

Summary of On-Road Fugitive Dust Emissions (lbs/day) for the Partial Removal Alternative

	PM₁₀ Fugitive Dust (lbs/day)	PM_{2.5} Fugitive Dust (lbs/day)¹
J.C. Boyle	1.98	0.30
Copco No. 1	2.39	3.27
Copco No. 1 (35%)	0.84	1.14
Copco No. 1 (8%)	0.19	0.26
Copco No. 1 (57%)	1.36	1.86
Copco No. 2	2.27	0.34
Iron Gate	3.07	0.46
Iron Gate (35%)	1.07	0.16
Iron Gate (8%)	0.25	0.04
Iron Gate (57%)	1.75	0.26

Summary of On-Road Exhaust Emissions (lbs/day) for the Partial Removal Alternative

	ROG (lbs/day)	NO_x (lbs/day)	PM₁₀ (lbs/day)	PM_{2.5} (lbs/day)	SO_x (lbs/day)	CO (lbs/day)	CO₂ (lbs/day)	CH₄ (lbs/day)	N₂O (lbs/day)
J.C. Boyle	0.32	1.61	0.03	0.03	13.34	0.04	3870.41	0.07	0.12
Copco No. 1	0.39	1.77	0.04	0.03	16.27	0.05	4658.58	0.09	0.14
Copco No. 1 (35%)	0.14	0.62	0.01	0.01	5.70	0.02	1630.50	0.03	0.05
Copco No. 1 (8%)	0.03	0.14	0.00	0.00	1.30	0.00	372.69	0.01	0.01
Copco No. 1 (57%)	0.22	1.01	0.02	0.02	9.28	0.03	2655.39	0.05	0.08
Copco No. 2	0.36	4.45	0.05	0.05	12.26	0.04	4537.53	0.07	0.28
Iron Gate	0.50	1.81	0.04	0.04	18.71	0.05	5279.24	0.10	0.14
Iron Gate (35%)	0.17	0.63	0.01	0.01	6.55	0.02	1847.73	0.03	0.05
Iron Gate (8%)	0.04	0.14	0.00	0.00	1.50	0.00	422.34	0.01	0.01
Iron Gate (57%)	0.28	1.03	0.02	0.02	10.66	0.03	3009.16	0.06	0.08

Notes

- ¹ Daily Truck Hauling trips based on total material import/export required for each dam
² Eighty-five percent of truck hauling mileage would occur on paved roads
⁴ Maximum trip length obtained from client
⁵ Daily VMT by workers = # workers * trips per worker * trip length

Activity Work Days (used for above calculations) for the Partial Removal Alternative

Activity	J.C. Boyle	Copco No. 1	Copco No. 2	Iron Gate	Restoration
Demolition	190	387	105	262	
Restoration					414

Pre-dam Removal Activities for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative

Description	Comparable OFFROAD Equipment	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NOx (g/hr)	NOx (lb/day)	SOx (g/hr)	SOx (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
Seed Collection						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/2 TON PICKUP TRUCK		277	3	2.73	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL							0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
IEV Control						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAT 426 BACKHOE	Tractor/Loaders/ Backhoes	94	1	2.91	320	10.29	0.07	124.19	0.80	104.17	0.67	0.17	0.00	6.14	0.04	5.65	0.04	16,533.09	106.03	5.35	0.03	0.15	0.00
Tractor with Till/Disc Attachment (JD 6175)	Tractor/Loaders/ Backhoes	175	1	6.82	750	14.31	0.22	200.12	3.01	133.53	2.01	0.31	0.00	6.74	0.10	6.20	0.09	30,272.47	455.04	9.79	0.15	0.28	0.00
Truck, Pickup (4x4, 3/4tn)		450	6	10.91	1200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL							0.28		3.80		2.68		0.01		0.14		0.13		561.08		0.18		0.01
Construction access, road, bridge, and culvert improvements						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/2 TON PICKUP TRUCK		277	2	2.75	390	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Backhoe Loader, 48 H.P.	Tractor/Loaders/ Backhoes	48	1	0.56	80	888.00	1.10	13.43	0.02	87.05	0.11	75.06	0.09	0.09	0.00	4.52	0.01	4.16	0.01	9,148.55	11.36	2.96	0.00
Clamshell Bucket, 1 C.Y.	NA	0	1	4.49	637.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump (Small)	Pump	84	1	4.56	647.49	41.71	0.42	254.79	2.56	246.53	2.48	0.44	0.00	10.88	0.11	10.88	0.11	35,325.47	355.11	3.73	0.04	0.30	0.00
Crawler Crane, 25 Ton	Cranes	231	1	4.49	637.12	23.41	0.23	112.43	1.11	274.95	2.72	0.33	0.00	11.16	0.11	10.27	0.10	31,679.95	313.37	10.24	0.10	0.29	0.00
Crawler Crane, 40 Ton	Cranes	231	1	2.66	378.06	23.41	0.14	112.43	0.66	274.95	1.61	0.33	0.00	11.16	0.07	10.27	0.06	31,679.95	185.95	10.24	0.06	0.29	0.00
Crawler Crane, 75 Ton	Cranes	231	1	0.84	119.82	23.41	0.04	112.43	0.21	274.95	0.51	0.33	0.00	11.16	0.02	10.27	0.02	31,679.95	58.93	10.24	0.02	0.29	0.00
Dozer, 105 H.P.	Rubber Tired Dozer	105	1	2.61	370.46	29.03	0.17	161.62	0.93	285.20	1.64	0.21	0.00	16.23	0.09	14.93	0.09	19,864.95	114.25	6.43	0.04	0.18	0.00
Drill Rig, Truck-Mounted	Bore/Drill Rigs	221	1	14.88	2113.14	14.64	0.48	117.59	3.86	171.39	5.62	0.53	0.02	5.19	0.17	4.78	0.16	51,713.07	1,696.58	16.73	0.55	0.47	0.02

Description	Comparable OFFROAD Equipment	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NOx (g/hr)	NOx (lb/day)	SOx (g/hr)	SOx (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)	
Gas Engine Vibrator	Cement and Motar Mixer	5.5	1	6.08	862.99	2.04	0.03	0.00	0.00	14.10	0.19	3.87	0.05	0.18	0.00	0.00	0.00	4,486.22	60.11	0.13	0.00	0.00	0.00	
Hammer, Diesel, 22k ft-lb	Bore/Drill Rigs	221	1	1.25	178.06	14.64	0.04	117.59	0.33	171.39	0.47	0.53	0.00	5.19	0.01	4.78	0.01	51,713.07	142.96	16.73	0.05	0.47	0.00	
Hammer, Diesel, 41k ft-lb	Bore/Drill Rigs	221	1	0.84	119.82	14.64	0.03	117.59	0.22	171.39	0.32	0.53	0.00	5.19	0.01	4.78	0.01	51,713.07	96.20	16.73	0.03	0.47	0.00	
Hyd. Crane, 80 Ton	Cranes	231	1	1.50	212.75	23.41	0.08	112.43	0.37	274.95	0.91	0.33	0.00	11.16	0.04	10.27	0.03	31,679.95	104.64	10.24	0.03	0.29	0.00	
Lattice Boom Crane, 150 Ton	Cranes	282	1	5.40	767.23	28.58	0.34	137.25	1.63	335.66	4.00	0.40	0.00	13.62	0.16	12.54	0.15	38,674.23	460.67	12.50	0.15	0.35	0.00	
Lead, 90' High				2.10	297.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Vibratory Hammer & Gen.	Bore/Drill Rigs	221	1	1.41	200	14.64	0.05	117.59	0.37	171.39	0.53	0.53	0.00	5.19	0.02	4.78	0.01	51,713.07	160.57	16.73	0.05	0.47	0.00	
TOTAL							3.70		19.87		26.47		0.20		1.09		1.02		4,871.51		12.84			0.05
Recreation Facilities Removal						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
20' Suction Hose, 6"	NA	0	1	4.00	480.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3/4 TN 4x4 P/U		450	1	1.78	213.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
50' Discharge Hoses, 6"	NA	0	1	8.00	960.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Backhoe Loader, 48 H.P.	Tractor/Loaders/ Backhoes	48	1	8.45	1014.22	13.43	0.25	87.05	1.62	75.06	1.40	0.09	0.00	4.52	0.08	4.16	0.08	9,148.55	170.47	2.96	0.06	0.08	0.00	
Brush Chipper, 12", 130 H.P.		130	1	1.58	189.18	1.11	0.00	8.82	0.03	8.91	0.03	0.02	0.00	0.57	0.00	NA	NA	1,434.72	4.99	0.57	0.00	NA	NA	
Centr. Water Pump, 6"	Pump	84	1	4.00	480.14	41.71	0.37	254.79	2.25	246.53	2.17	0.44	0.00	10.88	0.10	10.88	0.10	35,325.47	311.61	3.73	0.03	0.30	0.00	
Chain Saw, Gas, 36" Long		7	1	3.15	378.37	725.91	5.05	1,571.39	10.92	13.91	0.10	0.17	0.00	2.63	0.02	2.63	0.02	4,229.98	29.40	45.12	0.31	NA	NA	
Clamshell Bucket, 1 C.Y.	NA	0	1	1.74	208.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Crawler Loader, 3 C.Y.	Crawler Tractors	97	1	1.58	189.18	28.06	0.10	167.07	0.58	235.97	0.82	0.20	0.00	19.42	0.07	17.87	0.06	19,872.19	69.07	6.43	0.02	0.18	0.00	
Dozer, 200 H.P.	Rubber Tired Dozers	200	1	1.86	222.99	55.30	0.23	307.85	1.26	543.23	2.23	0.39	0.00	30.91	0.13	28.44	0.12	37,838.01	155.01	12.24	0.05	0.34	0.00	
Dozer, 300 H.P.	Rubber Tired Dozers	300	1	0.39	46.81	72.06	0.06	278.06	0.24	755.54	0.65	0.59	0.00	36.67	0.03	33.73	0.03	56,975.81	49.00	18.43	0.02	0.51	0.00	

Description	Comparable OFFROAD Equipment	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
Dozer, 80 H.P.	Rubber Tired Dozers	80	1	1.61	193.6	22.12	0.08	123.14	0.44	217.29	0.77	0.16	0.00	12.36	0.04	11.38	0.04	15,135.20	53.83	4.90	0.02	0.14	0.00
Dump Truck, 12 C.Y., 400 H.P.		400	1	0.96	115.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dump Truck, 18 C.Y., 450 H.P.		450	1	1.58	189.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dump Truck, 8 C.Y., 220 H.P.		220	1	3.50	420.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Earth Auger, Truck- Mtd.	Bore/Drill Rigs	221	1	0.44	52.93	17.04	0.02	327.23	0.32	176.61	0.17	0.54	0.00	7.70	0.01	7.08	0.01	52,713.83	51.26	17.05	0.02	0.47	0.00
F.E. Loader, T.M., 2.25 C.Y.	Tractor/Loaders/ Backhoes	97	1	1.60	192.42	10.62	0.04	128.15	0.45	107.49	0.38	0.18	0.00	6.34	0.02	5.83	0.02	17,060.75	60.31	5.52	0.02	0.15	0.00
F.E. Loader, W.M., 2.5 C.Y.	Tractor/Loaders/ Backhoes	97	1	5.25	629.86	10.62	0.12	128.15	1.48	107.49	1.24	0.18	0.00	6.34	0.07	5.83	0.07	17,060.75	197.42	5.52	0.06	0.15	0.00
Flatbed Truck, Gas, 3 Ton		450	1	1.06	127.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gas Engine Vibrator		5.5	1	1.73	207.84	2.04	0.01	0.00	0.00	4.02	0.02	0.93	0.00	0.18	0.00	0.00	0.00	1,278.53	4.88	0.03	0.00	0.00	0.00
Gradall, 5/8 C.Y.	Excavator	158	1	2.67	320	12.99	0.08	185.51	1.09	122.10	0.72	0.29	0.00	5.92	0.03	5.45	0.03	28,360.41	166.73	9.17	0.05	0.26	0.00
Grader, 30,000 Lbs.	Grader	187	1	10.51	1261.09	38.74	0.90	272.87	6.32	371.04	8.60	0.38	0.01	20.70	0.48	19.04	0.44	36,688.81	850.03	11.87	0.27	0.33	0.01
Heating Kettle, 115 Gallon	NA	0	1	0.84	100.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hyd. Crane, 12 Ton	Cranes	231	1	1.63	196.11	23.41	0.08	112.43	0.41	274.95	0.99	0.33	0.00	11.16	0.04	10.27	0.04	31,679.95	114.14	10.24	0.04	0.29	0.00
Hyd. Crane, 25 Ton	Cranes	231	1	0.73	87.9	23.41	0.04	112.43	0.18	274.95	0.44	0.33	0.00	11.16	0.02	10.27	0.02	31,679.95	51.16	10.24	0.02	0.29	0.00
Hyd. Excavator, 2 C.Y.	Excavator	231	1	0.34	40.51	14.29	0.01	96.84	0.07	149.73	0.11	0.43	0.00	4.59	0.00	4.22	0.00	41,414.00	30.82	13.40	0.01	0.38	0.00
Hyd. Excavator, 2.5 C.Y.	Excavator	231	1	0.46	55.06	14.29	0.01	96.84	0.10	149.73	0.15	0.43	0.00	4.59	0.00	4.22	0.00	41,414.00	41.89	13.40	0.01	0.38	0.00
Hyd. Excavator, 3.5 C.Y.	Excavator	231	1	1.74	208.74	14.29	0.05	96.84	0.37	149.73	0.57	0.43	0.00	4.59	0.02	4.22	0.02	41,414.00	158.82	13.40	0.05	0.38	0.00
Line Rem.,11 H.P.,Walk Behind		11	1	0.10	11.8	16.28	0.00	335.26	0.07	4.03	0.00	0.04	0.00	2.50	0.00	2.50	0.00	858.88	0.19	1.01	0.00	NA	NA
Loader, Skid Steer, 78 H.P.	Skid Steer Loaders	78	1	0.96	115.44	11.80	0.03	107.69	0.23	103.12	0.22	0.16	0.00	3.65	0.01	3.35	0.01	15,222.21	32.28	4.92	0.01	0.14	0.00
Paint Striper, T.M., 120 Gal.	NA	0	1	0.84	100.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Description	Comparable OFFROAD Equipment	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NOx (g/hr)	NOx (lb/day)	SOx (g/hr)	SOx (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)	
Rammer/Tamper, Gas, 15"	Plate Compactors	6.5	1	1.14	137.36	1.85	0.00	9.70	0.02	11.58	0.03	0.02	0.00	0.45	0.00	0.45	0.00	1,588.40	4.01	0.16	0.00	0.01	0.00	
Road Sweeper, S.P., 8' wide		64	1	0.02	2.95	35.89	0.00	173.69	0.01	142.77	0.01	0.16	0.00	12.12	0.00	11.15	0.00	15,465.67	0.84	5.00	0.00	0.14	0.00	
Roller, Vibratory, 25 Ton	Roller	80	1	2.07	248.64	25.76	0.12	139.74	0.64	132.27	0.60	0.16	0.00	8.93	0.04	8.22	0.04	15,984.04	73.01	5.17	0.02	0.14	0.00	
Tandem Roller, 5 Ton	Roller	80	1	0.39	46.82	25.76	0.02	139.74	0.12	132.27	0.11	0.16	0.00	8.93	0.01	8.22	0.01	15,984.04	13.75	5.17	0.00	0.14	0.00	
Trowel, 48" Walk-Behind		11.7	1	0.39	46.82	2.47	0.00	17.74	0.02	16.35	0.01	0.02	0.00	0.84	0.00	0.78	0.00	2,191.91	1.89	0.71	0.00	0.02	0.00	
Truck Tractor, 6x4, 450 H.P.	Tractor/Loaders/Backhoes	450	1	0.39	46.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Vibr. Roller, Towed, 12 Ton	Roller	80	1	4.39	526.75	25.76	0.25	139.74	1.35	132.27	1.28	0.16	0.00	8.93	0.09	8.22	0.08	15,984.04	154.68	5.17	0.05	0.14	0.00	
Vibratory Roller, Towed, 23 Ton	Roller	80	1	1.39	166.99	25.76	0.08	139.74	0.43	132.27	0.41	0.16	0.00	8.93	0.03	8.22	0.03	15,984.04	49.04	5.17	0.02	0.14	0.00	
Water Tank Trailer, 5000 Gal.		0	1	0.39	46.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Welder, Gas Engine, 300 amp	Welder	23	1	0.01	1.1	7.78	0.00	25.32	0.00	46.54	0.00	0.07	0.00	2.08	0.00	2.08	0.00	5,881.89	0.12	0.69	0.00	0.05	0.00	
TOTAL							8.00		31.03		24.24		0.03		1.35		1.24		2,900.65		1.17			0.03
Flood Improvements						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1/2 TON PICKUP TRUCK		277	1	2.76	240	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
TOTAL							0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00			0.00
Yreka Water Supply Pipeline Relocation						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1/2 TON PICKUP TRUCK		277	1	2.75	330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Air Compressor 600 cfm	Air Compressor	300	1	2.00	240	38.59	0.17	159.55	0.70	267.70	1.18	0.86	0.00	8.64	0.04	8.64	0.04	81,835.06	360.83	3.46	0.02	0.62	0.00	
Crawler Crane, 90 Ton	Cranes	231	1	4.01	480.6	23.41	0.21	112.43	0.99	274.95	2.43	0.33	0.00	11.16	0.10	10.27	0.09	31,679.95	279.72	10.24	0.09	0.29	0.00	
Dozer (235hp)(CATD7)	Rubber Tired Dozers	235	1	1.34	160.4	56.45	0.17	217.82	0.64	591.84	1.74	0.46	0.00	28.73	0.08	26.42	0.08	44,631.05	131.52	14.44	0.04	0.40	0.00	

Description	Comparable OFFROAD Equipment	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
Gas Engine Tamp	Plate Compactors	6.5	1	2.67	320.8	1.85	0.01	9.70	0.06	11.58	0.07	0.02	0.00	0.45	0.00	0.45	0.00	1,588.40	9.36	0.16	0.00	0.01	0.00
Hydraulic Crane (17tn)	Cranes	231	1	2.01	240.8	141.65	0.63	501.68	2.22	402.86	1.78	0.36	0.00	42.28	0.19	38.89	0.17	34,694.09	153.48	11.22	0.05	0.32	0.00
Microtunneling 36" ID Casing	NA	0	1	2.04	244.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller, Dbl Drum (steel wheel, 5.0 - 7.9 MTn)	Roller	80	1	1.34	160.4	25.76	0.08	139.74	0.41	132.27	0.39	0.16	0.00	8.93	0.03	8.22	0.02	15,984.04	47.10	5.17	0.02	0.14	0.00
Truck, Pickup (4x4, 3/4tn)		450	1	2.04	244.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welder, Portable	Welder	46	1	2.01	240.8	17.16	0.08	97.46	0.43	85.55	0.38	0.14	0.00	4.20	0.02	4.20	0.02	11,763.79	52.04	1.53	0.01	0.10	0.00
TOTAL							1.33		5.46		7.97		0.01		0.46		0.42		1,034.06		0.22		0.01
							13.03		56.36		58.68		0.24		2.89		2.69		8,806.23		14.24		0.08

Hatchery Exhaust Emissions for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, and Three Dam Removal Alternative
Fall Creek Hatchery Construction

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM10 (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
03A Air Comp 185d	Air Comp Portable 185 cfm Diesel	Air Compressor	49	366.6	2.40	1	20.86	0.11	118.09	0.62	99.28	0.52	0.16	0.00	4.99	0.03	4.99	0.03	13366.39	70.61	1.88	0.01	0.11	0.00
03A Air PB090	Hand Held Pavement Breaker 80-90 lbs	NA	0	366.6	2.40	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
03A Press Washer	Pressure Washer- 3000 psi	Pressure Washer	6.5	1.44	0.01	1	1.24	0.00	6.89	0.00	8.66	0.00	0.02	0.00	0.39	0.00	0.39	0.00	1108.18	0.02	0.11	0.00	0.01	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM10 (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
05 Paver 5-13 21K+	Crawler Mntd Asphalt Paver 5'-13' ABG Titan 125 21K	Pavers	60	0.533	0.00	1	30.43	0.00	133.60	0.00	115.97	0.00	0.14	0.00	9.32	0.00	8.58	0.00	13268.19	0.10	4.29	0.00	0.12	0.00
05 Paver 10-30 35K+	Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	Pavers	130	20.481	0.13	1	22.91	0.01	194.51	0.06	219.83	0.06	0.26	0.00	15.58	0.00	14.33	0.00	25649.64	7.57	8.29	0.00	0.23	0.00
06C0 HHP PI25	Hand Held Vibratory Plate 25" 8.0HP	Plate Compactors	8	32.65	0.21	1	2.27	0.00	11.93	0.01	14.25	0.01	0.03	0.00	0.55	0.00	0.55	0.00	1954.95	0.92	0.20	0.00	0.02	0.00
06C0 Trn 3K/32	Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	Roller	18	19.574	0.13	1	5.80	0.00	31.44	0.01	29.76	0.01	0.04	0.00	2.01	0.00	1.85	0.00	3596.41	1.01	1.16	0.00	0.03	0.00
06C1vp 05MT	Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	Roller	80	16.118	0.11	1	25.76	0.01	139.74	0.03	132.27	0.03	0.16	0.00	8.93	0.00	8.22	0.00	15984.04	3.71	5.17	0.00	0.14	0.00
06C1vp 11MT	Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	Roller	142	28.571	0.19	1	19.07	0.01	189.25	0.08	193.66	0.08	0.26	0.00	11.84	0.00	10.89	0.00	25571.71	10.53	8.27	0.00	0.23	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM10 (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
06C2t 02MT	Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	Roller	33	21.014	0.14	1	10.63	0.00	57.64	0.02	54.56	0.02	0.07	0.00	3.68	0.00	3.39	0.00	6593.42	2.00	2.13	0.00	0.06	0.00
06C2t 11MT	Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	Roller	138	20.481	0.13	1	18.53	0.01	183.92	0.05	188.20	0.06	0.26	0.00	11.51	0.00	10.58	0.00	24851.38	7.33	8.04	0.00	0.22	0.00
07 Cnc Saw 20	Concrete Saw 20" Gasoline	Concrete/Industrial Saw	3	5	0.03	1	1.50	0.00	5.12	0.00	9.49	0.00	0.02	0.00	0.35	0.00	0.35	0.00	1244.57	0.09	0.13	0.00	0.01	0.00
09 DZR 16MT	Standard Crawler Dozer Cat. D6R 165HP	Rubber Tired Dozer	165	16.118	0.11	1	45.62	0.01	253.98	0.06	448.16	0.10	0.32	0.00	25.50	0.01	23.46	0.01	31216.36	7.25	10.10	0.00	0.28	0.00
09 GA 12	Articulated Frame Grader Cat 12H 140HP	Grader	140	43.281	0.28	1	19.23	0.01	75.01	0.05	251.49	0.16	0.28	0.00	7.97	0.00	7.33	0.00	27238.52	16.99	8.81	0.01	0.25	0.00
09 LBK 15	Loader Backhoe C420-93HP 1.25cy- 15' depth	Tractors/Loaders/ Backhoes	93	42.25	0.28	1	10.18	0.01	122.87	0.07	103.06	0.06	0.17	0.00	6.08	0.00	5.59	0.00	16357.21	9.96	5.29	0.00	0.15	0.00
09 LBK 18	Loader Backhoe C446- 1.50cy- 17'+ Depth	Tractors/Loaders/ Backhoes	97	94.926	0.62	1	10.62	0.01	128.15	0.18	107.49	0.15	0.18	0.00	6.34	0.01	5.83	0.01	17060.75	23.34	5.52	0.01	0.15	0.00
09 LC 19MT	Standard Crawler Loader Cat. 963 158HP 3.20cy- 43K#	Crawler Tractor	158	74.723	0.49	1	43.68	0.05	243.20	0.26	429.15	0.46	0.31	0.00	24.42	0.03	22.47	0.02	29892.03	32.18	9.67	0.01	0.27	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM10 (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
09 LW 15MT	Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	Rubber Tired Loader	160	0.48	0.00	1	19.94	0.00	193.18	0.00	179.65	0.00	0.28	0.00	9.83	0.00	9.04	0.00	27134.23	0.19	8.78	0.00	0.25	0.00
10 Ex 20MT	Hydraulic Excavator Cat. 320138HP 1.25cy	Excavator	138	12.735	0.08	1	14.42	0.00	183.12	0.03	149.40	0.03	0.25	0.00	8.42	0.00	7.75	0.00	24530.94	4.50	7.93	0.00	0.22	0.00
10 Ex 33MT	Hydraulic Excavator Cat. 325 186HP 1.50cy	Excavator	186	62.409	0.41	1	15.30	0.01	218.38	0.20	143.73	0.13	0.35	0.00	6.97	0.01	6.41	0.01	33386.31	30.02	10.80	0.01	0.30	0.00
13 A/RT Hyd 80	80MT All/Rough Terrain Hydro Crane	Cranes	231	112.265	0.73	1	23.41	0.04	112.43	0.18	274.95	0.44	0.33	0.00	11.16	0.02	10.27	0.02	31679.95	51.25	10.24	0.02	0.29	0.00
13 Lift TeleBoom 6K	Telescopic Boom Lift Truck Grad 534 -6Kips	Aerial Lift	63	6.862	0.04	1	3.01	0.00	56.89	0.01	53.39	0.01	0.10	0.00	0.48	0.00	0.45	0.00	9593.11	0.95	3.10	0.00	0.09	0.00
13 Lift TeleBoom 10K	Telescopic Boom Lift Truck Grad 534 -10Kips	Aerial Lift	63	8.427	0.06	1	3.01	0.00	56.89	0.01	53.39	0.01	0.10	0.00	0.48	0.00	0.45	0.00	9593.11	1.16	3.10	0.00	0.09	0.00
16 Pump ELS 2HP	Electric Submersible Pump 2HP/2"	Pump	2	75.413	0.49	1	1.06	0.00	5.23	0.01	6.60	0.01	0.01	0.00	0.32	0.00	0.32	0.00	841.08	0.91	0.09	0.00	0.01	0.00
16 Pump HoseD 2.0	Discharge Hose 2.0 in	NA	0	75.413	0.49	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM10 (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
16 Pump HoseS 2.0	Suction Hose 2.0 in	NA	0	75.413	0.49	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18 Chain Saw 20	Chain Saw, 20"bar Length	NA	3	74.723	0.49	1	354.52	0.38	767.44	0.83	6.79	0.01	0.08	0.00	1.29	0.00	1.29	0.00	2065.86	2.22	22.03	0.02	0.00	0.00
19 Trlr Eq 80 Ton	80 Ton 16 Wheel Equipment Trailer	NA	0	104	0.68	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 8	Rear Dump Truck 8 cy	NA	350	26.316	0.17	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 18	Rear Dump Truck 12-18 cy	NA	350	164.626	1.08	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Trctr 70K	On-Highway Truck Tractors Maximum Gross Vehicle Weight: 75,000 lbs	NA	510	104	0.68	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Water 4.0K	On-Highway Water Truck 4000 Gallon	NA	300	44.689	0.29	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
22 Trl Mtd Chpr 16	Trailer Mtd Brush Chipper, 16"dia	NA	130	74.723	0.49	1	0.54	0.00	4.31	0.00	4.35	0.00	0.01	0.00	0.28	0.00	0.00	0.00	700.70	0.75	0.28	0.00	0.00	0.00
TOTAL								0.67		2.76		2.36		0.00		0.12		0.11		285.58		0.10		0.00

Hatchery Exhaust Emissions for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, and Three Dam Removal Alternative
Iron Gate Hatchery Removal

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NOx (g/hr)	NOx (lb/day)	SOx (g/hr)	SOx (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
03A Air Comp 185d	Air Comp Portable 185 cfm Diesel	Air Compressor	49	732.016	16.27	2	41.72	1.50	236.19	8.47	198.56	7.12	0.33	0.01	9.97	0.36	9.97	0.36	26732.78	958.71	3.76	0.13	0.22	0.01
03A Air PB090	Hand Held Pavement Breaker 80-90 lbs			732.016	16.27	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
03A Press Washer	Pressure Washer- 3000 psi	Pressure Washer	6.5	11.604	0.26	1	1.24	0.00	6.89	0.00	8.66	0.00	0.02	0.00	0.39	0.00	0.39	0.00	1108.18	0.63	0.11	0.00	0.01	0.00
05 Paver 10-30 35K+	Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	Pavers	130	0.427	0.01	1	22.91	0.00	194.51	0.00	219.83	0.00	0.26	0.00	15.58	0.00	14.33	0.00	25649.64	0.54	8.29	0.00	0.23	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
05 PVMill CM 84	Crawler Mntd Pavement Millers 84"- Terex-PR-800-7-Power Mode: Diesel	Pavers	60	4.575	0.10	1	30.43	0.01	133.60	0.03	115.97	0.03	0.14	0.00	9.32	0.00	8.58	0.00	13268.19	2.97	4.29	0.00	0.12	0.00
06C0 HHP P125	Hand Held Vibratory Plate 25" 8.0HP	Plate Compactors	8	292.145	6.49	1	2.27	0.03	11.93	0.17	14.25	0.20	0.03	0.00	0.55	0.01	0.55	0.01	1954.95	27.98	0.20	0.00	0.02	0.00
06C0 Trn 3K/32	Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	Roller	18	43.522	0.97	1	5.80	0.01	31.44	0.07	29.76	0.06	0.04	0.00	2.01	0.00	1.85	0.00	3596.41	7.67	1.16	0.00	0.03	0.00
06C1vp 05MT	Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	Roller	80	1.227	0.03	1	25.76	0.00	139.74	0.01	132.27	0.01	0.16	0.00	8.93	0.00	8.22	0.00	15984.04	0.96	5.17	0.00	0.14	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
06C1vp 11MT	Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	Roller	142	1.513	0.03	1	19.07	0.00	189.25	0.01	193.66	0.01	0.26	0.00	11.84	0.00	10.89	0.00	25571.71	1.90	8.27	0.00	0.23	0.00
06C2t 02MT	Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	Roller	33	0.427	0.01	1	10.63	0.00	57.64	0.00	54.56	0.00	0.07	0.00	3.68	0.00	3.39	0.00	6593.42	0.14	2.13	0.00	0.06	0.00
06C2t 11MT	Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	Roller	138	0.427	0.01	1	18.53	0.00	183.92	0.00	188.20	0.00	0.26	0.00	11.51	0.00	10.58	0.00	24851.38	0.52	8.04	0.00	0.22	0.00
07 Cnc Core Drill	Concrete Core Drill	Bore/Drill Rigs	221	16.312	0.36	1	14.64	0.01	117.59	0.09	171.39	0.14	0.53	0.00	5.19	0.00	4.78	0.00	51713.07	41.33	16.73	0.01	0.47	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
07 Cnc Pmp 80yph	Trailer Mtd Concrete Pumps, 80cy/hr, 160hp	Pump	160	23.211	0.52	1	30.78	0.04	351.41	0.40	248.76	0.28	0.71	0.00	11.37	0.01	11.37	0.01	67286.60	76.51	2.72	0.00	0.51	0.00
07 Cnc Saw 20	Concrete Saw 20" Gasoline	Concrete/ Industrial Saw	3	187.354	4.16	1	1.50	0.01	5.12	0.05	9.49	0.09	0.02	0.00	0.35	0.00	0.35	0.00	1244.57	11.42	0.13	0.00	0.01	0.00
09 Dzr 8MT	Standard Crawler Dozer Cat. D4C 81HP	Rubber Tired Dozer	81	0.276	0.01	1	22.39	0.00	124.68	0.00	220.01	0.00	0.16	0.00	12.52	0.00	11.52	0.00	15324.39	0.21	4.96	0.00	0.14	0.00
09 Dzr 16MT	Standard Crawler Dozer Cat. D6R 165HP	Rubber Tired Dozer	165	0.339	0.01	1	45.62	0.00	253.98	0.00	448.16	0.01	0.32	0.00	25.50	0.00	23.46	0.00	31216.36	0.52	10.10	0.00	0.28	0.00
09 GA 12	Articulated Frame Grader Cat 12H 140HP	Grader	140	2.067	0.05	1	51.71	0.01	255.53	0.03	409.00	0.04	0.28	0.00	32.71	0.00	30.09	0.00	26924.62	2.73	8.71	0.00	0.25	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
09 LBk 15	Loader Backhoe C420-93HP 1.25cy- 15' depth	Tractors/ Loaders/ Backhoes	93	109.98	2.44	1	10.18	0.05	122.87	0.66	103.06	0.56	0.17	0.00	6.08	0.03	5.59	0.03	16357.21	88.13	5.29	0.03	0.15	0.00
09 LBk 18	Loader Backhoe C446- 1.50cy- 17'+ Depth	Tractors/ Loaders/ Backhoes	97	441.453	9.81	2	21.24	0.46	256.31	5.54	214.98	4.65	0.35	0.01	12.68	0.27	11.66	0.25	34121.49	737.96	11.03	0.24	0.31	0.01
09 LW 15MT	Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	Rubber Tired Loader	160	4.235	0.09	1	19.94	0.00	193.18	0.04	179.65	0.04	0.28	0.00	9.83	0.00	9.04	0.00	27134.23	5.63	8.78	0.00	0.25	0.00
10 Ex 20MT	Hydraulic Excavator Cat. 320 138HP 1.25cy	Excavator	138	21.562	0.48	1	14.42	0.02	183.12	0.19	149.40	0.16	0.25	0.00	8.42	0.01	7.75	0.01	24530.94	25.91	7.93	0.01	0.22	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
10 Ex 33MT	Hydraulic Excavator Cat. 325 186HP 1.50cy	Excavator	186	169.818	3.77	1	15.30	0.13	218.38	1.82	143.73	1.20	0.35	0.00	6.97	0.06	6.41	0.05	33386.31	277.76	10.80	0.09	0.30	0.00
13 A/RT Hyd 20	20MT All/Rough Terrain Hydro Crane	Crane	231	40	0.89	1	23.41	0.05	112.43	0.22	274.95	0.54	0.33	0.00	11.16	0.02	10.27	0.02	31679.95	62.08	10.24	0.02	0.29	0.00
13 A/RT Hyd 40	40MT All/Rough Terrain Hydro Crane	Crane	231	61.421	1.36	1	23.41	0.07	112.43	0.34	274.95	0.83	0.33	0.00	11.16	0.03	10.27	0.03	31679.95	95.33	10.24	0.03	0.29	0.00
13 A/RT Hyd 80	80MT All/Rough Terrain Hydro Crane	Crane	231	358.45	7.97	1	23.41	0.41	112.43	1.97	274.95	4.83	0.33	0.01	11.16	0.20	10.27	0.18	31679.95	556.33	10.24	0.18	0.29	0.01
13 A/RT Hyd 100	100MT All/Rough Terrain Hydro Crane	Crane	231	6.789	0.15	1	23.41	0.01	112.43	0.04	274.95	0.09	0.33	0.00	11.16	0.00	10.27	0.00	31679.95	10.54	10.24	0.00	0.29	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
13 Lift TeleBoom 6K	Telescopic Boom Lift Truck Grad 534 -6Kips	Aerial Lift	63	25.375	0.56	1	3.22	0.00	60.81	0.08	57.07	0.07	0.11	0.00	0.52	0.00	0.48	0.00	10254.70	12.75	3.32	0.00	0.09	0.00
13 Lift TeleBoom 10K	Telescopic Boom Lift Truck Grad 534 -10Kips	Aerial Lift	63	37.34	0.83	1	3.22	0.01	60.81	0.11	57.07	0.10	0.11	0.00	0.52	0.00	0.48	0.00	10254.70	18.76	3.32	0.01	0.09	0.00
13BC ClamtBckt 1	1cy Standard Clamshell Bucket		0	59.951	1.33	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15 VHE 134T	Vibratory Hammer/Extractor 134.0 Ton 503Hydraulic HP	Bore/Drill Rigs	221	17.424	0.39	1	14.64	0.01	117.59	0.10	171.39	0.15	0.53	0.00	5.19	0.00	4.78	0.00	51713.07	44.14	16.73	0.01	0.47	0.00
16 Pump ELS 2HP	Electric Submersible Pump 2HP/2"	Pump	2	137.013	3.04	1	1.06	0.01	5.23	0.04	6.60	0.04	0.01	0.00	0.32	0.00	0.32	0.00	841.08	5.65	0.09	0.00	0.01	0.00

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
16 Pump HoseD 2.0	Discharge Hose 2.0 in		0	137.013	3.04	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16 Pump HoseS 2.0	Suction Hose 2.0 in		0	137.013	3.04	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17 BSP 96	Self Propelled Pavement Brooms 96" 76HP		76	4.575	0.10	1	2.57	0.00	12.42	0.00	10.21	0.00	0.01	0.00	0.87	0.00	0.80	0.00	1105.55	0.25	0.36	0.00	0.01	0.00
18 Tool Weld 300	Portable welder Diesel 300 amps	Welder	22	279.062	6.20	1	7.44	0.10	24.22	0.33	44.52	0.61	0.07	0.00	1.99	0.03	1.99	0.03	5626.16	76.92	0.66	0.01	0.05	0.00
18 Torch Acetylene	Torch Cutting Acetylene-Oxygen 150'		0	126.163	2.80	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
19 Trlr Eq 80 Ton	80 Ton 16 Wheel Equipment Trailer		0	96	2.13	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
20 Trk RDump 8	Rear Dump Truck 8 cy		350	82.142	1.83	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 18	Rear Dump Truck 12-18 cy		350	135.446	3.01	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Trctr 70K	On-Highway Truck Tractors Maximum Gross Vehicle Weight: 75,000 lbs		510	96	2.13	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Water 4.0K	On-Highway Water Truck 4000 Gallon	Water Trucks	300	2.74	0.06	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
22 HIB 2K/620	Hydraulic Impact Breaker 2K 620bpm	Bore/Drill Rigs	221	52.842	1.17	1	29.28	0.08	235.18	0.61	342.78	0.89	1.06	0.00	10.39	0.03	9.57	0.02	103426.14	267.75	33.46	0.09	0.94	0.00
TOTAL								3.02		21.44		22.76		0.04		1.09		1.04		3420.63		0.88		0.03

Dam and Powerhouse Removal Equipment for the Proposed Project, Two Dam Removal Alternative, Three Dam Removal Alternative Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle - Demolition	Copco No. 1&2 - Demolition	Copco No. 1 Modification	Copco No. 1 Demolition	Copco No. 2 Demolition	Iron Gate - Modification	Iron Gate - Demolition	Approximate Operating Hours/Day
Dam and Powerhouse Removal											
1/2 TON PICKUP TRUCK	277	Off-Highway Trucks	94	19	19	4.7	13.3	5.7	6.7	19	20
3/4 TN 4x4 P/U	450	Off-Highway Trucks	95	1	1	0.2	0.7	0.3	0.4	1	20
SINGLE AXLE LUBE TRUCK	250	Off-Highway Trucks	94	1	1	0.2	0.7	0.3	0.4	1	20
SMALL MECHTRUCK	277	Off-Highway Trucks	94	1	1	0.2	0.7	0.3	0.4	1	20
LRG MECH TRUCK	450	Off-Highway Trucks	95	1	1	0.2	0.7	0.3	0.4	1	20
4000 GAL WATER TRUCK	300	Water Trucks	219	2	1	0.2	0.7	0.3	0.7	2	20
1 TON FLATBED	410	Off-Highway Trucks	95	1	2	0.5	1.4	0.6	0.4	1	20
SEMI TRACTOR	510	Tractors/Loaders/ Backhoes	201	1		0.0	0	0	0.0		20
D6 DOZER	215	Rubber Tired Dozers	159	2	1	0.2	0.7	0.3	0.7	2	20
D8 DOZER	354	Rubber Tired Dozers	159	2	1	0.2	0.7	0.3	1.1	3	20
CAT 426 BACKHOE	94	Tractors/Loaders/ Backhoes	198	1	1	0.2	0.7	0.3	0.0	0	20
CAT 14H MOTORGRADER	250	Graders	85	1	1	0.2	0.7	0.3	0.7	2	20
CAT 336/330, JD 330 EXCAVATOR	273	Excavators	65	2	1	0.2	0.7	0.3	0.4	1	20
CAT 349/EX400 EXCAVATOR	275	Excavators	65	2	2	0.5	1.4	0.6	1.1	3	20

Dam and Powerhouse Removal Equipment for the Proposed Project, Two Dam Removal Alternative, Three Dam Removal Alternative Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle - Demolition	Copco No. 1&2 - Demolition	Copco No. 1 Modification	Copco No. 1 Demolition	Copco No. 2 Demolition	Iron Gate - Modification	Iron Gate - Demolition	Approximate Operating Hours/Day
CAT 374/365 EXCAVATOR	472	Excavators	66			0.0	0	0	0.4	1	20
EX1100/1250 EXCAVATOR	600	Excavators	66			0.0	0	0	0.7	2	20
CAT 563 - 84"ROLLER	137	Roller	149	1	1	0.2	0.7	0.3	0.4	1	20
WALK BEHIND ROLLER	20	Roller	147	1	1	0.2	0.7	0.3	0.4	1	20
S15-60T RT CRANE	365	Cranes	42	1	2	0.5	1.4	0.6	0.4	1	20
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	Cranes	42	1	1	0.2	0.7	0.3	0.4	1	20
3900 W 140T CRANE	287	Cranes	42		1	0.2	0.7	0.3	0.0		20
S15-222 100 TN MANITOWOC CRANE	318	Cranes	42	1		0.0	0	0	0.0		20
4100 SERIES 2 200T CRANE	231	Cranes	42	1		0.0	0	0	0.0		20
S15-777 175 TN MANITOWOC CRANE	231	Cranes	42		1	0.2	0.7	0.3	0.0		20
A40/CAT 740 HAUL TRUCK	496	Off-Highway Trucks	95	5	3	0.7	2.1	0.9	0.7	2	20
CAT 773 HAUL TRUCK	775	Off-Highway Trucks	96			0.0	0	0	1.4	4	20
175 COMPRESSOR	NA	NA		1	2	0.5	1.4	0.6	0.4	1	24
400 COMPRESSOR	NA	NA			1	0.2	0.7	0.3	0.0		24
200 - 250 AMP DIESEL WELDER	50	Welder	213	1	1	0.2	0.7	0.3	0.4	1	24
25 - 49 KW GENERATOR - 75 HP	75	Generator Sets	75	1	2	0.5	1.4	0.6	0.7	2	24
125 - 174 KW GENERATOR - 250 HP	250	Generator Sets	78	1	1	0.2	0.7	0.3	0.4	1	24
5 KW GENERATORS - 10 HP	10	Generator Sets	73	5	9	2.2	6.3	2.7	2.1	6	20
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	Generator Sets	75	5	5	1.2	3.5	1.5	1.8	5	20
6" TRASH PUMP	84	Pumps	139	2	3	0.7	2.1	0.9	0.7	2	24
6" SUB PUMP	84	Pumps	139	2	2	0.5	1.4	0.6	0.4	1	24
GROUT PUMP	84	Pumps	139	1	1	0.2	0.7	0.3	0.4	1	20
950 LOADER	240	Rubber Tired Loaders	167	1	1	0.2	0.7	0.3	0.0		20
966F LOADER	280	Rubber Tired Loaders	167	1	2	0.5	1.4	0.6	0.4	1	20
980G LOADER	431	Rubber Tired Loaders	168			0.0	0	0	0.4	1	20
MANLIFT 60'	89	Aerial Lifts	12	2	3	0.7	2.1	0.9	0.7	2	20
D19-42 PILE HAMMER (42,000 FT-LB)	NA	NA		1		0.0	0	0	0.0		20

Dam and Powerhouse Removal Equipment for the Proposed Project, Two Dam Removal Alternative, Three Dam Removal Alternative Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle - Demolition	Copco No. 1&2 - Demolition	Copco No. 1 Modification	Copco No. 1 Demolition	Copco No. 2 Demolition	Iron Gate - Modification	Iron Gate - Demolition	Approximate Operating Hours/Day
>10,000 LB EXTENDABLE FORKLIFT	89	Forklift	68	1	2	0.5	1.4	0.6	0.4	1	20
OSR SM HYD DRL/CMP (2-1/2" - 4-1/2") - ROCK DRILL	221	Bore/Drill Rigs	29	1	3	0.7	2.1	0.9	0.4	1	20
CONCRETE SHEAR	NA	NA		1		0.0	0	0	0.0		20
HOE RAM 330/349	NA	NA		1	1	0.2	0.7	0.3	0.4	1	20
MAXI HEATER	NA	NA		1		0.0	0	0	0.0		24
FLEXI FLOAT 10 X 40 X 7	NA	NA		6	20	4.9	14	6	2.1	6	24
WORK BOAT	250	Work boat			1	0.2	0.7	0.3	0.0		20
TOTAL											

J.C. Boyle Equipment for the Proposed Project, Two Dam Removal Alternative, and Three Dam Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33.85	1.49	253.14	11.16	335.13	14.78	0.91	0.04	12.08	0.53	11.11	0.49	88,557.38	3,904.72	28.64	1.26	0.81	0.04
103.29	4.55	398.56	17.57	1,082.94	47.75	0.84	0.04	52.56	2.32	48.35	2.13	81,665.32	3,600.83	26.42	1.16	0.74	0.03
170.06	7.50	656.23	28.93	1,783.08	78.62	1.39	0.06	86.55	3.82	79.61	3.51	134,462.91	5,928.80	43.50	1.92	1.21	0.05
10.29	0.45	124.19	5.48	104.17	4.59	0.17	0.01	6.14	0.27	5.65	0.25	16,533.09	728.99	5.35	0.24	0.15	0.01
34.34	1.51	133.95	5.91	449.09	19.80	0.50	0.02	14.23	0.63	13.09	0.58	48,640.21	2,144.67	15.73	0.69	0.44	0.02
33.78	1.49	228.90	10.09	353.90	15.60	1.02	0.04	10.85	0.48	9.98	0.44	97,887.63	4,316.11	31.66	1.40	0.89	0.04
34.03	1.50	230.58	10.17	356.50	15.72	1.02	0.05	10.93	0.48	10.05	0.44	98,604.76	4,347.73	31.89	1.41	0.89	0.04
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18.40	0.81	182.58	8.05	186.84	8.24	0.26	0.01	11.42	0.50	10.51	0.46	24,671.30	1,087.82	7.98	0.35	0.22	0.01
6.44	0.28	34.94	1.54	33.07	1.46	0.04	0.00	2.23	0.10	2.05	0.09	3,996.01	176.19	1.29	0.06	0.04	0.00

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
36.99	1.63	177.64	7.83	434.45	19.16	0.52	0.02	17.63	0.78	16.23	0.72	50,057.07	2,207.14	16.18	0.71	0.45	0.02
32.23	1.42	154.77	6.82	378.51	16.69	0.45	0.02	15.36	0.68	14.14	0.62	43,611.36	1,922.93	14.10	0.62	0.39	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32.23	1.42	154.77	6.82	378.51	16.69	0.45	0.02	15.36	0.68	14.14	0.62	43,611.36	1,922.93	14.10	0.62	0.39	0.02
23.41	1.03	112.43	4.96	274.95	12.12	0.33	0.01	11.16	0.49	10.27	0.45	31,679.95	1,396.85	10.24	0.45	0.29	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
211.95	9.35	1,260.75	55.59	1,841.04	81.18	4.62	0.20	67.57	2.98	62.10	2.74	447,208.38	19,718.53	144.66	6.38	4.03	0.18
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18.65	0.99	105.93	5.60	92.99	4.92	0.16	0.01	4.57	0.24	4.57	0.24	12,786.73	676.56	1.67	0.09	0.11	0.01
34.02	1.80	216.73	11.47	217.34	11.50	0.39	0.02	9.16	0.48	9.16	0.48	31,540.59	1,668.84	3.05	0.16	0.26	0.01
10.56	0.56	58.64	3.10	99.86	5.28	0.35	0.02	2.83	0.15	2.83	0.15	32,802.22	1,735.60	0.92	0.05	0.25	0.01
23.46	1.03	130.65	5.76	164.32	7.25	0.30	0.01	7.44	0.33	7.44	0.33	21,027.06	927.14	2.11	0.09	0.18	0.01
192.79	8.50	1,228.12	54.15	1,231.58	54.30	2.20	0.10	51.89	2.29	51.89	2.29	178,730.04	7,880.65	17.30	0.76	1.49	0.07
83.42	4.41	509.59	26.96	493.05	26.09	0.87	0.05	21.76	1.15	21.76	1.15	70,650.93	3,738.21	7.46	0.39	0.59	0.03
83.42	4.41	509.59	26.96	493.05	26.09	0.87	0.05	21.76	1.15	21.76	1.15	70,650.93	3,738.21	7.46	0.39	0.59	0.03
41.71	1.84	254.79	11.23	246.53	10.87	0.44	0.02	10.88	0.48	10.88	0.48	35,325.47	1,557.59	3.73	0.16	0.30	0.01
22.99	1.01	107.17	4.73	259.00	11.42	0.41	0.02	8.64	0.38	7.95	0.35	40,570.35	1,788.85	13.12	0.58	0.37	0.02
26.82	1.18	125.03	5.51	302.17	13.32	0.48	0.02	10.08	0.44	9.27	0.41	47,332.07	2,086.99	15.31	0.68	0.43	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	0.26	175.26	7.73	96.22	4.24	0.27	0.01	1.84	0.08	1.69	0.07	26,051.26	1,148.66	8.43	0.37	0.24	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17.84	0.79	98.52	4.34	80.46	3.55	0.10	0.00	5.66	0.25	5.20	0.23	9,353.60	412.42	3.03	0.13	0.08	0.00
14.64	0.65	117.59	5.18	171.39	7.56	0.53	0.02	5.19	0.23	4.78	0.21	51,713.07	2,280.16	16.73	0.74	0.47	0.02
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA
	61.89		353.67		538.78		0.90		22.39		21.10		83,044.12		21.88		0.73

Copco No. 1 Equipment for the Proposed Project, Two Dam Removal Alternative, Three Dam Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	P 2.5 (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36.15	1.59	139.49	6.15	379.03	16.71	0.29	0.01	18.40	0.81	16.92	0.75	28,582.9	1,260.29	9.25	0.41	0.26	0.01
59.52	2.62	229.68	10.13	624.08	27.52	0.49	0.02	30.29	1.34	27.86	1.23	47,062.0	2,075.08	15.22	0.67	0.42	0.02
7.20	0.32	86.93	3.83	72.92	3.22	0.12	0.01	4.30	0.19	3.96	0.17	11,573.2	510.29	3.74	0.16	0.10	0.00
24.04	1.06	93.77	4.13	314.36	13.86	0.35	0.02	9.96	0.44	9.16	0.40	34,048.1	1,501.27	11.01	0.49	0.31	0.01
11.82	0.52	80.12	3.53	123.87	5.46	0.36	0.02	3.80	0.17	3.49	0.15	34,260.7	1,510.64	11.08	0.49	0.31	0.01
23.82	1.05	161.40	7.12	249.55	11.00	0.72	0.03	7.65	0.34	7.04	0.31	69,023.3	3,043.41	22.33	0.98	0.63	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.88	0.57	127.81	5.64	130.79	5.77	0.18	0.01	8.00	0.35	7.35	0.32	17,269.9	761.47	5.59	0.25	0.16	0.01
4.51	0.20	24.46	1.08	23.15	1.02	0.03	0.00	1.56	0.07	1.44	0.06	2,797.21	123.34	0.90	0.04	0.03	0.00
51.79	2.28	248.70	10.97	608.23	26.82	0.73	0.03	24.69	1.09	22.72	1.00	70,079.9	3,090.00	22.66	1.00	0.63	0.03
22.56	0.99	108.34	4.78	264.95	11.68	0.32	0.01	10.75	0.47	9.90	0.44	30,528	1,346.05	9.87	0.44	0.28	0.01
20.36	0.90	97.78	4.31	239.13	10.54	0.29	0.01	9.71	0.43	8.93	0.39	27,552	1,214.83	8.91	0.39	0.25	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16.39	0.72	78.70	3.47	192.47	8.49	0.23	0.01	7.81	0.34	7.19	0.32	22,176	977.79	7.17	0.32	0.20	0.01
89.02	3.92	529.52	23.35	773.24	34.09	1.94	0.09	28.38	1.25	26.08	1.15	187,828	8,281.78	60.76	2.68	1.69	0.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13.06	0.69	74.15	3.92	65.09	3.44	0.11	0.01	3.20	0.17	3.20	0.17	8,950.7	473.59	1.17	0.06	0.07	0.00
47.63	2.52	303.42	16.05	304.27	16.10	0.54	0.03	12.82	0.68	12.82	0.68	44,156.8	2,336.38	4.27	0.23	0.37	0.02
7.39	0.39	41.05	2.17	69.90	3.70	0.24	0.01	1.98	0.10	1.98	0.10	22,961.6	1,214.92	0.65	0.03	0.17	0.01
29.56	1.30	164.62	7.26	207.04	9.13	0.37	0.02	9.37	0.41	9.37	0.41	26,494.1	1,168.19	2.66	0.12	0.22	0.01
134.95	5.95	859.69	37.91	862.11	38.01	1.54	0.07	36.32	1.60	36.32	1.60	125,111	5,516.46	12.11	0.53	1.05	0.05
87.59	4.63	535.07	28.31	517.71	27.39	0.91	0.05	22.84	1.21	22.84	1.21	74,183.5	3,925.12	7.83	0.41	0.62	0.03
58.39	3.09	356.71	18.87	345.14	18.26	0.61	0.03	15.23	0.81	15.23	0.81	49,455.7	2,616.75	5.22	0.28	0.41	0.02

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	P _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
29.20	1.29	178.36	7.86	172.57	7.61	0.30	0.01	7.61	0.34	7.61	0.34	24,727.8	1,090.31	2.61	0.12	0.21	0.01
16.09	0.71	75.02	3.31	181.30	7.99	0.29	0.01	6.05	0.27	5.56	0.25	28,399.2	1,252.19	9.19	0.41	0.26	0.01
37.55	1.66	175.04	7.72	423.04	18.65	0.68	0.03	14.11	0.62	12.98	0.57	66,264.9	2,921.78	21.44	0.95	0.60	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.30	0.28	184.03	8.11	101.03	4.45	0.28	0.01	1.93	0.09	1.77	0.08	27,353.8	1,206.10	8.85	0.39	0.25	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
24.97	1.10	137.93	6.08	112.64	4.97	0.13	0.01	7.92	0.35	7.29	0.32	13,095.0	577.39	4.24	0.19	0.12	0.01
30.75	1.36	246.94	10.89	359.91	15.87	1.11	0.05	10.91	0.48	10.05	0.44	108,597	4,788.33	35.13	1.55	0.99	0.04
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
35.00	1.54	196.61	8.67	111.40	4.91	556.32	24.53	15.07	0.66	NA	NA	40,791.9	1,798.62	NA	NA	NA	NA
	43.27		255.62		356.68		25.13		15.07		13.68		56,582.4		13.57		0.48

Copco No. 2 Equipment for the Proposed Project, Two Dam Removal Alternative, Three Dam Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.49	0.68	398.56	17.57	162.44	7.16	0.13	0.01	7.88	0.35	7.25	0.32	12,249.80	540.12	3.96	0.17	0.11	0.00
25.51	1.12	984.34	43.40	267.46	11.79	0.21	0.01	12.98	0.57	11.94	0.53	20,169.44	889.32	6.52	0.29	0.18	0.01
3.09	0.14	0.00	0.00	31.25	1.38	0.05	0.00	1.84	0.08	1.70	0.07	4,959.93	218.70	1.60	0.07	0.04	0.00
10.30	0.45	267.91	11.81	134.73	5.94	0.15	0.01	4.27	0.19	3.93	0.17	14,592.06	643.40	4.72	0.21	0.13	0.01
5.07	0.22	114.45	5.05	53.09	2.34	0.15	0.01	1.63	0.07	1.50	0.07	14,683.14	647.42	4.75	0.21	0.13	0.01
10.21	0.45	345.87	15.25	106.95	4.72	0.31	0.01	3.28	0.14	3.02	0.13	29,581.43	1,304.32	9.57	0.42	0.27	0.01
0.00	0.00	195.10	8.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	496.02	21.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.52	0.24	182.58	8.05	56.05	2.47	0.08	0.00	3.43	0.15	3.15	0.14	7,401.39	326.35	2.39	0.11	0.07	0.00

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
1.93	0.09	34.94	1.54	9.92	0.44	0.01	0.00	0.67	0.03	0.62	0.03	1,198.80	52.86	0.39	0.02	0.01	0.00
22.20	0.98	177.64	7.83	260.67	11.49	0.31	0.01	10.58	0.47	9.74	0.43	30,034.24	1,324.28	9.71	0.43	0.27	0.01
9.67	0.43	154.77	6.82	113.55	5.01	0.14	0.01	4.61	0.20	4.24	0.19	13,083.41	576.88	4.23	0.19	0.12	0.01
8.73	0.38	0.00	0.00	102.48	4.52	0.12	0.01	4.16	0.18	3.83	0.17	11,807.98	520.64	3.82	0.17	0.11	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.02	0.31	0.00	0.00	82.49	3.64	0.10	0.00	3.35	0.15	3.08	0.14	9,503.99	419.05	3.07	0.14	0.09	0.00
38.15	1.68	504.30	22.24	331.39	14.61	0.83	0.04	12.16	0.54	11.18	0.49	80,497.51	3,549.34	26.04	1.15	0.72	0.03
0.00	0.00	2,279.69	100.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5.60	0.30	105.93	5.60	27.90	1.48	0.05	0.00	1.37	0.07	1.37	0.07	3,836.02	202.97	0.50	0.03	0.03	0.00
20.41	1.08	433.46	22.93	130.40	6.90	0.23	0.01	5.49	0.29	5.49	0.29	18,924.36	1,001.31	1.83	0.10	0.16	0.01
3.17	0.17	58.64	3.10	29.96	1.59	0.10	0.01	0.85	0.04	0.85	0.04	9,840.67	520.68	0.28	0.01	0.07	0.00
12.67	0.56	156.78	6.91	88.73	3.91	0.16	0.01	4.02	0.18	4.02	0.18	11,354.61	500.65	1.14	0.05	0.09	0.00
57.84	2.55	1,228.12	54.15	369.47	16.29	0.66	0.03	15.57	0.69	15.57	0.69	53,619.01	2,364.20	5.19	0.23	0.45	0.02
37.54	1.99	509.59	26.96	221.87	11.74	0.39	0.02	9.79	0.52	9.79	0.52	31,792.92	1,682.19	3.36	0.18	0.27	0.01
25.03	1.32	254.79	13.48	147.92	7.83	0.26	0.01	6.53	0.35	6.53	0.35	21,195.28	1,121.46	2.24	0.12	0.18	0.01
12.51	0.55	254.79	11.23	73.96	3.26	0.13	0.01	3.26	0.14	3.26	0.14	10,597.64	467.28	1.12	0.05	0.09	0.00
6.90	0.30	0.00	0.00	77.70	3.43	0.12	0.01	2.59	0.11	2.38	0.11	12,171.10	536.65	3.94	0.17	0.11	0.00
16.09	0.71	125.03	5.51	181.30	7.99	0.29	0.01	6.05	0.27	5.56	0.25	28,399.24	1,252.19	9.19	0.41	0.26	0.01
0.00	0.00	237.27	10.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.70	0.12	175.26	7.73	43.30	1.91	0.12	0.01	0.83	0.04	0.76	0.03	11,723.07	516.90	3.79	0.17	0.11	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10.70	0.47	98.52	4.34	48.28	2.13	0.06	0.00	3.39	0.15	3.12	0.14	5,612.16	247.45	1.82	0.08	0.05	0.00
13.18	0.58	117.59	5.18	154.25	6.80	0.48	0.02	4.67	0.21	4.31	0.19	46,541.76	2,052.14	15.06	0.66	0.43	0.02
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
15.00	0.66	0.00	0.00	47.74	2.11	238.42	10.51	6.46	0.28	NA	NA	17,482.23	770.84	NA	NA	NA	NA
	18.54		448.17		152.86		10.77		6.46		5.86		24,249.59		5.81		0.21

Iron Gate Equipment for the Proposed Project, Two Dam Removal Alternative, Three Dam Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103.29	4.55	398.56	17.57	1,082.94	47.75	0.84	0.04	52.56	2.32	48.35	2.13	81,665.32	3,600.83	26.42	1.16	0.74	0.03
255.09	11.25	984.34	43.40	2,674.61	117.93	2.08	0.09	129.82	5.72	119.41	5.27	201,694.36	8,893.21	65.25	2.88	1.82	0.08
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68.68	3.03	267.91	11.81	898.17	39.60	1.00	0.04	28.45	1.25	26.18	1.15	97,280.41	4,289.34	31.47	1.39	0.88	0.04
16.89	0.74	114.45	5.05	176.95	7.80	0.51	0.02	5.43	0.24	4.99	0.22	48,943.82	2,158.05	15.83	0.70	0.44	0.02
51.04	2.25	345.87	15.25	534.74	23.58	1.54	0.07	16.40	0.72	15.08	0.66	147,907.14	6,521.59	47.84	2.11	1.34	0.06
25.65	1.13	195.10	8.60	238.86	10.53	0.88	0.04	8.00	0.35	7.35	0.32	84,230.25	3,713.92	27.24	1.20	0.77	0.03
65.21	2.88	496.02	21.87	607.27	26.78	2.23	0.10	20.34	0.90	18.70	0.82	214,144.71	9,442.17	69.27	3.05	1.95	0.09
18.40	0.81	182.58	8.05	186.84	8.24	0.26	0.01	11.42	0.50	10.51	0.46	24,671.30	1,087.82	7.98	0.35	0.22	0.01
6.44	0.28	34.94	1.54	33.07	1.46	0.04	0.00	2.23	0.10	2.05	0.09	3,996.01	176.19	1.29	0.06	0.04	0.00
36.99	1.63	177.64	7.83	434.45	19.16	0.52	0.02	17.63	0.78	16.23	0.72	50,057.07	2,207.14	16.18	0.71	0.45	0.02
32.23	1.42	154.77	6.82	378.51	16.69	0.45	0.02	15.36	0.68	14.14	0.62	43,611.36	1,922.93	14.10	0.62	0.39	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84.78	3.74	504.30	22.24	736.42	32.47	1.85	0.08	27.03	1.19	24.84	1.10	178,883.35	7,887.41	57.86	2.55	1.61	0.07
345.39	15.23	2,279.69	100.52	3,142.88	138.58	5.77	0.25	125.34	5.53	115.33	5.09	557,183.40	24,567.60	180.23	7.95	5.03	0.22
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18.65	0.99	105.93	5.60	92.99	4.92	0.16	0.01	4.57	0.24	4.57	0.24	12,786.73	676.56	1.67	0.09	0.11	0.01
68.04	3.60	433.46	22.93	434.68	23.00	0.78	0.04	18.32	0.97	18.32	0.97	63,081.19	3,337.69	6.11	0.32	0.53	0.03
10.56	0.56	58.64	3.10	99.86	5.28	0.35	0.02	2.83	0.15	2.83	0.15	32,802.22	1,735.60	0.92	0.05	0.25	0.01
28.15	1.24	156.78	6.91	197.18	8.69	0.36	0.02	8.92	0.39	8.92	0.39	25,232.48	1,112.56	2.53	0.11	0.21	0.01
192.79	8.50	1,228.12	54.15	1,231.58	54.30	2.20	0.10	51.89	2.29	51.89	2.29	178,730.04	7,880.65	17.30	0.76	1.49	0.07
83.42	4.41	509.59	26.96	493.05	26.09	0.87	0.05	21.76	1.15	21.76	1.15	70,650.93	3,738.21	7.46	0.39	0.59	0.03
41.71	2.21	254.79	13.48	246.53	13.04	0.44	0.02	10.88	0.58	10.88	0.58	35,325.47	1,869.11	3.73	0.20	0.30	0.02

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
41.71	1.84	254.79	11.23	246.53	10.87	0.44	0.02	10.88	0.48	10.88	0.48	35,325.47	1,557.59	3.73	0.16	0.30	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26.82	1.18	125.03	5.51	302.17	13.32	0.48	0.02	10.08	0.44	9.27	0.41	47,332.07	2,086.99	15.31	0.68	0.43	0.02
41.01	1.81	237.27	10.46	405.03	17.86	0.74	0.03	15.11	0.67	13.90	0.61	72,603.66	3,201.28	23.48	1.04	0.66	0.03
6.00	0.26	175.26	7.73	96.22	4.24	0.27	0.01	1.84	0.08	1.69	0.07	26,051.26	1,148.66	8.43	0.37	0.24	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17.84	0.79	98.52	4.34	80.46	3.55	0.10	0.00	5.66	0.25	5.20	0.23	9,353.60	412.42	3.03	0.13	0.08	0.00
14.64	0.65	117.59	5.18	171.39	7.56	0.53	0.02	5.19	0.23	4.78	0.21	51,713.07	2,280.16	16.73	0.74	0.47	0.02
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA
	76.98		448.17		683.29		1.15		28.20		26.44		107,505.69		29.78		0.96

Dam and Powerhouse Removal Equipment for the Partial Removal Alternative

Description	Power Rating (HP)	J.C. Boyle - Demolition	Copco No. 1 Modification	Copco No. 1 Demolition	Copco No. 2 Demolition	Iron Gate - Modification	Iron Gate - Demolition	Approximate Operating Hours/Day	J.C. Boyle - Demolition	Copco No. 1	Copco No. 2	Iron Gate - Demolition
Dam and Powerhouse Removal												
1/2 TON PICKUP TRUCK	277	19	4.7	13.3	5.7	6.7	19	20	0.7	0.9	0.8	0.8
3/4 TN 4x4 P/U	450	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
SINGLE AXLE LUBE TRUCK	250	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
SMALL MECHTRUCK	277	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
LRG MECH TRUCK	450	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
4000 GAL WATER TRUCK	300	2	0.2	0.7	0.3	0.7	2	20	0.7	0.9	0.8	0.8
1 TON FLATBED	410	1	0.5	1.4	0.6	0.4	1	20	0.7	0.9	0.8	0.8
SEMI TRACTOR	510	1	0.0	0	0	0.0		20	0.7	0.9	0.8	0.8
D6 DOZER	215	2	0.2	0.7	0.3	0.7	2	20	0.7	0.9	0.8	0.8
D8 DOZER	354	2	0.2	0.7	0.3	1.1	3	20	0.7	0.9	0.8	0.8
CAT 426 BACKHOE	94	1	0.2	0.7	0.3	0.0	0	20	0.7	0.9	0.8	0.8
CAT 14H MOTORGRADER	250	1	0.2	0.7	0.3	0.7	2	20	0.7	0.9	0.8	0.8
CAT 336/330, JD 330 EXCAVATOR	273	2	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
CAT 349/EX400 EXCAVATOR	275	2	0.5	1.4	0.6	1.1	3	20	0.7	0.9	0.8	0.8
CAT 374/365 EXCAVATOR	472		0.0	0	0	0.4	1	20	0.7	0.9	0.8	0.8
EX1100/1250 EXCAVATOR	600		0.0	0	0	0.7	2	20	0.7	0.9	0.8	0.8
CAT 563 - 84"ROLLER	137	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
WALK BEHIND ROLLER	20	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
S15-60T RT CRANE	365	1	0.5	1.4	0.6	0.4	1	20	0.7	0.9	0.8	0.8
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
3900 W 140T CRANE	287		0.2	0.7	0.3	0.0		20	0.7	0.9	0.8	0.8
S15-222 100 TN MANITOWOC CRANE	318	1	0.0	0	0	0.0		20	0.7	0.9	0.8	0.8
4100 SERIES 2 200T CRANE	231	1	0.0	0	0	0.0		20	0.7	0.9	0.8	0.8
S15-777 175 TN MANITOWOC CRANE	231		0.2	0.7	0.3	0.0		20	0.7	0.9	0.8	0.8

Description	Power Rating (HP)	J.C. Boyle - Demolition	Copco No. 1 Modification	Copco No. 1 Demolition	Copco No. 2 Demolition	Iron Gate - Modification	Iron Gate - Demolition	Approximate Operating Hours/Day	J.C. Boyle - Demolition	Copco No. 1	Copco No. 2	Iron Gate - Demolition
A40/CAT 740 HAUL TRUCK	496	5	0.7	2.1	0.9	0.7	2	20	0.7	0.9	0.8	0.8
CAT 773 HAUL TRUCK	775		0.0	0	0	1.4	4	20	0.7	0.9	0.8	0.8
175 COMPRESSOR	NA	1	0.5	1.4	0.6	0.4	1	24	0.7	0.9	0.8	0.8
400 COMPRESSOR	NA		0.2	0.7	0.3	0.0		24	0.7	0.9	0.8	0.8
200 - 250 AMP DIESEL WELDER	50	1	0.2	0.7	0.3	0.4	1	24	0.7	0.9	0.8	0.8
25 - 49 KW GENERATOR - 75 HP	75	1	0.5	1.4	0.6	0.7	2	24	0.7	0.9	0.8	0.8
125 - 174 KW GENERATOR - 250 HP	250	1	0.2	0.7	0.3	0.4	1	24	0.7	0.9	0.8	0.8
5 KW GENERATORS - 10 HP	10	5	2.2	6.3	2.7	2.1	6	20	0.7	0.9	0.8	0.8
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	5	1.2	3.5	1.5	1.8	5	20	0.7	0.9	0.8	0.8
6" TRASH PUMP	84	2	0.7	2.1	0.9	0.7	2	24	0.7	0.9	0.8	0.8
6" SUB PUMP	84	2	0.5	1.4	0.6	0.4	1	24	0.7	0.9	0.8	0.8
GROUT PUMP	84	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
950 LOADER	240	1	0.2	0.7	0.3	0.0		20	0.7	0.9	0.8	0.8
966F LOADER	280	1	0.5	1.4	0.6	0.4	1	20	0.7	0.9	0.8	0.8
980G LOADER	431		0.0	0	0	0.4	1	20	0.7	0.9	0.8	0.8
MANLIFT 60'	89	2	0.7	2.1	0.9	0.7	2	20	0.7	0.9	0.8	0.8
D19-42 PILE HAMMER (42,000 FT-LB)	NA	1	0.0	0	0	0.0		20	0.7	0.9	0.8	0.8
>10,000 LB EXTENDABLE FORKLIFT	89	1	0.5	1.4	0.6	0.4	1	20	0.7	0.9	0.8	0.8
OSR SM HYD DRL/CMP (2-1/2" - 4-1/2") - ROCK DRILL	221	1	0.7	2.1	0.9	0.4	1	20	0.7	0.9	0.8	0.8
CONCRETE SHEAR	NA	1	0.0	0	0	0.0		20	0.7	0.9	0.8	0.8
HOE RAM 330/349	NA	1	0.2	0.7	0.3	0.4	1	20	0.7	0.9	0.8	0.8
MAXI HEATER	NA	1	0.0	0	0	0.0		24	0.7	0.9	0.8	0.8
FLEXI FLOAT 10 X 40 X 7	NA	6	4.9	14	6	2.1	6	24	0.7	0.9	0.8	0.8
WORK BOAT	250		0.2	0.7	0.3	0.0		20	0.7	0.9	0.8	0.8
TOTAL												

J.C. Boyle Equipment for the Partial Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33.85	1.04	253.14	7.81	335.13	10.34	0.91	0.03	12.08	0.37	11.11	0.34	88,557.38	2,733.30	28.64	0.88	0.81
103.29	3.19	398.56	12.30	1,082.94	33.42	0.84	0.03	52.56	1.62	48.35	1.49	81,665.32	2,520.58	26.42	0.82	0.74
170.06	5.25	656.23	20.25	1,783.08	55.03	1.39	0.04	86.55	2.67	79.61	2.46	134,462.91	4,150.16	43.50	1.34	1.21
10.29	0.32	124.19	3.83	104.17	3.22	0.17	0.01	6.14	0.19	5.65	0.17	16,533.09	510.29	5.35	0.16	0.15
34.34	1.06	133.95	4.13	449.09	13.86	0.50	0.02	14.23	0.44	13.09	0.40	48,640.21	1,501.27	15.73	0.49	0.44
33.78	1.04	228.90	7.06	353.90	10.92	1.02	0.03	10.85	0.33	9.98	0.31	97,887.63	3,021.28	31.66	0.98	0.89
34.03	1.05	230.58	7.12	356.50	11.00	1.02	0.03	10.93	0.34	10.05	0.31	98,604.76	3,043.41	31.89	0.98	0.89
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18.40	0.02	182.58	0.20	186.84	0.20	0.26	0.00	11.42	0.01	10.51	0.01	24,671.30	26.65	7.98	0.01	0.22
6.44	0.20	34.94	1.08	33.07	1.02	0.04	0.00	2.23	0.07	2.05	0.06	3,996.01	123.34	1.29	0.04	0.04
36.99	1.14	177.64	5.48	434.45	13.41	0.52	0.02	17.63	0.54	16.23	0.50	50,057.07	1,545.00	16.18	0.50	0.45
32.23	0.99	154.77	4.78	378.51	11.68	0.45	0.01	15.36	0.47	14.14	0.44	43,611.36	1,346.05	14.10	0.44	0.39
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32.23	0.99	154.77	4.78	378.51	11.68	0.45	0.01	15.36	0.47	14.14	0.44	43,611.36	1,346.05	14.10	0.44	0.39
23.41	0.72	112.43	3.47	274.95	8.49	0.33	0.01	11.16	0.34	10.27	0.32	31,679.95	977.79	10.24	0.32	0.29
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
211.95	6.54	1,260.75	38.91	1,841.04	56.82	4.62	0.14	67.57	2.09	62.10	1.92	447,208.38	13,802.97	144.66	4.46	4.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18.65	0.69	105.93	3.92	92.99	3.44	0.16	0.01	4.57	0.17	4.57	0.17	12,786.73	473.59	1.67	0.06	0.11
34.02	1.26	216.73	8.03	217.34	8.05	0.39	0.01	9.16	0.34	9.16	0.34	31,540.59	1,168.19	3.05	0.11	0.26
10.56	0.39	58.64	2.17	99.86	3.70	0.35	0.01	2.83	0.10	2.83	0.10	32,802.22	1,214.92	0.92	0.03	0.25
23.46	0.72	130.65	4.03	164.32	5.07	0.30	0.01	7.44	0.23	7.44	0.23	21,027.06	648.99	2.11	0.07	0.18
192.79	5.95	1,228.12	37.91	1,231.58	38.01	2.20	0.07	51.89	1.60	51.89	1.60	178,730.04	5,516.46	17.30	0.53	1.49
83.42	3.09	509.59	18.87	493.05	18.26	0.87	0.03	21.76	0.81	21.76	0.81	70,650.93	2,616.75	7.46	0.28	0.59
83.42	3.09	509.59	18.87	493.05	18.26	0.87	0.03	21.76	0.81	21.76	0.81	70,650.93	2,616.75	7.46	0.28	0.59

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)
41.71	1.29	254.79	7.86	246.53	7.61	0.44	0.01	10.88	0.34	10.88	0.34	35,325.47	1,090.31	3.73	0.12	0.30
22.99	0.71	107.17	3.31	259.00	7.99	0.41	0.01	8.64	0.27	7.95	0.25	40,570.35	1,252.19	13.12	0.41	0.37
26.82	0.83	125.03	3.86	302.17	9.33	0.48	0.01	10.08	0.31	9.27	0.29	47,332.07	1,460.89	15.31	0.47	0.43
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	0.19	175.26	5.41	96.22	2.97	0.27	0.01	1.84	0.06	1.69	0.05	26,051.26	804.07	8.43	0.26	0.24
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17.84	0.55	98.52	3.04	80.46	2.48	0.10	0.00	5.66	0.17	5.20	0.16	9,353.60	288.70	3.03	0.09	0.08
14.64	9.04	117.59	72.59	171.39	105.80	0.53	0.33	5.19	3.21	4.78	2.95	51,713.07	1,596.11	16.73	10.33	0.47
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA
	51.36		311.09		472.09		0.93		18.38		17.26		57,396.06		24.89	

Copco No. 1 Equipment for the Partial Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36.15	1.43	139.49	5.54	379.03	15.04	0.29	0.01	18.40	0.73	16.92	0.67	28,582.86	1,134.26	9.25	0.37	0.26	0.01
59.52	2.36	229.68	9.11	624.08	24.77	0.49	0.02	30.29	1.20	27.86	1.11	47,062.02	1,867.57	15.22	0.60	0.42	0.02
7.20	0.29	86.93	3.45	72.92	2.89	0.12	0.00	4.30	0.17	3.96	0.16	11,573.17	459.26	3.74	0.15	0.10	0.00
24.04	0.95	93.77	3.72	314.36	12.47	0.35	0.01	9.96	0.40	9.16	0.36	34,048.14	1,351.14	11.01	0.44	0.31	0.01
11.82	0.47	80.12	3.18	123.87	4.92	0.36	0.01	3.80	0.15	3.49	0.14	34,260.67	1,359.57	11.08	0.44	0.31	0.01
23.82	0.95	161.40	6.41	249.55	9.90	0.72	0.03	7.65	0.30	7.04	0.28	69,023.33	2,739.07	22.33	0.89	0.63	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.88	0.51	127.81	5.07	130.79	5.19	0.18	0.01	8.00	0.32	7.35	0.29	17,269.91	685.33	5.59	0.22	0.16	0.01

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
4.51	0.18	24.46	0.97	23.15	0.92	0.03	0.00	1.56	0.06	1.44	0.06	2,797.21	111.00	0.90	0.04	0.03	0.00
51.79	2.06	248.70	9.87	608.23	24.14	0.73	0.03	24.69	0.98	22.72	0.90	70,079.90	2,781.00	22.66	0.90	0.63	0.03
22.56	0.90	108.34	4.30	264.95	10.51	0.32	0.01	10.75	0.43	9.90	0.39	30,527.95	1,211.45	9.87	0.39	0.28	0.01
20.36	0.81	97.78	3.88	239.13	9.49	0.29	0.01	9.71	0.39	8.93	0.35	27,551.96	1,093.35	8.91	0.35	0.25	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16.39	0.65	78.70	3.12	192.47	7.64	0.23	0.01	7.81	0.31	7.19	0.29	22,175.97	880.01	7.17	0.28	0.20	0.01
89.02	3.53	529.52	21.01	773.24	30.68	1.94	0.08	28.38	1.13	26.08	1.04	187,827.52	7,453.60	60.76	2.41	1.69	0.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13.06	0.62	74.15	3.53	65.09	3.10	0.11	0.01	3.20	0.15	3.20	0.15	8,950.71	426.23	1.17	0.06	0.07	0.00
47.63	2.27	303.42	14.45	304.27	14.49	0.54	0.03	12.82	0.61	12.82	0.61	44,156.83	2,102.74	4.27	0.20	0.37	0.02
7.39	0.35	41.05	1.95	69.90	3.33	0.24	0.01	1.98	0.09	1.98	0.09	22,961.55	1,093.43	0.65	0.03	0.17	0.01
29.56	1.17	164.62	6.53	207.04	8.22	0.37	0.01	9.37	0.37	9.37	0.37	26,494.10	1,051.37	2.66	0.11	0.22	0.01
134.95	5.36	859.69	34.12	862.11	34.21	1.54	0.06	36.32	1.44	36.32	1.44	125,111.02	4,964.81	12.11	0.48	1.05	0.04
87.59	4.17	535.07	25.48	517.71	24.65	0.91	0.04	22.84	1.09	22.84	1.09	74,183.48	3,532.61	7.83	0.37	0.62	0.03
58.39	2.78	356.71	16.99	345.14	16.44	0.61	0.03	15.23	0.73	15.23	0.73	49,455.65	2,355.07	5.22	0.25	0.41	0.02
29.20	1.16	178.36	7.08	172.57	6.85	0.30	0.01	7.61	0.30	7.61	0.30	24,727.83	981.28	2.61	0.10	0.21	0.01
16.09	0.64	75.02	2.98	181.30	7.19	0.29	0.01	6.05	0.24	5.56	0.22	28,399.24	1,126.97	9.19	0.36	0.26	0.01
37.55	1.49	175.04	6.95	423.04	16.79	0.68	0.03	14.11	0.56	12.98	0.52	66,264.90	2,629.61	21.44	0.85	0.60	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.30	0.25	184.03	7.30	101.03	4.01	0.28	0.01	1.93	0.08	1.77	0.07	27,353.82	1,085.49	8.85	0.35	0.25	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
24.97	0.99	137.93	5.47	112.64	4.47	0.13	0.01	7.92	0.31	7.29	0.29	13,095.04	519.65	4.24	0.17	0.12	0.00
30.75	1.22	246.94	9.80	359.91	14.28	1.11	0.04	10.91	0.43	10.05	0.40	108,597.45	4,309.50	35.13	1.39	0.99	0.04
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
35.00	1.39	196.61	7.80	111.40	4.42	556.32	22.08	15.07	0.60	NA	NA	40,791.88	1,618.75	NA	NA	NA	NA
	38.94		230.06		321.01		22.62		13.57		12.31		50,924.14		12.21		0.43

Copco No. 2 Equipment for the Partial Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.49	0.55	162.44	5.73	162.44	5.73	0.13	0.00	7.88	0.28	7.25	0.26	12,249.80	432.10	3.96	0.14	0.11	0.00
25.51	0.90	267.46	9.43	267.46	9.43	0.21	0.01	12.98	0.46	11.94	0.42	20,169.44	711.46	6.52	0.23	0.18	0.01
3.09	0.11	31.25	1.10	31.25	1.10	0.05	0.00	1.84	0.06	1.70	0.06	4,959.93	174.96	1.60	0.06	0.04	0.00
10.30	0.36	134.73	4.75	134.73	4.75	0.15	0.01	4.27	0.15	3.93	0.14	14,592.06	514.72	4.72	0.17	0.13	0.00
5.07	0.18	53.09	1.87	53.09	1.87	0.15	0.01	1.63	0.06	1.50	0.05	14,683.14	517.93	4.75	0.17	0.13	0.00
10.21	0.36	106.95	3.77	106.95	3.77	0.31	0.01	3.28	0.12	3.02	0.11	29,581.43	1,043.45	9.57	0.34	0.27	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.52	0.19	56.05	1.98	56.05	1.98	0.08	0.00	3.43	0.12	3.15	0.11	7,401.39	261.08	2.39	0.08	0.07	0.00
1.93	0.07	9.92	0.35	9.92	0.35	0.01	0.00	0.67	0.02	0.62	0.02	1,198.80	42.29	0.39	0.01	0.01	0.00
22.20	0.78	260.67	9.19	260.67	9.19	0.31	0.01	10.58	0.37	9.74	0.34	30,034.24	1,059.43	9.71	0.34	0.27	0.01
9.67	0.34	113.55	4.01	113.55	4.01	0.14	0.00	4.61	0.16	4.24	0.15	13,083.41	461.50	4.23	0.15	0.12	0.00
8.73	0.31	102.48	3.61	102.48	3.61	0.12	0.00	4.16	0.15	3.83	0.14	11,807.98	416.51	3.82	0.13	0.11	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.02	0.25	82.49	2.91	82.49	2.91	0.10	0.00	3.35	0.12	3.08	0.11	9,503.99	335.24	3.07	0.11	0.09	0.00
38.15	1.35	331.39	11.69	331.39	11.69	0.83	0.03	12.16	0.43	11.18	0.39	80,497.51	2,839.47	26.04	0.92	0.72	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5.60	0.24	27.90	1.18	27.90	1.18	0.05	0.00	1.37	0.06	1.37	0.06	3,836.02	162.37	0.50	0.02	0.03	0.00
20.41	0.86	130.40	5.52	130.40	5.52	0.23	0.01	5.49	0.23	5.49	0.23	18,924.36	801.05	1.83	0.08	0.16	0.01
3.17	0.13	29.96	1.27	29.96	1.27	0.10	0.00	0.85	0.04	0.85	0.04	9,840.67	416.54	0.28	0.01	0.07	0.00
12.67	0.45	88.73	3.13	88.73	3.13	0.16	0.01	4.02	0.14	4.02	0.14	11,354.61	400.52	1.14	0.04	0.09	0.00
57.84	2.04	369.47	13.03	369.47	13.03	0.66	0.02	15.57	0.55	15.57	0.55	53,619.01	1,891.36	5.19	0.18	0.45	0.02
37.54	1.59	221.87	9.39	221.87	9.39	0.39	0.02	9.79	0.41	9.79	0.41	31,792.92	1,345.76	3.36	0.14	0.27	0.01
25.03	1.06	147.92	6.26	147.92	6.26	0.26	0.01	6.53	0.28	6.53	0.28	21,195.28	897.17	2.24	0.09	0.18	0.01

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
12.51	0.44	73.96	2.61	73.96	2.61	0.13	0.00	3.26	0.12	3.26	0.12	10,597.64	373.82	1.12	0.04	0.09	0.00
6.90	0.24	77.70	2.74	77.70	2.74	0.12	0.00	2.59	0.09	2.38	0.08	12,171.10	429.32	3.94	0.14	0.11	0.00
16.09	0.57	181.30	6.40	181.30	6.40	0.29	0.01	6.05	0.21	5.56	0.20	28,399.24	1,001.75	9.19	0.32	0.26	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.70	0.10	43.30	1.53	43.30	1.53	0.12	0.00	0.83	0.03	0.76	0.03	11,723.07	413.52	3.79	0.13	0.11	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10.70	0.38	48.28	1.70	48.28	1.70	0.06	0.00	3.39	0.12	3.12	0.11	5,612.16	197.96	1.82	0.06	0.05	0.00
13.18	0.46	154.25	5.44	154.25	5.44	0.48	0.02	4.67	0.16	4.31	0.15	46,541.76	1,641.71	15.06	0.53	0.43	0.01
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
15.00	0.53	47.74	1.68	47.74	1.68	238.42	8.41	6.46	0.23	NA	NA	17,482.23	616.67	NA	NA	NA	NA
	14.83		122.29		122.29		8.62		5.17		4.69		19,399.67		4.65		0.17

Iron Gate Equipment for the Partial Removal Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103.29	3.64	398.56	14.06	1,082.94	38.20	0.84	0.03	52.56	1.85	48.35	1.71	81,665.32	2,880.66	26.42	0.93	0.74	0.03
255.09	9.00	984.34	34.72	2,674.61	94.34	2.08	0.07	129.82	4.58	119.41	4.21	201,694.36	7,114.56	65.25	2.30	1.82	0.06
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68.68	2.42	267.91	9.45	898.17	31.68	1.00	0.04	28.45	1.00	26.18	0.92	97,280.41	3,431.47	31.47	1.11	0.88	0.03
16.89	0.60	114.45	4.04	176.95	6.24	0.51	0.02	5.43	0.19	4.99	0.18	48,943.82	1,726.44	15.83	0.56	0.44	0.02
51.04	1.80	345.87	12.20	534.74	18.86	1.54	0.05	16.40	0.58	15.08	0.53	147,907.14	5,217.27	47.84	1.69	1.34	0.05
25.65	0.90	195.10	6.88	238.86	8.43	0.88	0.03	8.00	0.28	7.35	0.26	84,230.25	2,971.14	27.24	0.96	0.77	0.03
65.21	2.30	496.02	17.50	607.27	21.42	2.23	0.08	20.34	0.72	18.70	0.66	214,144.71	7,553.74	69.27	2.44	1.95	0.07
18.40	0.65	182.58	6.44	186.84	6.59	0.26	0.01	11.42	0.40	10.51	0.37	24,671.30	870.26	7.98	0.28	0.22	0.01

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
6.44	0.23	34.94	1.23	33.07	1.17	0.04	0.00	2.23	0.08	2.05	0.07	3,996.01	140.96	1.29	0.05	0.04	0.00
36.99	1.30	177.64	6.27	434.45	15.32	0.52	0.02	17.63	0.62	16.23	0.57	50,057.07	1,765.71	16.18	0.57	0.45	0.02
32.23	1.14	154.77	5.46	378.51	13.35	0.45	0.02	15.36	0.54	14.14	0.50	43,611.36	1,538.35	14.10	0.50	0.39	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84.78	2.99	504.30	17.79	736.42	25.98	1.85	0.07	27.03	0.95	24.84	0.88	178,883.35	6,309.93	57.86	2.04	1.61	0.06
345.39	12.18	2,279.69	80.41	3,142.88	110.86	5.77	0.20	125.34	4.42	115.33	4.07	557,183.40	19,654.08	180.23	6.36	5.03	0.18
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18.65	0.79	105.93	4.48	92.99	3.94	0.16	0.01	4.57	0.19	4.57	0.19	12,786.73	541.25	1.67	0.07	0.11	0.00
68.04	2.88	433.46	18.35	434.68	18.40	0.78	0.03	18.32	0.78	18.32	0.78	63,081.19	2,670.15	6.11	0.26	0.53	0.02
10.56	0.45	58.64	2.48	99.86	4.23	0.35	0.01	2.83	0.12	2.83	0.12	32,802.22	1,388.48	0.92	0.04	0.25	0.01
28.15	0.99	156.78	5.53	197.18	6.96	0.36	0.01	8.92	0.31	8.92	0.31	25,232.48	890.05	2.53	0.09	0.21	0.01
192.79	6.80	1,228.12	43.32	1,231.58	43.44	2.20	0.08	51.89	1.83	51.89	1.83	178,730.04	6,304.52	17.30	0.61	1.49	0.05
83.42	3.53	509.59	21.57	493.05	20.87	0.87	0.04	21.76	0.92	21.76	0.92	70,650.93	2,990.57	7.46	0.32	0.59	0.03
41.71	1.77	254.79	10.79	246.53	10.44	0.44	0.02	10.88	0.46	10.88	0.46	35,325.47	1,495.28	3.73	0.16	0.30	0.01
41.71	1.47	254.79	8.99	246.53	8.70	0.44	0.02	10.88	0.38	10.88	0.38	35,325.47	1,246.07	3.73	0.13	0.30	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26.82	0.95	125.03	4.41	302.17	10.66	0.48	0.02	10.08	0.36	9.27	0.33	47,332.07	1,669.59	15.31	0.54	0.43	0.02
41.01	1.45	237.27	8.37	405.03	14.29	0.74	0.03	15.11	0.53	13.90	0.49	72,603.66	2,561.02	23.48	0.83	0.66	0.02
6.00	0.21	175.26	6.18	96.22	3.39	0.27	0.01	1.84	0.06	1.69	0.06	26,051.26	918.93	8.43	0.30	0.24	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17.84	0.63	98.52	3.48	80.46	2.84	0.10	0.00	5.66	0.20	5.20	0.18	9,353.60	329.94	3.03	0.11	0.08	0.00
14.64	0.52	117.59	4.15	171.39	6.05	0.53	0.02	5.19	0.18	4.78	0.17	51,713.07	1,824.13	16.73	0.59	0.47	0.02
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA
	61.58		358.54		546.63		0.92		22.56		21.15		86,004.55		23.82		0.76

Dam and Powerhouse Equipment for the Continued Operations with Fish Passage Alternative

Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle	JC Boyle Hours	Copco No. 1	Copco No. 1 No. Hours	Copco No. 2	Copco No. 2 No. Hours	Iron Gate	Iron Gate Hours	Approximate Operating Hours/Day
Dam and Powerhouse Removal												
Lattice boom crane, 160'	335	Crane	42	1	968	1	1896	1	440	1	2280	8
Hydraulic yard crane, 40'-60'	130	Crane	40	2	1456	2	2848	2	656	2	3424	8
Hydraulic excavator w/ hoe ram attachment	321	Excavator	65	1	240	1	472	1	112	1	568	8
Hydraulic excavator, CAT 244-321 hp	321	Excavator	65	1	728	1	1424	1	328	1	1712	8
Wheel-loader, CAT 966, 5 yd3	246	Tractors/Loaders/ Backhoes		1	728	1	1424	1	328	1	1712	8
Dump truck, CAT 740, 20 yd3	415			2	976	2	952	2	448	2	2288	8
Crawler dozer, CAT 238	238	Rubber Tired Dozers	159	1	240	1	472	1	112	1	568	8
Pickup trucks	191			1		1	1896	1		1	2280	8
Pickup trucks	160			1	968	1	1896	1	440	1	2280	
Pickup trucks	195			1	968	1	1896	1	440	1	2280	
Water tank truck, off-highway	175	Water truck	218	1	448	1	952	1	224	1	1144	8
Concrete pump truck w/ boom and hosing	235	Pump	142	4	1536	5	5320	4	704	5	4560	8
Vibratory compactor	138	Bore/Drill Rigs	27	1	240	1	472	1	112	1	568	8
Engine generator, 6.5 KW	13	Generator Sets	73	1	872	1	1704	1	400	1	2056	8
Portable generator, 1 KW	2.75	Generator Sets	73	2	1744	2	3408	2	800	2	4112	8

Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle	JC Boyle Hours	Copco No. 1	Copco No. 1 No. Hours	Copco No. 2	Copco No. 2 No. Hours	Iron Gate	Iron Gate Hours	Approximate Operating Hours/Day
Air compressor, 160 cfm, 100 psi	60	Air compressor	17	1	240	1	472	1	112	1	568	8
Air compressor, 250 cfm, 100 psi	80	Air compressor	17	1	240	1	472	1	112	1	568	
Highway dump truck	450			1	488	1	952	1	224	1	1144	8

J.C. Boyle Equipment for the Continued Operations with Fish Passage Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CO2 (lb)	CH ₄ (g/hr)	CH ₄ (lb/day)	CH ₄ (lb)	N ₂ O (g/hr)	N ₂ O (lb/day)	N ₂ O (lb)
33.95	0.60	20.44	0.36	49.99	0.88	0.06	0.00	2.03	0.04	1.87	0.03	5,759.99	101.59	12,292.26	1.86	0.03	3.97	0.05	0.00	0.11
49.12	0.87	306.51	5.41	432.11	7.62	0.36	0.01	30.03	0.53	27.63	0.49	35,429.46	624.87	113,726.19	11.46	0.20	36.79	0.32	0.01	1.03
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	30,449.91	18.61	0.33	9.85	0.52	0.01	0.28
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	92,364.74	18.61	0.33	29.88	0.52	0.01	0.84
19.06	0.34	107.96	1.90	215.65	3.80	0.45	0.01	7.28	0.13	6.70	0.12	42,831.43	755.42	68,743.01	13.85	0.24	22.23	0.39	0.01	0.62
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57.17	1.01	220.60	3.89	599.40	10.57	0.47	0.01	29.09	0.51	26.76	0.47	45,200.81	797.21	23,916.19	14.62	0.26	7.74	0.41	0.01	0.22
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.72	0.86	581.71	10.26	393.10	6.93	0.86	0.02	19.79	0.35	18.22	0.32	82,300.72	1,451.54	81,286.09	26.62	0.47	26.29	0.75	0.01	0.74
137.03	2.42	717.16	12.65	1,223.56	21.58	4.17	0.07	36.17	0.64	36.17	0.64	395,308.78	6,972.06	1,338,635.37	11.83	0.21	40.04	2.97	0.05	10.07
14.97	0.26	228.10	4.02	188.84	3.33	0.33	0.01	9.04	0.16	8.31	0.15	32,083.10	565.85	16,975.49	10.38	0.18	5.49	0.29	0.01	0.16
6.10	0.11	22.95	0.40	28.87	0.51	0.05	0.00	1.31	0.02	1.31	0.02	3,693.94	65.15	7,101.36	0.37	0.01	0.71	0.03	0.00	0.06
2.58	0.05	14.37	0.25	18.07	0.32	0.03	0.00	0.82	0.01	0.82	0.01	2,312.98	40.79	8,893.08	0.23	0.00	0.89	0.02	0.00	0.07
25.55	0.45	144.60	2.55	121.56	2.14	0.20	0.00	6.11	0.11	6.11	0.11	16,367.01	288.66	8,659.95	2.30	0.04	1.22	0.14	0.00	0.07
34.06	0.00	192.81	0.00	162.09	0.00	0.27	0.00	8.14	0.00	8.14	0.00	21,822.68	0.00	11,546.60	3.07	0.00	1.63	0.18	0.00	0.10
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	7.65		46.45		65.03		0.14		2.72		2.57		13,693.13	1,814,590.23		2.31	186.73		0.11	14.36

Copco No. 1 Equipment for the Continued Operations with Fish Passage Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CO ₂ (lb)	CH ₄ (g/hr)	CH ₄ (lb/day)	CH ₄ (lb)	N ₂ O (g/hr)	N ₂ O (lb/day)	N ₂ O (lb)
33.95	0.60	20.44	0.36	49.99	0.88	0.06	0.00	2.03	0.04	1.87	0.03	5,759.99	101.59	24,076.58	1.86	0.03	7.78	0.05	0.00	0.22
49.12	0.87	306.51	5.41	432.11	7.62	0.36	0.01	30.03	0.53	27.63	0.49	35,429.46	624.87	222,453.43	11.46	0.20	71.96	0.32	0.01	2.02
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	59,884.83	18.61	0.33	19.37	0.52	0.01	0.54
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	180,669.49	18.61	0.33	58.44	0.52	0.01	1.64
19.06	0.34	107.96	1.90	215.65	3.80	0.45	0.01	7.28	0.13	6.70	0.12	42,831.43	755.42	134,464.35	13.85	0.24	43.49	0.39	0.01	1.22
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57.17	1.01	220.60	3.89	599.40	10.57	0.47	0.01	29.09	0.51	26.76	0.47	45,200.81	797.21	47,035.18	14.62	0.26	15.22	0.41	0.01	0.42
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.72	0.86	581.71	10.26	393.10	6.93	0.86	0.02	19.79	0.35	18.22	0.32	82,300.72	1,451.54	172,732.94	26.62	0.47	55.86	0.75	0.01	1.57
171.29	3.02	896.45	15.81	1,529.45	26.97	5.22	0.09	45.21	0.80	45.21	0.80	494,135.98	8,715.07	5,795,524.21	14.78	0.26	173.37	3.72	0.07	43.59
14.97	0.26	228.10	4.02	188.84	3.33	0.33	0.01	9.04	0.16	8.31	0.15	32,083.10	565.85	33,385.12	10.38	0.18	10.80	0.29	0.01	0.31
6.10	0.11	22.95	0.40	28.87	0.51	0.05	0.00	1.31	0.02	1.31	0.02	3,693.94	65.15	13,876.96	0.37	0.01	1.39	0.03	0.00	0.12
2.58	0.05	14.37	0.25	18.07	0.32	0.03	0.00	0.82	0.01	0.82	0.01	2,312.98	40.79	17,378.23	0.23	0.00	1.74	0.02	0.00	0.15
25.55	0.45	144.60	2.55	121.56	2.14	0.20	0.00	6.11	0.11	6.11	0.11	16,367.01	288.66	17,031.23	2.30	0.04	2.40	0.14	0.00	0.14
34.06	0.00	192.81	0.00	162.09	0.00	0.27	0.00	8.14	0.00	8.14	0.00	21,822.68	0.00	22,708.31	3.07	0.00	3.20	0.18	0.00	0.19
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	8.26		49.61		70.43		0.16		2.88		2.73		15,436.15	6,741,220.85		2.36	465.02		0.13	52.12

Copco No. 2 Equipment for the Continued Operations with Fish Passage Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CO ₂ (lb)	CH ₄ (g/hr)	CH ₄ (lb/day)	CH ₄ (lb)	N ₂ O (g/hr)	N ₂ O (lb/day)	N ₂ O (lb)
33.95	0.60	20.44	0.36	49.99	0.88	0.06	0.00	2.03	0.04	1.87	0.03	5,759.99	101.59	5,587.39	1.86	0.03	1.81	0.05	0.00	0.05
49.12	0.87	306.51	5.41	432.11	7.62	0.36	0.01	30.03	0.53	27.63	0.49	35,429.46	624.87	51,239.27	11.46	0.20	16.57	0.32	0.01	0.47
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	14,209.96	18.61	0.33	4.60	0.52	0.01	0.13
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	41,614.88	18.61	0.33	13.46	0.52	0.01	0.38
19.06	0.34	107.96	1.90	215.65	3.80	0.45	0.01	7.28	0.13	6.70	0.12	42,831.43	755.42	30,972.12	13.85	0.24	10.02	0.39	0.01	0.28
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57.17	1.01	220.60	3.89	599.40	10.57	0.47	0.01	29.09	0.51	26.76	0.47	45,200.81	797.21	11,160.89	14.62	0.26	3.61	0.41	0.01	0.10
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.72	0.86	581.71	10.26	393.10	6.93	0.86	0.02	19.79	0.35	18.22	0.32	82,300.72	1,451.54	40,643.05	26.62	0.47	13.14	0.75	0.01	0.37
137.03	2.42	717.16	12.65	1,223.56	21.58	4.17	0.07	36.17	0.64	36.17	0.64	395,308.78	6,972.06	613,541.21	11.83	0.21	18.35	2.97	0.05	4.61
14.97	0.26	228.10	4.02	188.84	3.33	0.33	0.01	9.04	0.16	8.31	0.15	32,083.10	565.85	7,921.89	10.38	0.18	2.56	0.29	0.01	0.07
6.10	0.11	22.95	0.40	28.87	0.51	0.05	0.00	1.31	0.02	1.31	0.02	3,693.94	65.15	3,257.50	0.37	0.01	0.33	0.03	0.00	0.03
2.58	0.05	14.37	0.25	18.07	0.32	0.03	0.00	0.82	0.01	0.82	0.01	2,312.98	40.79	4,079.40	0.23	0.00	0.41	0.02	0.00	0.03
25.55	0.45	144.60	2.55	121.56	2.14	0.20	0.00	6.11	0.11	6.11	0.11	16,367.01	288.66	4,041.31	2.30	0.04	0.57	0.14	0.00	0.03
34.06	0.00	192.81	0.00	162.09	0.00	0.27	0.00	8.14	0.00	8.14	0.00	21,822.68	0.00	5,388.41	3.07	0.00	0.76	0.18	0.00	0.05
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	7.65		46.45		65.03		0.14		2.72		2.57		13,693.13	833,657.29		2.31	86.19		0.11	6.60

Iron Gate Equipment for the Continued Operations with Fish Passage Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CO ₂ (lb)	CH ₄ (g/hr)	CH ₄ (lb/day)	CH ₄ (lb)	N ₂ O (g/hr)	N ₂ O (lb/day)	N ₂ O (lb)
33.95	0.60	20.44	0.36	49.99	0.88	0.06	0.00	2.03	0.04	1.87	0.03	5,759.99	101.59	28,952.85	1.86	0.03	9.36	0.05	0.00	0.26
49.12	0.87	306.51	5.41	432.11	7.62	0.36	0.01	30.03	0.53	27.63	0.49	35,429.46	624.87	267,444.01	11.46	0.20	86.51	0.32	0.01	2.43
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	72,064.80	18.61	0.33	23.31	0.52	0.01	0.65
19.86	0.35	134.57	2.37	208.06	3.67	0.60	0.01	6.38	0.11	5.87	0.10	57,549.32	1,015.00	217,209.39	18.61	0.33	70.26	0.52	0.01	1.97
19.06	0.34	107.96	1.90	215.65	3.80	0.45	0.01	7.28	0.13	6.70	0.12	42,831.43	755.42	161,659.38	13.85	0.24	52.29	0.39	0.01	1.47
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57.17	1.01	220.60	3.89	599.40	10.57	0.47	0.01	29.09	0.51	26.76	0.47	45,200.81	797.21	56,601.66	14.62	0.26	18.31	0.41	0.01	0.51
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.72	0.86	581.71	10.26	393.10	6.93	0.86	0.02	19.79	0.35	18.22	0.32	82,300.72	1,451.54	207,569.84	26.62	0.47	67.13	0.75	0.01	1.89
171.29	3.02	896.45	15.81	1,529.45	26.97	5.22	0.09	45.21	0.80	45.21	0.80	494,135.98	8,715.07	4,967,592.18	14.78	0.26	148.60	3.72	0.07	37.36
14.97	0.26	228.10	4.02	188.84	3.33	0.33	0.01	9.04	0.16	8.31	0.15	32,083.10	565.85	40,175.32	10.38	0.18	13.00	0.29	0.01	0.37
6.10	0.11	22.95	0.40	28.87	0.51	0.05	0.00	1.31	0.02	1.31	0.02	3,693.94	65.15	16,743.57	0.37	0.01	1.68	0.03	0.00	0.14
2.58	0.05	14.37	0.25	18.07	0.32	0.03	0.00	0.82	0.01	0.82	0.01	2,312.98	40.79	20,968.10	0.23	0.00	2.10	0.02	0.00	0.18
25.55	0.45	144.60	2.55	121.56	2.14	0.20	0.00	6.11	0.11	6.11	0.11	16,367.01	288.66	20,495.21	2.30	0.04	2.89	0.14	0.00	0.17
34.06	0.00	192.81	0.00	162.09	0.00	0.27	0.00	8.14	0.00	8.14	0.00	21,822.68	0.00	27,326.94	3.07	0.00	3.85	0.18	0.00	0.23
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	8.26		49.61		70.43		0.16		2.88		2.73		15,436.15	6,104,803.22		2.36	499.28		0.13	47.62

Restoration Equipment for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Alternative

Description	Power Rating (HP)	Comparable OFFROAD Equipment	J.C. Boyle - Demolition	Copco No. 1 - Demolition	Copco No. 2 - Demolition	Iron Gate - Demolition	Total	Approximate Operating Hours/Day
Restoration								
1/2 TON PICKUP TRUCK	277	Off-Highway Trucks	2	1.4	0.6	2	6	10
3/4 TON PICKUP TRUCK	450	Off-Highway Trucks	2	1.4	0.6	2	6	10
1 TON FLATBED	410	Off-Highway Trucks	1	0	0	1	2	10
SEMI TRACTOR	510	Tractors/Loaders/Backhoes	1	0.7	0.3	1	3	10
HONDA PIONEER 1000 SIDE BY SIDE	72	NA	3	2.1	0.9	3	9	10
GODWIN 3" PUMP	84	Pumps	1	0.7	0.3	1	3	10
GODWIN 6" PUMP	84	Pumps	1	0.7	0.3	1	3	10
CAT 323 EXCAVATOR	164	Excavators	1	0.7	0.3	1	3	10
CAT 330 EXCAVATOR	275	Excavators	1	0.7	0.3	1	3	10
CAT 336 EXCAVATOR	311	Excavators	1	0	0		1	10
CAT 304 EXCAVATOR	40	Excavators	1	0.7	0.3	1	3	10
CAT D6 DOZER	215	Rubber Tired Dozers	1	0.7	0.3	1	3	10
CAT 299 SKID STEER	110	Skid Steer Loader	2	0.7	0.3	1	4	10
CAT 735 HAUL TRUCK	424	Off-Highway Trucks	2	1.4	0.6	2	6	10
MAROOKA MST2200VDR TRACK TRUCK	250	Off-Highway Trucks	1	0.7	0.3	1	3	10
JOHN DEERE 6150M TRACTOR	150	Tractors/Loaders/Backhoes	1	0.7	0.3	1	3	10
JOHN DEERE 5125R TRACTOR	125	Tractors/Loaders/Backhoes	1	0.7	0.3	1	3	10
CASE 340 TRACTOR	340	Tractors/Loaders/Backhoes	1	0.7	0.3	1	3	10
HONDA EM6500S GENERATOR	7.4	Generator Sets	1	1.4	0.6	2	5	10
BELL 206L LONG RANGER HELICOPTER	450	Helicopter	1	0	0	1	2	6
TOTAL								

J.C. Boyle Restoration Equipment for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33.85	0.75	253.14	5.58	335.13	7.39	0.91	0.02	12.08	0.27	11.11	0.25	88,557.38	1,952.36	28.64	0.63	0.81	0.02
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
41.71	0.92	254.79	5.62	246.53	5.43	0.44	0.01	10.88	0.24	10.88	0.24	35,325.47	778.79	3.73	0.08	0.30	0.01
41.71	0.92	254.79	5.62	246.53	5.43	0.44	0.01	10.88	0.24	10.88	0.24	35,325.47	778.79	3.73	0.08	0.30	0.01
13.49	0.30	192.55	4.25	126.73	2.79	0.31	0.01	6.14	0.14	5.65	0.12	29,437.39	648.98	9.52	0.21	0.27	0.01
17.01	0.38	115.29	2.54	178.25	3.93	0.51	0.01	5.47	0.12	5.03	0.11	49,302.38	1,086.93	15.95	0.35	0.45	0.01
19.24	0.42	130.38	2.87	201.58	4.44	0.58	0.01	6.18	0.14	5.68	0.13	55,756.51	1,229.22	18.03	0.40	0.51	0.01
8.55	0.19	67.81	1.49	59.56	1.31	0.08	0.00	3.06	0.07	2.82	0.06	7,985.74	176.06	2.58	0.06	0.07	0.00
51.64	1.14	199.28	4.39	541.47	11.94	0.42	0.01	26.28	0.58	24.17	0.53	40,832.66	900.21	13.21	0.29	0.37	0.01
14.49	0.32	266.74	5.88	192.58	4.25	0.40	0.01	7.84	0.17	7.21	0.16	38,418.96	846.99	12.42	0.27	0.35	0.01
72.47	1.60	431.10	9.50	629.52	13.88	1.58	0.03	23.10	0.51	21.24	0.47	152,916.41	3,371.23	49.46	1.09	1.38	0.03
23.69	0.52	128.10	2.82	200.33	4.42	0.47	0.01	7.80	0.17	7.17	0.16	44,668.35	984.77	14.45	0.32	0.41	0.01
12.27	0.27	171.53	3.78	114.45	2.52	0.27	0.01	5.78	0.13	5.32	0.12	25,947.83	572.05	8.39	0.19	0.24	0.01
13.69	0.30	165.15	3.64	138.52	3.05	0.23	0.00	8.17	0.18	7.52	0.17	21,985.50	484.70	7.11	0.16	0.20	0.00
26.34	0.58	149.21	3.29	298.05	6.57	0.62	0.01	10.06	0.22	9.26	0.20	59,197.91	1,305.09	19.15	0.42	0.54	0.01
3.47	0.08	19.34	0.43	24.32	0.54	0.04	0.00	1.10	0.02	1.10	0.02	3,112.01	68.61	0.31	0.01	0.03	0.00
770.00	10.19	960.00	12.70	0.00	0.00	700.00	9.26	22.00	0.29	NA	NA	318,662.37	4,215.19	NA	NA	NA	NA
	18.86		74.41		77.90		9.42		3.48		2.98		19,399.98		4.56		0.14

Copco No. 1 Restoration Equipment for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
23.70	0.52	177.19	3.91	234.59	5.17	0.63	0.01	8.45	0.19	7.78	0.17	61,990.17	1,366.65	20.05	0.44	0.56	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
29.20	0.64	178.36	3.93	172.57	3.80	0.30	0.01	7.61	0.17	7.61	0.17	24,727.83	545.16	2.61	0.06	0.21	0.00
29.20	0.64	178.36	3.93	172.57	3.80	0.30	0.01	7.61	0.17	7.61	0.17	24,727.83	545.16	2.61	0.06	0.21	0.00
9.44	0.21	134.79	2.97	88.71	1.96	0.21	0.00	4.30	0.09	3.96	0.09	20,606.17	454.29	6.67	0.15	0.19	0.00
11.91	0.26	80.70	1.78	124.77	2.75	0.36	0.01	3.83	0.08	3.52	0.08	34,511.67	760.85	11.16	0.25	0.31	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.98	0.13	47.46	1.05	41.69	0.92	0.06	0.00	2.15	0.05	1.97	0.04	5,590.02	123.24	1.81	0.04	0.05	0.00
36.15	0.80	139.49	3.08	379.03	8.36	0.29	0.01	18.40	0.41	16.92	0.37	28,582.86	630.14	9.25	0.20	0.26	0.01
5.07	0.11	93.36	2.06	67.40	1.49	0.14	0.00	2.74	0.06	2.52	0.06	13,446.64	296.45	4.35	0.10	0.12	0.00
50.73	1.12	301.77	6.65	440.66	9.71	1.11	0.02	16.17	0.36	14.86	0.33	107,041.49	2,359.86	34.62	0.76	0.96	0.02
16.59	0.37	89.67	1.98	140.23	3.09	0.33	0.01	5.46	0.12	5.02	0.11	31,267.85	689.34	10.11	0.22	0.28	0.01
8.59	0.19	120.07	2.65	80.12	1.77	0.19	0.00	4.04	0.09	3.72	0.08	18,163.48	400.44	5.87	0.13	0.17	0.00
9.58	0.21	115.60	2.55	96.96	2.14	0.16	0.00	5.72	0.13	5.26	0.12	15,389.85	339.29	4.98	0.11	0.14	0.00
18.44	0.41	104.44	2.30	208.63	4.60	0.43	0.01	7.04	0.16	6.48	0.14	41,438.54	913.56	13.40	0.30	0.38	0.01
4.86	0.11	27.07	0.60	34.05	0.75	0.06	0.00	1.54	0.03	1.54	0.03	4,356.81	96.05	0.44	0.01	0.04	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA
	5.72		39.43		50.31		0.10		2.10		1.96		9,520.48		2.82		0.09

Copco No. 2 Restoration Equipment for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10.16	0.22	75.94	1.67	100.54	2.22	0.27	0.01	3.62	0.08	3.33	0.07	26,567.21	585.71	8.59	0.19	0.24	0.01
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12.51	0.28	76.44	1.69	73.96	1.63	0.13	0.00	3.26	0.07	3.26	0.07	10,597.64	233.64	1.12	0.02	0.09	0.00
12.51	0.28	76.44	1.69	73.96	1.63	0.13	0.00	3.26	0.07	3.26	0.07	10,597.64	233.64	1.12	0.02	0.09	0.00
4.05	0.09	57.77	1.27	38.02	0.84	0.09	0.00	1.84	0.04	1.70	0.04	8,831.22	194.70	2.86	0.06	0.08	0.00
5.10	0.11	34.59	0.76	53.47	1.18	0.15	0.00	1.64	0.04	1.51	0.03	14,790.71	326.08	4.78	0.11	0.13	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.56	0.06	20.34	0.45	17.87	0.39	0.02	0.00	0.92	0.02	0.85	0.02	2,395.72	52.82	0.77	0.02	0.02	0.00
15.49	0.34	59.78	1.32	162.44	3.58	0.13	0.00	7.88	0.17	7.25	0.16	12,249.80	270.06	3.96	0.09	0.11	0.00
2.17	0.05	40.01	0.88	28.89	0.64	0.06	0.00	1.18	0.03	1.08	0.02	5,762.84	127.05	1.86	0.04	0.05	0.00
21.74	0.48	129.33	2.85	188.86	4.16	0.47	0.01	6.93	0.15	6.37	0.14	45,874.92	1,011.37	14.84	0.33	0.41	0.01
7.11	0.16	38.43	0.85	60.10	1.32	0.14	0.00	2.34	0.05	2.15	0.05	13,400.51	295.43	4.33	0.10	0.12	0.00
3.68	0.08	51.46	1.13	34.34	0.76	0.08	0.00	1.73	0.04	1.60	0.04	7,784.35	171.62	2.52	0.06	0.07	0.00
4.11	0.09	49.54	1.09	41.56	0.92	0.07	0.00	2.45	0.05	2.25	0.05	6,595.65	145.41	2.13	0.05	0.06	0.00
7.90	0.17	44.76	0.99	89.41	1.97	0.18	0.00	3.02	0.07	2.78	0.06	17,759.37	391.53	5.74	0.13	0.16	0.00
2.08	0.05	11.60	0.26	14.59	0.32	0.03	0.00	0.66	0.01	0.66	0.01	1,867.20	41.16	0.19	0.00	0.02	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	NA	NA
	2.45		16.90		21.56		0.04		0.90		0.84		4,080.20		1.21		0.04

Iron Gate Restoration Equipment for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Alternative

ROG (g/hr)	ROG (lb/day)	CO (gr/hr)	CO (lb/day)	NO _x (g/hr)	NO _x (lb/day)	SO _x (g/hr)	SO _x (lb/day)	PM ₁₀ (g/hr)	PM ₁₀ (lb/day)	PM _{2.5} (g/hr)	PM _{2.5} (lb/day)	CO ₂ (gr/hr)	CO ₂ (lb/day)	CH ₄ (g/hr)	CH ₄ (lb/day)	N ₂ O (g/hr)	N ₂ O (lb/day)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33.85	0.75	253.14	5.58	335.13	7.39	0.91	0.02	12.08	0.27	11.11	0.25	88,557.38	1,952.36	28.64	0.63	0.81	0.02
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
41.71	0.92	254.79	5.62	246.53	5.43	0.44	0.01	10.88	0.24	10.88	0.24	35,325.47	778.79	3.73	0.08	0.30	0.01
41.71	0.92	254.79	5.62	246.53	5.43	0.44	0.01	10.88	0.24	10.88	0.24	35,325.47	778.79	3.73	0.08	0.30	0.01
13.49	0.30	192.55	4.25	126.73	2.79	0.31	0.01	6.14	0.14	5.65	0.12	29,437.39	648.98	9.52	0.21	0.27	0.01
17.01	0.38	115.29	2.54	178.25	3.93	0.51	0.01	5.47	0.12	5.03	0.11	49,302.38	1,086.93	15.95	0.35	0.45	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.55	0.19	67.81	1.49	59.56	1.31	0.08	0.00	3.06	0.07	2.82	0.06	7,985.74	176.06	2.58	0.06	0.07	0.00
51.64	1.14	199.28	4.39	541.47	11.94	0.42	0.01	26.28	0.58	24.17	0.53	40,832.66	900.21	13.21	0.29	0.37	0.01
7.24	0.16	133.37	2.94	96.29	2.12	0.20	0.00	3.92	0.09	3.61	0.08	19,209.48	423.50	6.21	0.14	0.17	0.00
72.47	1.60	431.10	9.50	629.52	13.88	1.58	0.03	23.10	0.51	21.24	0.47	152,916.41	3,371.23	49.46	1.09	1.38	0.03
23.69	0.52	128.10	2.82	200.33	4.42	0.47	0.01	7.80	0.17	7.17	0.16	44,668.35	984.77	14.45	0.32	0.41	0.01
12.27	0.27	171.53	3.78	114.45	2.52	0.27	0.01	5.78	0.13	5.32	0.12	25,947.83	572.05	8.39	0.19	0.24	0.01
13.69	0.30	165.15	3.64	138.52	3.05	0.23	0.00	8.17	0.18	7.52	0.17	21,985.50	484.70	7.11	0.16	0.20	0.00
26.34	0.58	149.21	3.29	298.05	6.57	0.62	0.01	10.06	0.22	9.26	0.20	59,197.91	1,305.09	19.15	0.42	0.54	0.01
6.94	0.15	38.67	0.85	48.64	1.07	0.09	0.00	2.20	0.05	2.20	0.05	6,224.01	137.22	0.62	0.01	0.05	0.00
770.00	10.19	960.00	12.70	0.00	0.00	700.00	9.26	22.00	0.29	NA	NA	318,662.37	4,215.19	NA	NA	NA	NA
	18.36		69.02		71.87		9.40		3.29		2.80		17,815.87		4.03		0.12

Emissions Factors: Pre-dam Removal Activities for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative

Description	Comparable OFFROAD Equipment	row	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Seed Collection															
1/2 TON PICKUP TRUCK			277	3	2.73	300	NA	NA	NA	NA	NA	NA	NA	NA	NA
IEV Control															
CAT 426 BACKHOE	Tractor/Loaders/ Backhoes	198	94	1	2.91	320	10.291402	124.1896416	104.1661	0.170422	6.142148	5.65175	16533.09384	5.345686	0.148647078
Tractor with Till/Disc Attachment (JD 6175)	Tractor/Loaders/ Backhoes	199	175	1	6.82	750	14.30975	200.122825	133.5280975	0.3108	6.740475	6.20305	30272.47038	9.7902	0.276736582
Truck, Pickup (4x4, 3/4tn)			450	6	10.91	1200	NA	NA	NA	NA	NA	NA	NA	NA	NA
Construction access, road, bridge, and culvert improvements															
1/2 TON PICKUP TRUCK			277	2	2.75	390	NA	NA	NA	NA	NA	NA	NA	NA	NA
Backhoe Loader, 48 H.P.	Tractor/Loaders/ Backhoes	197	48		0.56	80	888	13.42656	87.0545472	75.0613968	0.094128	4.51992	4.157616	9148.554288	2.958816
Clamshell Bucket, 1 C.Y.	NA		0		4.49	637.12									
Concrete Pump (Small)	Pump	139	84		4.56	647.49	41.70936	254.79384	246.52656	0.43512	10.878	10.878	35325.46584	3.7296	0.295346552
Crawler Crane, 25 Ton	Cranes	42	231		4.49	637.12	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Crawler Crane, 40 Ton	Cranes	42	231		2.66	378.06	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Crawler Crane, 75 Ton	Cranes	42	231		0.84	119.82	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Dozer, 105 H.P.	Rubber Tired Dozer	158	105		2.61	370.46	29.0304	161.62188	285.19554	0.2058	16.2288	14.931	19864.9542	6.426	0.17950481
Drill Rig, Truck-Mounted	Bore/Drill Rigs	29	221		14.88	2113.14	14.64125	117.59189	171.38771	0.5304	5.1935	4.78465	51713.0718	16.7297	0.472268608
Gas Engine Vibrator		33	5.5		6.08	862.99	2.03588	0	14.09663778	3.8661952	0.183554941	0	4486.218886	0.127739089	0.000488399
Hammer, Diesel, 22k ft-lb	Bore/Drill Rigs	29	221		1.25	178.06	14.64125	117.59189	171.38771	0.5304	5.1935	4.78465	51713.0718	16.7297	0.472268608

Description	Comparable OFFROAD Equipment	row	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Hammer, Diesel, 41k ft-lb	Bore/Drill Rigs	29	221		0.84	119.82	14.64125	117.59189	171.38771	0.5304	5.1935	4.78465	51713.0718	16.7297	0.472268608
Hyd. Crane, 80 Ton	Cranes	29	231		1.50	212.75	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Lattice Boom Crane, 150 Ton	Cranes	29	282		5.40	767.23	28.58211	137.2464672	335.6570142	0.400722	13.624548	12.536874	38674.22815	12.504162	0.349521509
Lead, 90' High					2.10	297.88									
Vibratory Hammer & Gen.	Bore/Drill Rigs	29	221		1.41	200	14.64125	117.59189	171.38771	0.5304	5.1935	4.78465	51713.0718	16.7297	0.472268608
Recreation Facilities Removal															
20' Suction Hose, 6"	NA	NA	0		4.00	480.14									
3/4 TN 4x4 P/U			450		1.78	213.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
50' Discharge Hoses, 6"	NA	NA	0		8.00	960.27									
Backhoe Loader, 48 H.P.	Tractor/Loaders/ Backhoes	197	48		8.45	1014.22	13.42656	87.0545472	75.0613968	0.094128	4.51992	4.157616	9148.554288	2.958816	0.084384729
Brush Chipper, 12", 130 H.P.			130		1.58	189.18	1.11	8.82	8.91	0.02	0.57	-	1,434.72	0.57	-
Centr. Water Pump, 6"	Pump	139	84		4.00	480.14	41.70936	254.79384	246.52656	0.43512	10.878	10.878	35325.46584	3.7296	0.295346552
Chain Saw, Gas, 36" Long			7		3.15	378.37	725.91	1,571.39	13.91	0.17	2.63	2.63	4,229.98	45.12	-
Clamshell Bucket, 1 C.Y.	NA	NA	0		1.74	208.74									
Crawler Loader, 3 C.Y.	Crawler Tractors	47	97		1.58	189.18	28.062488	167.0689879	235.9726566	0.204379	19.424347	17.872735	19872.18727	6.427511	0.178265372
Dozer, 200 H.P.	Rubber Tired Dozers	158	200		1.86	222.99	55.296	307.8512	543.2296	0.392	30.912	28.44	37838.008	12.24	0.341913924
Dozer, 300 H.P.	Rubber Tired Dozers	159	300		0.39	46.81	72.06	278.0628	755.5404	0.588	36.672	33.732	56975.808	18.432	0.512870886
Dozer, 80 H.P.	Rubber Tired Dozers	158	80		1.61	193.6	22.1184	123.14048	217.29184	0.1568	12.3648	11.376	15135.2032	4.896	0.13676557
Dump Truck, 12 C.Y., 400 H.P.			400		0.96	115.44	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dump Truck, 18 C.Y., 450 H.P.			450		1.58	189.18	NA	NA	NA	NA	NA	NA	NA	NA	NA

Description	Comparable OFFROAD Equipment	row	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Dump Truck, 8 C.Y., 220 H.P.			220		3.50	420.27	NA	NA	NA	NA	NA	NA	NA	NA	NA
Earth Auger, Truck-Mtd.	Bore/Drill Rigs	28	221		0.44	52.93	17.0391	327.2347	176.61215	0.54145	7.70185	7.08305	52713.8261	17.05015	0.472268608
F.E. Loader, T.M., 2.25 C.Y.	Tractor/Loaders/ Backhoes	198	97		1.60	192.42	10.619851	128.1531408	107.49055	0.175861	6.338174	5.832125	17060.74577	5.516293	0.153391134
F.E. Loader, W.M., 2.5 C.Y.	Tractor/Loaders/ Backhoes	198	97		5.25	629.86	10.619851	128.1531408	107.49055	0.175861	6.338174	5.832125	17060.74577	5.516293	0.153391134
Flatbed Truck, Gas, 3 Ton			450		1.06	127.73	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gas Engine Vibrator		33	5.5		1.73	207.84	2.03588	0	4.01740864	0.9311232	0.183554941	0	1278.530015	0.030764311	0.000488399
Gradall, 5/8 C.Y.	Excavator	64	158		2.67	320	12.992656	185.50859	122.0955428	0.294196	5.919944	5.445628	28360.41034	9.174112	0.2566064
Grader, 30,000 Lbs.	Grader	84	187		10.51	1261.09	38.741351	272.8654632	371.0421649	0.375683	20.7009	19.044828	36688.81076	11.868516	0.327681757
Heating Kettle, 115 Gallon	NA	NA	0		0.84	100.8									
Hyd. Crane, 12 Ton	Cranes	42	231		1.63	196.11	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Hyd. Crane, 25 Ton	Cranes	42	231		0.73	87.9	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Hyd. Excavator, 2 C.Y.	Excavator	65	231		0.34	40.51	14.290584	96.8424072	149.7281016	0.430122	4.590894	4.222218	41413.99832	13.395228	0.375165053
Hyd. Excavator, 2.5 C.Y.	Excavator	65	231		0.46	55.06	14.290584	96.8424072	149.7281016	0.430122	4.590894	4.222218	41413.99832	13.395228	0.375165053
Hyd. Excavator, 3.5 C.Y.	Excavator	65	231		1.74	208.74	14.290584	96.8424072	149.7281016	0.430122	4.590894	4.222218	41413.99832	13.395228	0.375165053
Line Rem.,11 H.P.,Walk Behind			11		0.10	11.8	16.284	335.258	4.034	0.035	2.501	2.501	858.879	1.012	-
Loader, Skid Steer, 78 H.P.	Skid Steer Loaders	182	78		0.96	115.44	11.797968	107.6933988	103.1179344	0.155844	3.645018	3.353532	15222.20989	4.923516	0.137125185
Paint Striper, T.M., 120 Gal.	NA	NA	0		0.84	100.8									
Rammer/Tamper, Gas, 15"	Plate Compactors	15	6.5		1.14	137.36	1.847495	9.695855	11.57689	0.02236	0.449995	0.449995	1588.395705	0.164905	0.013280142
Road Sweeper, S.P., 8' wide		192	64		0.02	2.95	35.890304	173.6948224	142.7681024	0.158976	12.120448	11.151872	15465.6681	5.001856	0.139880992
Roller, Vibratory, 25 Ton	Roller	148	80		2.07	248.64	25.764	139.743024	132.269488	0.16416	8.93152	8.21712	15984.04032	5.17104	0.144442329

Description	Comparable OFFROAD Equipment	row	Power Rating (HP)	# of Units	Approximate Operating Hours/Day	Total Hours	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Tandem Roller, 5 Ton	Roller	148	80		0.39	46.82	25.764	139.743024	132.269488	0.16416	8.93152	8.21712	15984.04032	5.17104	0.144442329
Trowel, 48" Walk-Behind		125	11.7		0.39	46.82	2.470338	17.73555264	16.35207912	0.0227448	0.8440848	0.7762716	2191.910058	0.7088796	0.020012865
Truck Tractor, 6x4, 450 H.P.	Tractor/Loaders/ Backhoes	201	450		0.39	46.81	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vibr. Roller, Towed, 12 Ton	Roller	148	80		4.39	526.75	25.764	139.743024	132.269488	0.16416	8.93152	8.21712	15984.04032	5.17104	0.144442329
Vibratory Roller, Towed, 23 Ton	Roller	148	80		1.39	166.99	25.764	139.743024	132.269488	0.16416	8.93152	8.21712	15984.04032	5.17104	0.144442329
Water Tank Trailer, 5000 Gal.			0		0.39	46.81	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welder, Gas Engine, 300 amp	Welder	212	23		0.01	1.1	7.7832	25.3161	46.54395	0.07245	2.08035	2.08035	5881.89465	0.69345	0.049176911
Flood Improvements															
1/2 TON PICKUP TRUCK			277	1	2.76	240	NA	NA	NA	NA	NA	NA	NA	NA	NA
Yreka Water Supply Pipeline Relocation															
1/2 TON PICKUP TRUCK			277	1	2.75	330	NA	NA	NA	NA	NA	NA	NA	NA	NA
Air Compressor 600 cfm	Air Compressor	20	300		2.00	240	38.592	159.552	267.696	0.864	8.64	8.64	81835.056	3.456	0.615445063
Crawler Crane, 90 Ton	Cranes	42	231		4.01	480.6	23.413005	112.4252976	274.9530861	0.328251	11.160534	10.269567	31679.95284	10.242771	0.286310172
Dozer (235hp)(CATD7)	Rubber Tired Dozers	159	235		1.34	160.4	56.447	217.81586	591.83998	0.4606	28.7264	26.4234	44631.0496	14.4384	0.401748861
Gas Engine Tamp	Plate Compactors	130	6.5		2.67	320.8	1.847495	9.695855	11.57689	0.02236	0.449995	0.449995	1588.395705	0.164905	0.013280142
Hydraulic Crane (17tn)	Cranes	42	231		2.01	240.8	141.650355	501.6767217	402.8611125	0.355047	42.277389	38.894394	34694.08751	11.220825	0.318295777
Microtunneling 36" ID Casing	NA	NA	0		2.04	244.8									
Roller, Dbl Drum (steel wheel, 5.0 - 7.9 MTn)	Roller	148	80		1.34	160.4	25.764	139.743024	132.269488	0.16416	8.93152	8.21712	15984.04032	5.17104	0.144442329
Truck, Pickup (4x4, 3/4tn)			450		2.04	244.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welder, Portable	Welder	213	46		2.01	240.8	17.1603	97.4556	85.5531	0.1449	4.2021	4.2021	11763.7893	1.5318	0.098353823

Emissions Factors: Hatcheries for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative
Fall Creek Hatchery Construction

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
03A Air Comp 185d	Air Comp Portable 185 cfm Diesel	Air Compressor	49	366.6	2.40	1	20.86224	118.0939	99.27792	0.16464	4.98624	4.98624	13366.39	1.8816	0.111753
03A Air PB090	Hand Held Pavement Breaker 80-90 lbs	NA	0	366.6	2.40	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
03A Press Washer	Pressure Washer-3000 psi	Pressure Washer	6.5	1.44	0.01	1	1.2363	6.88545	8.65995	0.0156	0.39195	0.39195	1108.183	0.11115	0.009265
05 Paver 5-13 21K+	Crawler Mntd Asphalt Paver 5'-13' ABG Titan 125 21K	Pavers	60	0.533	0.00	1	30.429	133.6008	115.9661	0.13608	9.32148	8.57556	13268.19	4.29156	0.119735
05 Paver 10-30 35K+	Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	Pavers	130	20.481	0.13	1	22.91016	194.513	219.8316	0.26208	15.57738	14.3325	25649.64	8.29374	0.233356
06C0 HHP PI25	Hand Held Vibratory Plate 25" 8.0HP	Plate Compactors	8	32.65	0.21	1	2.27384	11.93336	14.24848	0.02752	0.55384	0.55384	1954.949	0.20296	0.016345
06C0 Trn 3K/32	Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	Roller	18	19.574	0.13	1	5.7969	31.44218	29.76063	0.036936	2.009592	1.848852	3596.409	1.163484	0.0325
06C1vp 05MT	Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	Roller	80	16.118	0.11	1	25.764	139.743	132.2695	0.16416	8.93152	8.21712	15984.04	5.17104	0.144442
06C1vp 11MT	Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	Roller	142	28.571	0.19	1	19.069464	189.248	193.657	0.264404	11.83882	10.88913	25571.71	8.272068	0.230621

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
06C2t 02MT	Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	Roller	33	21.014	0.14	1	10.62765	57.644	54.56116	0.067716	3.684252	3.389562	6593.417	2.133054	0.059582
06C2t 11MT	Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	Roller	138	20.481	0.13	1	18.532296	183.917	188.2019	0.256956	11.50534	10.58239	24851.38	8.039052	0.224125
07 Cnc Saw 20	Concrete Saw 20" Gasoline	Concrete/Industrial Saw	3	5	0.03	1	1.50015	5.1246	9.48708	0.01533	0.35259	0.35259	1244.575	0.13359	0.010406
09 DZR 16MT	Standard Crawler Dozer Cat. D6R 165HP	Rubber Tired Dozer	165	16.118	0.11	1	45.6192	253.9772	448.1644	0.3234	25.5024	23.463	31216.36	10.098	0.282079
09 GA 12	Articulated Frame Grader Cat 12H 140HP	Grader	140	43.281	0.28	1	19.229	75.01434	251.4889	0.28126	7.96712	7.32998	27238.52	8.8109	0.245323
09 LBK 15	Loader Backhoe C420-93HP 1.25cy- 15' depth	Tractors/Loaders/ Backhoes	93	42.25	0.28	1	10.181919	122.8685	103.058	0.168609	6.076806	5.591625	16357.21	5.288817	0.147066
09 LBK 18	Loader Backhoe C446- 1.50cy- 17'+ Depth	Tractors/Loaders/ Backhoes	97	94.926	0.62	1	10.619851	128.1531	107.4906	0.175861	6.338174	5.832125	17060.75	5.516293	0.153391
09 LC 19MT	Standard Crawler Loader Cat. 963 158HP 3.20cy- 43K#	Crawler Tractor	158	74.723	0.49	1	43.68384	243.2024	429.1514	0.30968	24.42048	22.4676	29892.03	9.6696	0.270112
09 LW 15MT	Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	Rubber Tired Loader	160	0.48	0.00	1	19.93536	193.1795	179.6463	0.28224	9.82656	9.03744	27134.23	8.77824	0.246178
10 Ex 20MT	Hydraulic Excavator Cat. 320 138HP 1.25cy	Excavator	138	12.735	0.08	1	14.421	183.1184	149.3968	0.251712	8.421864	7.750632	24530.94	7.934172	0.224125
10 Ex 33MT	Hydraulic Excavator Cat. 325 186HP 1.50cy	Excavator	186	62.409	0.41	1	15.295152	218.3835	143.7327	0.346332	6.969048	6.410676	33386.31	10.7999	0.302081

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
13 A/RT Hyd 80	80MT All/Rough Terrain Hydro Crane	Cranes	231	112.265	0.73	1	23.413005	112.4253	274.9531	0.328251	11.16053	10.26957	31679.95	10.24277	0.28631
13 Lift TeleBoom 6K	Telescopic Boom Lift Truck Grad 534 -6Kips	Aerial Lift	63	6.862	0.04	1	3.010896	56.88712	53.39188	0.098658	0.484155	0.445788	9593.107	3.102246	0.086808
13 Lift TeleBoom 10K	Telescopic Boom Lift Truck Grad 534 -10Kips	Aerial Lift	63	8.427	0.06	1	3.010896	56.88712	53.39188	0.098658	0.484155	0.445788	9593.107	3.102246	0.086808
16 Pump ELS 2HP	Electric Submersible Pump 2HP/2"	Pump	2	75.413	0.49	1	1.06116	5.22588	6.60376	0.01184	0.31672	0.31672	841.0825	0.09472	0.007032
16 Pump HoseD 2.0	Discharge Hose 2.0 in	NA	0	75.413	0.49	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
16 Pump HoseS 2.0	Suction Hose 2.0 in	NA	0	75.413	0.49	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
18 Chain Saw 20	Chain Saw, 20"bar Length	NA	3	74.723	0.49	1	725.905	1571.385	13.911	0.174	2.633	2.633	4229.982	45.118	0
19 Trlr Eq 80 Ton	80 Ton 16 Wheel Equipment Trailer	NA	0	104	0.68	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 8	Rear Dump Truck 8 cy	NA	350	26.316	0.17	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 18	Rear Dump Truck 12-18 cy	NA	350	164.626	1.08	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Trctr 70K	On-Highway Truck Tractors Maximum Gross Vehicle Weight: 75,000 lbs	NA	510	104	0.68	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Water 4.0K	On-Highway Water Truck 4000 Gallon	NA	300	44.689	0.29	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
22 Trl Mtd Chpr 16	Trailer Mtd Brush Chipper, 16"dia	NA	130	74.723	0.49	1	1.114838102	8.822038	8.909179	0.01683	0.568741	0	1434.719	0.568741	0

Emissions Factors: Hatcheries for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative
Iron Gate Hatchery Construction

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NOX (g/hr)	SOX (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
03A Air Comp 185d	Air Comp Portable 185 cfm Diesel	Air Compressor	49	732.016	16.27	2	20.86224	118.0939	99.27792	0.16464	4.98624	4.98624	13366.39	1.8816	0.111753
03A Air PB090	Hand Held Pavement Breaker 80-90 lbs			732.016	16.27	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
03A Press Washer	Pressure Washer-3000 psi	Pressure Washer	6.5	11.604	0.26	1	1.2363	6.88545	8.65995	0.0156	0.39195	0.39195	1108.183	0.11115	0.009265
05 Paver 10-30 35K+	Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	Pavers	130	0.427	0.01	1	22.91016	194.513	219.8316	0.26208	15.57738	14.3325	25649.64	8.29374	0.233356
05 PvMill CM 84	Crawler Mntd Pavement Millers 84"-Terex-PR-800-7-Power Mode: Diesel	Pavers	60	4.575	0.10	1	30.429	133.6008	115.9661	0.13608	9.32148	8.57556	13268.19	4.29156	0.119735
06C0 HHP PI25	Hand Held Vibratory Plate 25" 8.0HP	Plate Compactors	8	292.145	6.49	1	2.27384	11.93336	14.24848	0.02752	0.55384	0.55384	1954.949	0.20296	0.016345
06C0 Trn 3K/32	Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	Roller	18	43.522	0.97	1	5.7969	31.44218	29.76063	0.036936	2.009592	1.848852	3596.409	1.163484	0.0325
06C1vp 05MT	Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	Roller	80	1.227	0.03	1	25.764	139.743	132.2695	0.16416	8.93152	8.21712	15984.04	5.17104	0.144442

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NOX (g/hr)	SOX (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
06C1vp 11MT	Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	Roller	142	1.513	0.03	1	19.069464	189.248	193.657	0.264404	11.83882	10.88913	25571.71	8.272068	0.230621
06C2t 02MT	Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	Roller	33	0.427	0.01	1	10.62765	57.644	54.56116	0.067716	3.684252	3.389562	6593.417	2.133054	0.059582
06C2t 11MT	Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	Roller	138	0.427	0.01	1	18.532296	183.917	188.2019	0.256956	11.50534	10.58239	24851.38	8.039052	0.224125
07 Cnc CoreDrill	Concrete Core Drill	Bore/Drill Rigs	221	16.312	0.36	1	14.64125	117.5919	171.3877	0.5304	5.1935	4.78465	51713.07	16.7297	0.472269
07 Cnc Pmp 80yph	Trailer Mtd Concrete Pumps, 80cy/hr, 160hp	Pump	160	23.211	0.52	1	30.784	351.4112	248.7584	0.7104	11.3664	11.3664	67286.6	2.7232	0.506033
07 Cnc Saw 20	Concrete Saw 20" Gasoline	Concrete/Industrial Saw	3	187.354	4.16	1	1.50015	5.1246	9.48708	0.01533	0.35259	0.35259	1244.575	0.13359	0.010406
09 Dzir 8MT	Standard Crawler Dozer Cat. D4C 81HP	Rubber Tired Dozer	81	0.276	0.01	1	22.39488	124.6797	220.008	0.15876	12.51936	11.5182	15324.39	4.9572	0.138475
09 Dzir 16MT	Standard Crawler Dozer Cat. D6R 165HP	Rubber Tired Dozer	165	0.339	0.01	1	45.6192	253.9772	448.1644	0.3234	25.5024	23.463	31216.36	10.098	0.282079
09 GA 12	Articulated Frame Grader Cat 12H 140HP	Grader	140	2.067	0.05	1	51.71166	255.5305	408.9951	0.27552	32.70652	30.08908	26924.62	8.70758	0.245323
09 LBk 15	Loader Backhoe C420-93HP 1.25cy- 15' depth	Tractors/Loaders/ Backhoes	93	109.98	2.44	1	10.181919	122.8685	103.058	0.168609	6.076806	5.591625	16357.21	5.288817	0.147066
09 LBk 18	Loader Backhoe C446- 1.50cy- 17'+ Depth	Tractors/Loaders/ Backhoes	97	441.453	9.81	2	10.619851	128.1531	107.4906	0.175861	6.338174	5.832125	17060.75	5.516293	0.153391
09 LW 15MT	Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	Rubber Tired Loader	160	4.235	0.09	1	19.93536	193.1795	179.6463	0.28224	9.82656	9.03744	27134.23	8.77824	0.246178
10 Ex 20MT	Hydraulic Excavator Cat.	Excavator	138	21.562	0.48	1	14.421	183.1184	149.3968	0.251712	8.421864	7.750632	24530.94	7.934172	0.224125

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NOX (g/hr)	SOX (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
	320 138HP 1.25cy														
10 Ex 33MT	Hydraulic Excavator Cat. 325 186HP 1.50cy	Excavator	186	169.818	3.77	1	15.295152	218.3835	143.7327	0.346332	6.969048	6.410676	33386.31	10.7999	0.302081
13 A/RT Hyd 20	20MT All/Rough Terrain Hydro Crane	Crane	231	40	0.89	1	23.413005	112.4253	274.9531	0.328251	11.16053	10.26957	31679.95	10.24277	0.28631
13 A/RT Hyd 40	40MT All/Rough Terrain Hydro Crane	Crane	231	61.421	1.36	1	23.413005	112.4253	274.9531	0.328251	11.16053	10.26957	31679.95	10.24277	0.28631
13 A/RT Hyd 80	80MT All/Rough Terrain Hydro Crane	Crane	231	358.45	7.97	1	23.413005	112.4253	274.9531	0.328251	11.16053	10.26957	31679.95	10.24277	0.28631
13 A/RT Hyd 100	100MT All/Rough Terrain Hydro Crane	Crane	231	6.789	0.15	1	23.413005	112.4253	274.9531	0.328251	11.16053	10.26957	31679.95	10.24277	0.28631
13 Lift TeleBoom 6K	Telescopic Boom Lift Truck Grad 534 -6Kips	Aerial Lift	63	25.375	0.56	1	3.218544	60.81037	57.07408	0.105462	0.517545	0.476532	10254.7	3.316194	0.092795
13 Lift TeleBoom 10K	Telescopic Boom Lift Truck Grad 534 -10Kips	Aerial Lift	63	37.34	0.83	1	3.218544	60.81037	57.07408	0.105462	0.517545	0.476532	10254.7	3.316194	0.092795
13BC ClamtBckt 1	1cy Standard Clamshell Bucket		0	59.951	1.33	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
15 VHE 134T	Vibratory Hammer/Extractor 134.0 Ton 503Hydraulic HP	Bore/Drill Rigs	221	17.424	0.39	1	14.64125	117.5919	171.3877	0.5304	5.1935	4.78465	51713.07	16.7297	0.472269
16 Pump ELS 2HP	Electric Submersible Pump 2HP/2"	Pump	2	137.013	3.04	1	1.06116	5.22588	6.60376	0.01184	0.31672	0.31672	841.0825	0.09472	0.007032
16 Pump HoseD 2.0	Discharge Hose 2.0 in		0	137.013	3.04	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
16 Pump HoseS 2.0	Suction Hose 2.0 in		0	137.013	3.04	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
17 BSP 96	Self Propelled Pavement	Sweepers/Scrubbers	76	4.575	0.10	1	2.56559595	12.41647	10.20569	0.011364	0.866423	0.797185	1105.554	0.357555	0.009999

Resource Summary	Description	Comparable OFFROAD Equipment	Power Rating (HP)	Total Hours	Approximate Operating Hours/Day	Approximate Number of Units	ROG (g/hr)	CO (gr/hr)	NOX (g/hr)	SOX (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
	Brooms 96" 76HP														
18 Tool Weld 300	Portable welder Diesel 300 amps	Welder	22	279.062	6.20	1	7.4448	24.2154	44.5203	0.0693	1.9899	1.9899	5626.16	0.6633	0.047039
18 Torch Acetylene	Torch Cutting Acetylene-Oxygen 150'		0	126.163	2.80	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
19 Trlr Eq 80 Ton	80 Ton 16 Wheel Equipment Trailer		0	96	2.13	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 8	Rear Dump Truck 8 cy		350	82.142	1.83	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk RDump 18	Rear Dump Truck 12-18 cy		350	135.446	3.01	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Trctr 70K	On-Highway Truck Tractors Maximum Gross Vehicle Weight: 75,000 lbs		510	96	2.13	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
20 Trk Water 4.0K	On-Highway Water Truck 4000 Gallon	Water Trucks	300	2.74	0.06	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
22 HIB 2K / 620	Hydraulic Impact Breaker 2K 620bpm	Bore/Drill Rigs	221	52.842	1.17	1	29.2825	235.1838	342.7754	1.0608	10.387	9.5693	103426.1	33.4594	0.944537

Emissions Factors: Dam and Powerhouse Removal for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative

Description	Power Rating (HP)	Comparable OFFROAD Equipment	J.C. Boyle - Demolition	Copco No. 1 - Demolition	Copco No. 2 - Demolition	Iron Gate - Demolition	Total	Approximate Operating Hours/Day	ROG (g/hr)	CO (g/hr)	NO _x (g/hr)	SO _x	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (g/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Dam and Powerhouse Removal																	
1/2 TON PICKUP TRUCK	277		19	13.3	5.7	19	57	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/4 TN 4x4 P/U	450		1	0.7	0.3	1	3	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
SINGLE AXLE LUBE TRUCK	250		1	0.7	0.3	1	3	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
SMALL MECHTRUCK	277		1	0.7	0.3	1	3	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
LRG MECH TRUCK	450		1	0.7	0.3	1	3	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
4000 GAL WATER TRUCK	300		2	0.7	0.3	2	5	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
1 TON FLATBED	410		1	1.4	0.6	1	4	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
SEMI TRACTOR	510	Tractors/Loaders/ Backhoes	1	0	0		1	20	33.85	253.14	335.13	0.91	12.08	11.11	88,557.38	28.64	0.81
D6 DOZER	215	Rubber Tired Dozers	2	0.7	0.3	2	5	20	51.64	199.28	541.47	0.42	26.28	24.17	40,832.66	13.21	0.37
D8 DOZER	354	Rubber Tired Dozers	2	0.7	0.3	3	6	20	85.03	328.11	891.54	0.69	43.27	39.80	67,231.45	21.75	0.61
CAT 426 BACKHOE	94	Tractors/Loaders/ Backhoes	1	0.7	0.3	0	2	20	10.29	124.19	104.17	0.17	6.14	5.65	16,533.09	5.35	0.15
CAT 14H MOTORGRADER	250	Graders	1	0.7	0.3	2	4	20	34.34	133.95	449.09	0.50	14.23	13.09	48,640.21	15.73	0.44
CAT 336/330, JD 330 EXCAVATOR	273	Excavators	2	0.7	0.3	1	4	20	16.89	114.45	176.95	0.51	5.43	4.99	48,943.82	15.83	0.44
CAT 349/EX400 EXCAVATOR	275	Excavators	2	1.4	0.6	3	7	20	17.01	115.29	178.25	0.51	5.47	5.03	49,302.38	15.95	0.45
CAT 374/365 EXCAVATOR	472	Excavators		0	0	1	1	20	25.65	195.10	238.86	0.88	8.00	7.35	84,230.25	27.24	0.77
EX1100/1250 EXCAVATOR	600	Excavators		0	0	2	2	20	32.60	248.01	303.64	1.12	10.17	9.35	107,072.36	34.63	0.97
CAT 563 - 84"ROLLER	137	Roller	1	0.7	0.3	1	3	20	18.40	182.58	186.84	0.26	11.42	10.51	24,671.30	7.98	0.22
WALK BEHIND ROLLER	20	Roller	1	0.7	0.3	1	3	20	6.44	34.94	33.07	0.04	2.23	2.05	3,996.01	1.29	0.04
S15-60T RT CRANE	365	Cranes	1	1.4	0.6	1	4	20	36.99	177.64	434.45	0.52	17.63	16.23	50,057.07	16.18	0.45

Description	Power Rating (HP)	Comparable OFFROAD Equipment	J.C. Boyle - Demolition	Copco No. 1 - Demolition	Copco No. 2 - Demolition	Iron Gate - Demolition	Total	Approximate Operating Hours/Day	ROG (g/hr)	CO (g/hr)	NO _x (g/hr)	SO _x	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (g/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	Cranes	1	0.7	0.3	1	3	20	32.23	154.77	378.51	0.45	15.36	14.14	43,611.36	14.10	0.39
3900 W 140T CRANE	287	Cranes		0.7	0.3		1	20	29.09	139.68	341.61	0.41	13.87	12.76	39,359.94	12.73	0.36
S15-222 100 TN MANITOWOC CRANE	318	Cranes	1	0	0		1	20	32.23	154.77	378.51	0.45	15.36	14.14	43,611.36	14.10	0.39
4100 SERIES 2 200T CRANE	231	Cranes	1	0	0		1	20	23.41	112.43	274.95	0.33	11.16	10.27	31,679.95	10.24	0.29
S15-777 175 TN MANITOWOC CRANE	231	Cranes		0.7	0.3		1	20	23.41	112.43	274.95	0.33	11.16	10.27	31,679.95	10.24	0.29
A40/CAT 740 HAUL TRUCK	496	Off-Highway Trucks	5	2.1	0.9	2	10	20	42.39	252.15	368.21	0.92	13.51	12.42	89,441.68	28.93	0.81
CAT 773 HAUL TRUCK	775	Off-Highway Trucks		0	0	4	4	20	86.35	569.92	785.72	1.44	31.33	28.83	139,295.85	45.06	1.26
175 COMPRESSOR	NA	NA	1	1.4	0.6	1	4	24	NA	NA	NA	NA	NA	NA	NA	NA	NA
400 COMPRESSOR	NA	NA		0.7	0.3		1	24	NA	NA	NA	NA	NA	NA	NA	NA	NA
200 - 250 AMP DIESEL WELDER	50	Welder	1	0.7	0.3	1	3	24	18.65	105.93	92.99	0.16	4.57	4.57	12,786.73	1.67	0.11
25 - 49 KW GENERATOR - 75 HP	75	Generator Sets	1	1.4	0.6	2	5	24	34.02	216.73	217.34	0.39	9.16	9.16	31,540.59	3.05	0.26
125 - 174 KW GENERATOR - 250 HP	250	Generator Sets	1	0.7	0.3	1	3	24	10.56	58.64	99.86	0.35	2.83	2.83	32,802.22	0.92	0.25
5 KW GENERATORS - 10 HP	10	Generator Sets	5	6.3	2.7	6	20	20	4.69	26.13	32.86	0.06	1.49	1.49	4,205.41	0.42	0.04
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	Generator Sets	5	3.5	1.5	5	15	20	38.56	245.62	246.32	0.44	10.38	10.38	35,746.01	3.46	0.30
6" TRASH PUMP	84	Pumps	2	2.1	0.9	2	7	24	41.71	254.79	246.53	0.44	10.88	10.88	35,325.47	3.73	0.30
6" SUB PUMP	84	Pumps	2	1.4	0.6	1	5	24	41.71	254.79	246.53	0.44	10.88	10.88	35,325.47	3.73	0.30
GROUT PUMP	84	Pumps	1	0.7	0.3	1	3	20	41.71	254.79	246.53	0.44	10.88	10.88	35,325.47	3.73	0.30
950 LOADER	240	Rubber Tired Loaders	1	0.7	0.3		2	20	22.99	107.17	259.00	0.41	8.64	7.95	40,570.35	13.12	0.37
966F LOADER	280	Rubber Tired Loaders	1	1.4	0.6	1	4	20	26.82	125.03	302.17	0.48	10.08	9.27	47,332.07	15.31	0.43

Description	Power Rating (HP)	Comparable OFFROAD Equipment	J.C. Boyle - Demolition	Copco No. 1 - Demolition	Copco No. 2 - Demolition	Iron Gate - Demolition	Total	Approximate Operating Hours/Day	ROG (g/hr)	CO (g/hr)	NO _x (g/hr)	SO _x	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (g/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
980G LOADER	431	Rubber Tired Loaders		0	0	1	1	20	41.01	237.27	405.03	0.74	15.11	13.90	72,603.66	23.48	0.66
MANLIFT 60'	89	Aerial Lifts	2	2.1	0.9	2	7	20	3.00	87.63	48.11	0.14	0.92	0.84	13,025.63	4.21	0.12
D19-42 PILE HAMMER (42,000 FT-LB)	NA	NA	1	0	0		1	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
>10,000 LB EXTENDABLE FORKLIFT	89	Forklift	1	1.4	0.6	1	4	20	17.84	98.52	80.46	0.10	5.66	5.20	9,353.60	3.03	0.08
OSR SM HYD DRL/CMP (2-1/2" - 4-1/2") - ROCK DRILL	221	Bore/Drill Rigs	1	2.1	0.9	1	5	20	14.64	117.59	171.39	0.53	5.19	4.78	51,713.07	16.73	0.47
CONCRETE SHEAR	NA	NA	1	0	0		1	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HOE RAM 330/349	NA	NA	1	0.7	0.3	1	3	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAXI HEATER	NA	NA	1	0	0		1	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLEXI FLOAT 10 X 40 X 7	NA	NA	6	14	6	6	32	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WORK BOAT	250	Work boat		0.7	0.3		1	20	50.00	280.88	159.15	794.74	21.53	NA	58,274.12	NA	NA

Emissions Factors: Continued Operations with Fish Passage Alternative Fish Ladder Construction
Approximate number of units

Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle - Demolition	Copco No. 1	Copco No. 2	Iron Gate - Demolition	Approximate Operating Hours/Day	ROG (g/hr)	CO (gr/hr)	NO _x (g/hr)	SO _x (g/hr)	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (gr/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Fish Ladder Construction																	
Lattice boom crane, 160'	335	Crane	42	1	1	1	1	8	4.26	20.44	49.99	0.06	2.03	1.87	5,759.99	1.86	0.05
Hydraulic yard crane, 40'-60'	130	Crane	40	2	2	2	2	8	24.56	153.25	216.05	0.18	15.02	13.81	17,714.73	5.73	0.16
Hydraulic excavator w/ hoe ram attachment	321	Excavator	65	1	1	1	1	8	19.86	134.57	208.06	0.60	6.38	5.87	57,549.32	18.61	0.52
Hydraulic excavator, CAT 244-321 hp	321	Excavator	65	1	1	1	1	8	19.86	134.57	208.06	0.60	6.38	5.87	57,549.32	18.61	0.52
Wheel-loader, CAT 966, 5 yd3	246	Tractors/Loaders/ Backhoes	200	1	1	1	1	8	19.06	107.96	215.65	0.45	7.28	6.70	42,831.43	13.85	0.39
Dump truck, CAT 740, 20 yd3	415			2	2	2	2	8									
Crawler dozer, CAT 238	238	Rubber Tired Dozers	159	1	1	1	1	8	57.17	220.60	599.40	0.47	29.09	26.76	45,200.81	14.62	0.41
Pickup trucks	191			1	1	1	1	8									
Pickup trucks	160			1	1	1	1										
Pickup trucks	195			1	1	1	1										
Water tank truck, off-highway	175	Water truck	218	1	1	1	1	8	48.72	581.71	393.10	0.86	19.79	18.22	82,300.72	26.62	0.75
Concrete pump truck w/ boom and hosing	235	Pump	142	4	5	4	5	8	34.26	179.29	305.89	1.04	9.04	9.04	98,827.20	2.96	0.74
Vibratory compactor	138	Bore/Drill Rigs	27	1	1	1	1	8	14.97	228.10	188.84	0.33	9.04	8.31	32,083.10	10.38	0.29
Engine generator, 6.5 KW	13	Generator Sets	73	1	1	1	1	8	6.10	22.95	28.87	0.05	1.31	1.31	3,693.94	0.37	0.03
Portable generator, 1 KW	2.75	Generator Sets	73	2	2	2	2	8	1.29	7.19	9.04	0.02	0.41	0.41	1,156.49	0.12	0.01
Air compressor, 160 cfm, 100 psi	60	Air compressor	17	1	1	1	1	8	25.55	144.60	121.56	0.20	6.11	6.11	16,367.01	2.30	0.14
Air compressor, 250 cfm, 100 psi	80	Air compressor	17	1	1	1	1		34.06	192.81	162.09	0.27	8.14	8.14	21,822.68	3.07	0.18
Highway dump truck	450			1	1	1	1	8									

Emissions Factors: Restoration for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative
Approximate Number of Units

Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle - Demolition	Copco No. 1&2 - Demolition	Copco No. 1	Copco No. 2	Iron Gate - Demolition	Total	Approximate Operating Hours/Day	ROG (g/hr)	CO (g/hr)	NO _x (g/hr)	SO _x	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (g/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
Restoration																			
1/2 TON PICKUP TRUCK	277		94	2.00	2	1.4	0.6	2	6	10	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/4 TON PICKUP TRUCK	450		95	2	2	1.4	0.6	2	6	10	NA	NA	NA	NA	NA	NA	NA	NA	NA
1 TON FLATBED	410		96	1		0	0	1	2	10	NA	NA	NA	NA	NA	NA	NA	NA	NA
SEMI TRACTOR	510	Tractors/ Loaders/ Backhoes	201	1	1	0.7	0.3	1	3	10	33.85	253.14	335.13	0.91	12.08	11.11	88,557.38	28.64	0.81
HONDA PIONEER 1000 SIDE BY SIDE	72	NA		3	3	2.1	0.9	3	9	10	NA	NA	NA	NA	NA	NA	NA	NA	NA
GODWIN 3" PUMP	84	Pumps	139	1	1	0.7	0.3	1	3	10	41.71	254.79	246.53	0.44	10.88	10.88	35,325.47	3.73	0.30
GODWIN 6" PUMP	84	Pumps	139	1	1	0.7	0.3	1	3	10	41.71	254.79	246.53	0.44	10.88	10.88	35,325.47	3.73	0.30
CAT 323 EXCAVATOR	164	Excavators	64	1	1	0.7	0.3	1	3	10	13.49	192.55	126.73	0.31	6.14	5.65	29,437.39	9.52	0.27
CAT 330 EXCAVATOR	275	Excavators	65	1	1	0.7	0.3	1	3	10	17.01	115.29	178.25	0.51	5.47	5.03	49,302.38	15.95	0.45
CAT 336 EXCAVATOR	311	Excavators	65	1		0	0		1	10	19.24	130.38	201.58	0.58	6.18	5.68	55,756.51	18.03	0.51
CAT 304 EXCAVATOR	40	Excavators	62	1	1	0.7	0.3	1	3	10	8.55	67.81	59.56	0.08	3.06	2.82	7,985.74	2.58	0.07
CAT D6 DOZER	215	Rubber Tired Dozers	159	1	1	0.7	0.3	1	3	10	51.64	199.28	541.47	0.42	26.28	24.17	40,832.66	13.21	0.37
CAT 299 SKID STEER	110	Skid Steer Loader	183	2	1	0.7	0.3	1	4	10	7.24	133.37	96.29	0.20	3.92	3.61	19,209.48	6.21	0.17
CAT 735 HAUL TRUCK	424	Off-Highway Trucks	95	2	2	1.4	0.6	2	6	10	36.24	215.55	314.76	0.79	11.55	10.62	76,458.21	24.73	0.69
MAROOKA MST2200VDR	250	Off-Highway Trucks	94	1	1	0.7	0.3	1	3	10	23.69	128.10	200.33	0.47	7.80	7.17	44,668.35	14.45	0.41

Description	Power Rating (HP)	Comparable OFFROAD Equipment	RCEM OFFROAD EF Row	J.C. Boyle - Demolition	Copco No. 1&2 - Demolition	Copco No. 1	Copco No. 2	Iron Gate - Demolition	Total	Approximate Operating Hours/Day	ROG (g/hr)	CO (g/hr)	NO _x (g/hr)	SO _x	PM ₁₀ (g/hr)	PM _{2.5} (g/hr)	CO ₂ (g/hr)	CH ₄ (g/hr)	N ₂ O (g/hr)
TRACK TRUCK																			
JOHN DEERE 6150M TRACTOR	150	Tractors/ Loaders/ Backhoes	199	1	1	0.7	0.3	1	3	10	12.27	171.53	114.45	0.27	5.78	5.32	25,947.83	8.39	0.24
JOHN DEERE 5125R TRACTOR	125	Tractors/ Loaders/ Backhoes	198	1	1	0.7	0.3	1	3	10	13.69	165.15	138.52	0.23	8.17	7.52	21,985.50	7.11	0.20
CASE 340 TRACTOR	340	Tractors/ Loaders/ Backhoes	200	1	1	0.7	0.3	1	3	10	26.34	149.21	298.05	0.62	10.06	9.26	59,197.91	19.15	0.54
HONDA EM6500S GENERATOR	7.4	Generator Sets	73	1	2	1.4	0.6	2	5	10	3.47	19.34	24.32	0.04	1.10	1.10	3,112.01	0.31	0.03
BELL 206L LONG RANGER HELICOPTER	450	Helicopter		1		0	0	1	2	6	770.00	960.00	0.00	700.00	22.00	NA	318,662.37	NA	NA

Emissions Factors: Supplemental Equipment Exhaust

Boats

Marine Engine Emission Factor and Fuel Consumption Algorithm

Pollutant	Coefficient	Exponent	Intercept
	(a)	(x)	(b)
HC\ROG	0.0667	1.5	NA
NOx	0.1255	1.5	10.4496
SO2	2.3735	1.5	NA
PM	0.0059	1.5	0.2551
CO	0.8378	1.5	NA
CO2	44.1	1.5	648.6

Source: Factors are provided by EPA 2000, p. 5-2. Emission factors developed with this data are considered to be conservative because ARB has passed new rules addressing harborcraft emissions since 2000.

Emission Factor Algorithm

symbology:	E	=	a	*	(Fractional Load)	^	(-x)	+	b
HC\ROG			0.0667		20%		-1.5		0
NOx			0.1255		20%		-1.5		10.4496
SO2			2.3735		20%		0		0
PM			0.0059		20%		-1.5		0.2551
CO			0.8378		20%		-1		0
CO2			44.1		20%		-1		648.6

Source: Equation is provided by EPA 2000, p. 5-2

Emission Factors

	g/kW-hr	g/bhp-hr
HC\ROG	0.75	1.00
NOx	11.85	15.89
SO2	2.37	3.18
PM10	0.32	0.43
CO	4.19	5.62
CO2	869.10	1165.48

Project Boats

Equipment	Power (HP)	HC\ROG	NO _x	SO ₂	PM ₁₀	CO	CO ₂	units
Marine Workboat	250	50.00	794.738817	159.1457968	21.5	280.9	58,274.1	g/bhp-hr

value units source

mass conversion rate 1.34102209 hp/kW onlineconversion.com/power.htm

Ratio of PM2.5 to PM10 0.97 none See Note 1

Load Factor 0.2 EPA 2000, Table 4-2 on p. 4-13

Source: EPA 2000. p. 5-2. Emission factors are calculated using the Emission Factor Algorithm and pollutant factors. 20% is the fractional load for many harborcraft when maneuvering. See Table 4-2 on p. 4-13. It is assumed that all of the PM emissions are PM10.

Lawn Mowers/Chainsaws/Chippers

CalEEMod Landscape Equipment Emissions Factors (Appendix D, Table 7.2)(g/bhp-hr)

Emission Rates Lawn Mowers/Chainsaws/Chippers

	Project Equip. HP	CalEEMod Max HP	ROG	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Lawn Mower ¹	11	15	16.284	335.258	4.034	0.035	2.501	2.501	858.879	1.012	-
Chainsaws ¹	7	15	7.26E+02	1.57E+03	1.39E+01	1.74E-01	2.63E+00	2.63E+00	4.23E+03	4.51E+01	-
Chipper ²	130	-	1.11E+00	8.82E+00	8.91E+00	1.68E-02	5.69E-01	-	1.43E+03	5.69E-01	-

Source:

¹ CalEEMod, Appendix B, Table 7.2

² Shasta County, Offroad2007

Helicopter

Emission Rates of Bell 206L Helicopter

HC/ROG	NO _x	SO ₂	PM	CO	Fuel	Units
0.77	0.7	0	0.022	0.96	116.7	kg/hr
HC/ROG	NO _x	SO ₂	PM	CO	CO ₂ e	
770	700	0	22	960	318,662	g/hr

GHG Emissions Rate for Helicopter	Value	Units	Source
rate of fuel consumption by helicopter	116.7	kg/hr	Federal Office of Civil Aviation of Switzerland
density of jet A-1 fuel	0.804	kg/L	British Petroleum 2000
volume conversion rate	3.79	L/gal	onlineconversion.com/volume.htm
density of jet fuel	3.04	kg/gal	conversion calculation
jet A-1 fuel consumption rate	38.34	gal/hr	calculation
CO ₂ emission factor for jet fuel	8.31	kg/gal	EPA 2014, Table 1 - Aviation Gasoline
CO ₂ emission rate for jet fuel	318.6	kg/hr	calculation
N ₂ O emission factor for jet fuel	0.07	g/gal	EPA 2014, Table 1 - Aviation Gasoline
CH ₄ emission factor for jet fuel	0.36	g/gal	EPA 2014, Table 1 - Aviation Gasoline
mass conversion rate	1,000	g/kg	onlineconversion.com/weight
global warming potential of CO ₂	1	unitless	EPA 2014, IPCC AR4
global warming potential of N ₂ O	298	unitless	EPA 2014, IPCC AR4
global warming potential of CH ₄	25	unitless	EPA 2014, IPCC AR4
CO ₂ e emission rate for jet fuel	318.7	kg/hr	summation
mass conversion rate	2.205	lb/kg	onlineconversion.com/weight.htm
CO ₂ e emission rate for jet fuel	702.5	lb/hr	conversion calculation
mass conversion rate	453.592	g/hr	onlineconversion.com/weight.htm
CO ₂ e emission rate for jet fuel	318,662	g/hr	calculation

Notes: A Dell 206L helicopter with a shaft horsepower (shp) of 450 was used.

Source: Federal Office of Civil Aviation (Switzerland). 2015 (December). Guidance on the Determination of Helicopter Emissions. Reference: COO.2207.111.2.2015750.

Emissions Factors: Worker Trip Exhaust for the Proposed Project and Alternatives
Raw Emission Factors from EMFAC2011

Veh	Fuel	Pop	VMT	Trips	Running Exhaust Emission Rates (g/mile)							
		(Vehicles)	(Miles/day)	(Trips/day)	ROG_RUNEX	NOX_RUNEX	PM10_RUNEX	PM2_5_RUNEX	CO_RUNEX	SOX_RUNEX	CO2_RUNEX (Pavley I+LCFS)	CH4_RUNEX
LDA	GAS	41,326	1,618,773	192,286	0.018	0.065	0.002	0.002	0.881	0.003	294.112	0.004
LDA	DSL	551	20,733	2,510	0.035	0.230	0.016	0.016	0.469	0.002	239.835	0.002
LDT1	GAS	6,494	213,932	28,383	0.059	0.227	0.003	0.003	2.163	0.003	352.703	0.012
LDT1	DSL	12	193	41	0.224	0.928	0.174	0.167	1.257	0.004	465.361	0.010
LDT2	GAS	18,760	665,446	84,831	0.037	0.179	0.002	0.002	1.478	0.004	384.621	0.008
LDT2	DSL	84	3,690	406	0.031	0.099	0.009	0.009	0.262	0.003	314.395	0.001
Total			2,522,769									

Source: wksht: EMFAC2017 Output

Veh	Fuel	Ratio of Vehicle/Fuel Type to Total VMT
LDA	GAS	64%
LDA	DSL	0.8%
LDT1	GAS	8%
LDT1	DSL	0.0%
LDT2	GAS	26%
LDT2	DSL	0.1%

Exhaust Emission Rates for Composite Light Duty Vehicles for the Proposed Project and Alternatives

ROG_RUNEX	NOX_RUNEX	PM10_RUNEX	PM2_5_RUNEX	CO_RUNEX	SOX_RUNEX	CO2_RUNEX (Pavley I+LCFS)	CH4_RUNEX	N2O_RUNEX
(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)	(gms/mile)
0.027	0.110	0.002	0.002	1.143	0.003	322.551	0.006	0.009

Source: EMFAC2017 emission factors (above) and weighted mix of passenger vehicle fleet (also above)

ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂	CH ₄	N ₂ O	Units
0.00006	0.00024	0.000005	0.000005	0.00252	0.00001	0.71110	0.00001	0.00002	lbs/mile

J.C. Boyle

	Value	Unit	Source
trips per worker	2	trips/worker	See Note 2
trip length	58.6	miles/trip	assumption
portion of trip on paved surfaces	100%	%	See Note 3
portion of trip on unpaved surfaces	0%	%	See Note 3
mass conversion rate	453.59	g/lb	onlineconversion.com/weight_common.htm

Exhaust Emissions per Worker Per Day for J.C. Boyle

ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂ e	Units
0.0069	0.0285	0.0006	0.0006	0.2954	0.0008	83.3414	lb/worker-day

Source: Exhaust emissions are based on trip length and the Exhaust Emission Rates for Composite Light Duty Vehicles (above).

Copco No. 1

	Value	Unit	Source
trips per worker	2	trips/worker	See Note 2
trip length	58.6	miles/trip	assumption
portion of trip on paved surfaces	100%	%	See Note 3
portion of trip on unpaved surfaces	0%	%	See Note 3
mass conversion rate	453.59	g/lb	onlineconversion.com/weight_common.htm

Exhaust Emissions per Worker Per Day for Copco No. 1

ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂ e	Units
0.0069	0.0285	0.0006	0.0006	0.2954	0.0008	83.3414	lb/worker-day

Source: Exhaust emissions are based on trip length and the Exhaust Emission Rates for Composite Light Duty Vehicles (above).

Copco No. 2

	Value	Unit	Source
trips per worker	2	trips/worker	See Note 2
trip length	58.47	miles/trip	assumption
portion of trip on paved surfaces	100%	%	See Note 3
portion of trip on unpaved surfaces	0%	%	See Note 3
mass conversion rate	453.59	g/lb	onlineconversion.com/weight_common.htm

Exhaust Emissions per Worker Per Day for Copco No. 2

ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂ e	Units
0.0069	0.0284	0.0006	0.0006	0.2947	0.0008	83.1565	lb/worker-day

Source: Exhaust emissions are based on trip length and the Exhaust Emission Rates for Composite Light Duty Vehicles (above).

Iron Gate

	Value	Unit	Source
trips per worker	2	trips/worker	See Note 2
trip length	46.4	miles/trip	assumpttion
portion of trip on paved surfaces	100%	%	See Note 3
portion of trip on unpaved surfaces	0%	%	See Note 3
mass conversion rate	453.59	g/lb	onlineconversion.com/weight_common.htm

Exhaust Emissions per Worker Per Day for Iron Gate

ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂ e	Units
0.0055	0.0226	0.0005	0.0005	0.2339	0.0007	65.9904	lb/worker-day

Source: Exhaust emissions are based on trip length and the Exhaust Emission Rates for Composite Light Duty Vehicles (above).

Notes

- ¹ It is conservatively assumed that all workers would drive alone and none would make trips during break periods due to the remoteness of the work sites.
- ² It is conservatively assumed that all workers would commute from Medford, OR as it would be the longest commute distance to the work sites.
- ³ Daily VMT by workers = # workers * trips per worker * trip length

Emissions Factors: Haul Truck for the Proposed Project and Alternatives

Exhaust Emission Factors for Haul Trucks	ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂	CH ₄	N ₂ O	Units	Source
Running Exhaust Emission Factors	0.125	4.775	0.038	0.037	0.680	0.017	1747.553	0.006	0.275	g/mile	See Note 1 and Note 2
Idling Exhaust Emiss Factors	1.593	20.618	0.014	0.013	21.826	0.038	3996.049	0.074	0.628	g/truck/day	See Note 1 and Note 2

Source: wksht EMFAC2011 output

Exhaust Emission Factors for Haul Trucks

ROG	NO _x	PM ₁₀	PM _{2.5}	CO	SO _x	CO ₂	CH ₄	N ₂ O	Units
0.00028	0.01053	0.00008	0.00008	0.00150	0.00004	3.85270	0.00001	0.00061	lbs/mile

- ¹ Emission rates are provided in wksht: EMFAC2017 Output.
- ² CalEEMod assumes that Heavy-Heavy Diesel Trucks (HHDT) are used to haul materials and equipment during construction. Therefore, haul truck emissions are estimated using EMFAC2017 emission factors for a Heavy-Heavy Duty Diesel CA International Registration Plan Construction Truck (T7 CAIRP construction).

Emissions Factors: Fugitive Dust for the Proposed Project and Alternatives

1	Aggregate Storage Piles ¹					
	Emissions result from several distinct processes within the stockpiling cycle: 1. loading in of materials through batch or drop operations, 2. equipment traffic in storage areas, 3. wind erosion of piles, 4. loadout of material through batch or drop operations					
	$E(\text{lb/ton})=(k)(0.0032)(U/5)^{1.3}/(M/2)^{1.4}$					
	Where:	PM10	Unit	Source		
	k= Particle Size Multiplier:	0.35	lbs/ton	AP-42 Chapter 13.2.4-3, PM10 emissions		
	U=mean wind speed	5	mph	CalEEMod Appendix D for Siskiyou County		
	M=moisture content (%)	3.400	constant	AP-42 Chapter 13.2.4-3, Table 13.2.4-1, exposed ground		
		0.00053	lbs/ton			
2	Travel on Unpaved Roads (Heavy Duty Trucks) ²		15% percent of travel			
	$E(\text{lbs/VMT})=(k)(s/12)^a (W/3)^b$					
	Where:	PM10	Unit	Source		
	k= Particle Size Multiplier:	1.5	lbs/VMT	AP-42 Chapter 13.2.2-2, PM10 emissions; industrial roads		
	s= Silt Content	4.3	constant	AP-42 Chapter 13.2.2-2, service roads		
	a=	0.9	constant	AP-42 Chapter 13.2.2-2, industrial roads		
	b=	0.45	constant	AP-42 Chapter 13.2.2-2, industrial roads		
	W=Vehicle Weight	10	tons	Average weight of loaded and unloaded truck: assumed empty truck weights 2 tons, 10 CY truck capacity and 1 CY of fill equals 1.6 tons $((2+(10\text{cy truck capacity}\times 1.6\text{ tons}+2))/2)$		
		1.02	lbs/VMT			

1	Aggregate Storage Piles ¹					
2a	Correction for Natural Precipitation ³					
	$E(\text{ext})=E[(365-P)/365]$					
	Where:		Unit	Source		
	$P=\text{\#days/yr with}\geq 0.01 \text{ precip}$	85	inches	CalEEMod Appendix D for Siskiyou County		
		0.79	lbs/VMT			
3	Travel on Paved Roads (Heavy Duty Trucks) ⁴		85% percent of travel			
	$E(\text{lbs/VMT})=(k)(sL)^{.91} (W)^{1.02}-C$					
	Where:	PM10	Unit	Source		
	$k= \text{Particle Size Multiplier:}$	0.0022	lbs/VMT	AP-42 Chapter 13.2.1, Table 13.2.1-1, PM10 emissions		
	$sL= \text{road surface silt loading}$	0.06	g/m ²	AP-42 Chapter 13.2.1, Table 13.2.1-2		
	$C= \text{exhaust, break, tire wear}$	0.00047	lbs/VMT	AP-42 Chapter 13.2.1, Background Documentation Pg 2-5		
	$W=\text{Vehicle Weight}$	2.1	tons	Worker Commute Vehicles		
	$W=\text{Vehicle Weight}$	10	tons	Average weight of loaded and unloaded truck: assumed empty truck weights 2 tons, 10 CY truck capacity and 1 CY of fill equals 1.6 tons $((2+(10\text{cy truck capacity}\times 1.6 \text{ tons}+2))/2)$		
		0.002	lbs/VMT	Heavy Duty Haul Trucks		
		0.00037	lbs/VMT	Worker Commute Vehicles		
3a	Correction for Natural Precipitation ⁵					
	$E(\text{ext})=E[(1-P/4N)]$					
	Where:		Unit	Source		
	$P=\text{\#days/yr with}\geq 0.01 \text{ precip}$	85	inches	CalEEMod Appendix D for Siskiyou County		
	$N=\text{\# days in averaging period}$	365	days			
		0.002	lbs/VMT	Heavy Duty Haul Trucks		
		0.0003	lbs/VMT	Worker Commute Vehicles		
	<i>Worker Commute Vehicle Weight Calculation</i>					
	Parameters and Calculations for Worker Commute Trips (i.e., passenger vehicles)					
				Source		
	Vehicle class for worker trips	LDA, LDT1, LDT2		default value in CalEEMod's tab for Trips and VMT in the Construction module		

1	Aggregate Storage Piles ¹						
	Weight			4230 lb		average of vehicle category weight (LDA-3,190 lbs, LDT1-3,750 lbs, LDT2-5,750 lbs) from EMFAC2011	
	Mass conversion	2000	lb/ton	google.com			
	Weight			2.12	Ton	calculation	
4	Bulldozing ⁶						
	Equation is applied to graders and dozers to estimate fugitive dust from grading activity						
	Emissions factors for P10 from bulldozing are scaled from those of PM15						
	$E(\text{lbs/hr}) = C(\text{PM15}) * s^{1.5} / M^{1.5}$						
	Where						
	$E(\text{PM10}) = E(\text{PM15}) * F(\text{PM10})$						
	Where:					Unit	Source
	C=		coefficient	1	constant		AP-42 Table 11.9-1, PM15,overburden
	M=		material moisture content	0.079%			AP-42 Table 11.9-3,Overburden
	s=		material silt content	0.069%			AP-42 Table 11.9-3,Overburden
	F=		scaling factor	0.75	constant		AP-42 Table 11.9-1, PM10
					0.63	lbs/hr	
						PM10	
					0.47	lbs/hr	

Sources

- ¹ EPA 2006. AP-42, Chapter 13.2.4 Miscellaneous Sources, Aggregate Storage Piles, Equation 1
- ² EPA 2006. AP-42, Chapter 13.2.4 Miscellaneous Sources, Upaved Roads, Equation 1a
- ³ EPA 2006. AP-42, Chapter 13.2.4 Miscellaneous Sources, Upaved Roads, Equation 2
- ⁴ EPA 2011. AP-42, Chapter 13.2.4 Miscellaneous Sources, Paved Roads, Equation 1
- ⁵ EPA 2011. AP-42, Chapter 13.2.4 Miscellaneous Sources, Paved Roads, Equation 2
- ⁶ EPA 1998. AP-42 Chapter 11.9 Mineral Products Industry, Western Surface Coal Mining, Equation 11.9-1 Bulldozing

Emissions Factors: Blasting for the Proposed Project, Partial Removal Alternative, Two Dam Removal Alternative, Three Dam Removal Alternative
Emissions Factors for Detonation of Explosives

	lb	lb/day	lb/blast (3–6 blasts per day)		tons
Total ANFO blast material	180,000	2,250	375	=	0.1875
	CO	NO_x	SO₂	CH₄	
ANFO ¹	67	17	2	NA	lb/ton
	CO	NO_x	SO₂	CH₄	
Total	12.5625	3.1875	0.375	NA	lb
lbs/tons	2000				

Sources

- ¹ US EPA., 1980. AP 42: Compilation of Air Emissions Factors, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, Explosives Detonation.

SMAQMD Road Construction Emissions Model OFFOAD Equipment Emissions Factors

2021 Equipment	MaxHP	g/hp/hr ROG	g/hp/hr CO	g/hp/hr NO_x	g/hp/hr SO_x	g/hp/hr PM₁₀	g/hp/hr PM_{2.5}	g/hp/hr CO₂	g/hp/hr CH₄	g/hp/hr N₂O
Aerial Lifts	15	0.165	3.114	2.922	0.005	0.027	0.024	525.074	0.170	0.005
Aerial Lifts	25	0.165	3.114	2.922	0.005	0.027	0.024	525.074	0.170	0.005
Aerial Lifts	50	0.165	3.114	2.922	0.005	0.027	0.024	525.074	0.170	0.005
Aerial Lifts	120	0.109	3.176	1.744	0.005	0.033	0.031	472.114	0.153	0.004
Aerial Lifts	500	0.072	0.951	0.640	0.005	0.009	0.008	472.055	0.153	0.004
Aerial Lifts	750	0.187	1.004	1.610	0.005	0.050	0.050	568.299	0.016	0.004
Air Compressors	15	0.717	3.531	4.462	0.008	0.214	0.214	568.299	0.064	0.005
Air Compressors	25	0.752	2.446	4.497	0.007	0.201	0.201	568.299	0.067	0.005
Air Compressors	50	0.887	5.021	4.221	0.007	0.212	0.212	568.299	0.080	0.005
Air Compressors	120	0.442	3.670	3.083	0.006	0.190	0.190	568.299	0.039	0.004
Air Compressors	175	0.343	3.192	2.218	0.006	0.115	0.115	568.299	0.030	0.004
Air Compressors	250	0.268	1.108	1.859	0.006	0.060	0.060	568.299	0.024	0.004
Air Compressors	500	0.261	1.064	1.663	0.005	0.058	0.058	568.299	0.023	0.004
Air Compressors	750	0.262	1.064	1.699	0.005	0.058	0.058	568.299	0.023	0.004
Air Compressors	1000	0.284	1.134	3.565	0.005	0.082	0.082	568.300	0.025	0.004
Bore/Drill Rigs	15	0.711	4.548	4.634	0.006	0.291	0.268	535.378	0.173	0.005
Bore/Drill Rigs	25	0.711	4.548	4.634	0.006	0.291	0.268	535.378	0.173	0.005
Bore/Drill Rigs	50	0.711	4.548	4.634	0.006	0.291	0.268	535.378	0.173	0.005
Bore/Drill Rigs	120	0.217	3.306	2.737	0.005	0.131	0.121	464.973	0.150	0.004
Bore/Drill Rigs	175	0.154	2.961	1.598	0.005	0.070	0.064	477.048	0.154	0.004
Bore/Drill Rigs	250	0.133	1.064	1.551	0.005	0.047	0.043	467.992	0.151	0.004
Bore/Drill Rigs	500	0.117	1.015	1.221	0.005	0.041	0.038	469.816	0.152	0.004
Bore/Drill Rigs	750	0.098	0.972	0.955	0.005	0.033	0.031	474.079	0.153	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO_x	SO_x	PM₁₀	PM_{2.5}	CO₂	CH₄	N₂O
Bore/Drill Rigs	1000	0.136	0.993	3.058	0.005	0.061	0.057	471.816	0.153	0.004
Cement and Mortar Mixers	15	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059	0.005
Cement and Mortar Mixers	25	0.712	2.381	4.419	0.007	0.180	0.180	568.299	0.064	0.005
Concrete/Industrial Saws	25	0.685	2.340	4.332	0.007	0.161	0.161	568.299	0.061	0.005
Concrete/Industrial Saws	50	0.722	4.481	4.063	0.007	0.184	0.184	568.300	0.065	0.005
Concrete/Industrial Saws	120	0.369	3.523	2.913	0.006	0.166	0.166	568.299	0.033	0.004
Concrete/Industrial Saws	175	0.286	3.072	2.055	0.006	0.101	0.101	568.299	0.025	0.004
Cranes	50	2.115	7.489	6.014	0.005	0.631	0.581	517.900	0.168	0.005
Cranes	120	0.651	4.065	5.731	0.005	0.398	0.366	469.887	0.152	0.004
Cranes	175	0.498	3.516	5.113	0.005	0.273	0.251	474.546	0.154	0.004
Cranes	250	0.350	1.678	4.104	0.005	0.167	0.153	472.906	0.153	0.004
Cranes	500	0.295	2.448	3.443	0.005	0.139	0.127	472.455	0.153	0.004
Cranes	750	0.228	1.440	2.727	0.005	0.107	0.098	470.550	0.152	0.004
Cranes	9999	0.192	1.008	2.374	0.005	0.061	0.057	472.055	0.153	0.004
Crawler Tractors	50	2.064	7.349	2.374	0.005	0.591	0.543	516.108	0.167	0.005
Crawler Tractors	120	0.673	4.005	5.657	0.005	0.466	0.429	476.437	0.154	0.004
Crawler Tractors	175	0.436	3.310	4.395	0.005	0.245	0.225	471.421	0.153	0.004
Crawler Tractors	250	0.343	1.515	4.334	0.005	0.163	0.150	472.925	0.153	0.004
Crawler Tractors	500	0.283	2.024	3.276	0.005	0.129	0.119	474.484	0.154	0.004
Crawler Tractors	750	0.239	1.270	2.825	0.005	0.104	0.096	473.094	0.153	0.004
Crawler Tractors	1000	0.399	1.896	6.399	0.005	0.182	0.167	471.822	0.153	0.004
Crushing/Proc. Equipment	50	0.862	5.136	4.211	0.007	0.201	0.201	568.299	0.077	0.005
Crushing/Proc. Equipment	120	0.438	3.711	2.989	0.006	0.178	0.178	568.299	0.039	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Crushing/Proc. Equipment	175	0.344	3.235	2.114	0.006	0.109	0.109	568.299	0.031	0.004
Crushing/Proc. Equipment	250	0.274	1.119	1.756	0.006	0.057	0.057	568.299	0.024	0.004
Crushing/Proc. Equipment	500	0.268	1.072	1.574	0.005	0.055	0.055	568.300	0.024	0.004
Crushing/Proc. Equipment	750	0.268	1.072	1.606	0.005	0.055	0.055	568.299	0.024	0.004
Crushing/Proc. Equipment	9999	0.314	1.136	3.487	0.005	0.080	0.080	568.299	0.028	0.004
Dumpers/Tenders	25	0.685	2.339	4.333	0.007	0.163	0.163	568.299	0.061	0.005
Excavators	25	0.562	4.461	3.919	0.005	0.202	0.186	525.377	0.170	0.005
Excavators	50	0.562	4.461	3.919	0.005	0.202	0.186	525.377	0.170	0.005
Excavators	120	0.275	3.492	2.849	0.005	0.161	0.148	467.791	0.151	0.004
Excavators	175	0.216	3.090	2.034	0.005	0.099	0.091	472.359	0.153	0.004
Excavators	250	0.163	1.103	1.706	0.005	0.052	0.048	471.793	0.153	0.004
Excavators	500	0.143	1.088	1.332	0.005	0.045	0.041	469.616	0.152	0.004
Excavators	750	0.165	1.150	1.619	0.005	0.056	0.052	469.547	0.152	0.004
Forklifts	50	1.002	5.535	4.520	0.005	0.318	0.292	525.483	0.170	0.005
Forklifts	120	0.412	3.720	3.756	0.005	0.267	0.245	471.529	0.153	0.004
Forklifts	175	0.308	3.231	2.921	0.005	0.158	0.145	472.106	0.153	0.004
Forklifts	250	0.249	1.337	2.582	0.005	0.099	0.091	473.326	0.153	0.004
Forklifts	500	0.254	1.485	2.303	0.005	0.094	0.086	473.615	0.153	0.004
Generator Sets	15	0.634	3.531	4.441	0.008	0.201	0.201	568.299	0.057	0.005
Generator Sets	25	0.712	2.446	4.497	0.007	0.196	0.196	568.299	0.064	0.005
Generator Sets	50	0.613	3.905	3.916	0.007	0.165	0.165	568.299	0.055	0.005
Generator Sets	120	0.326	3.361	2.888	0.006	0.153	0.153	568.299	0.029	0.004
Generator Sets	175	0.243	2.925	2.068	0.006	0.091	0.091	568.299	0.021	0.004
Generator Sets	250	0.183	1.016	1.730	0.006	0.049	0.049	568.299	0.016	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO_x	SO_x	PM₁₀	PM_{2.5}	CO₂	CH₄	N₂O
Generator Sets	500	0.175	0.996	1.562	0.005	0.048	0.048	568.299	0.015	0.004
Generator Sets	750	0.177	0.996	1.596	0.005	0.048	0.048	568.299	0.016	0.004
Generator Sets	9999	0.220	1.060	3.372	0.005	0.070	0.070	568.300	0.019	0.004
Graders	50	2.235	7.626	5.485	0.005	0.631	0.581	492.935	0.159	0.005
Graders	120	0.901	4.452	7.125	0.005	0.570	0.524	469.070	0.152	0.004
Graders	175	0.505	3.559	4.839	0.005	0.270	0.248	478.529	0.155	0.004
Graders	250	0.335	1.307	4.381	0.005	0.139	0.128	474.539	0.154	0.004
Graders	500	0.322	1.460	3.013	0.005	0.117	0.108	471.898	0.153	0.004
Graders	750	0.303	1.207	1.808	0.005	0.064	0.064	568.299	0.027	0.004
Off-Highway Tractors	120	0.395	3.743	3.773	0.005	0.261	0.240	474.516	0.154	0.004
Off-Highway Tractors	175	0.259	3.220	2.660	0.005	0.129	0.118	472.924	0.153	0.004
Off-Highway Tractors	250	0.200	1.162	2.113	0.005	0.072	0.067	471.003	0.152	0.004
Off-Highway Tractors	750	0.181	1.122	1.715	0.005	0.063	0.058	471.806	0.153	0.004
Off-Highway Tractors	1000	0.160	1.033	2.414	0.005	0.064	0.059	472.055	0.153	0.004
Off-Highway Trucks	175	0.278	3.324	2.246	0.005	0.113	0.104	470.290	0.152	0.004
Off-Highway Trucks	250	0.249	1.348	2.109	0.005	0.082	0.076	470.193	0.152	0.004
Off-Highway Trucks	500	0.225	1.338	1.954	0.005	0.072	0.066	474.542	0.154	0.004
Off-Highway Trucks	750	0.293	1.935	2.668	0.005	0.106	0.098	472.991	0.153	0.004
Off-Highway Trucks	1000	0.256	1.252	4.158	0.005	0.099	0.091	471.055	0.152	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO_x	SO_x	PM₁₀	PM_{2.5}	CO₂	CH₄	N₂O
Other Construction Equipment	15	1.010	5.307	4.902	0.005	0.382	0.351	527.783	0.171	0.005
Other Construction Equipment	25	1.010	5.307	4.902	0.005	0.382	0.351	527.783	0.171	0.005
Other Construction Equipment	50	1.010	5.307	4.902	0.005	0.382	0.351	527.783	0.171	0.005
Other Construction Equipment	120	0.482	3.703	4.456	0.005	0.323	0.298	472.275	0.153	0.004
Other Construction Equipment	175	0.330	3.183	3.438	0.005	0.180	0.165	469.764	0.152	0.004
Other Construction Equipment	500	0.215	1.599	2.428	0.005	0.090	0.083	475.212	0.154	0.004
Other General Industrial Equipment	15	0.831	5.314	4.425	0.005	0.289	0.266	526.176	0.170	0.005
Other General Industrial Equipment	25	0.831	5.314	4.425	0.005	0.289	0.266	526.176	0.170	0.005
Other General Industrial Equipment	50	0.831	5.314	4.425	0.005	0.289	0.266	526.176	0.170	0.005
Other General Industrial Equipment	120	0.404	3.740	3.718	0.005	0.256	0.235	470.000	0.152	0.004
Other General Industrial Equipment	175	0.254	3.234	2.347	0.005	0.121	0.111	471.850	0.153	0.004
Other General Industrial Equipment	250	0.204	1.171	2.094	0.005	0.070	0.064	473.223	0.153	0.004
Other General Industrial Equipment	500	0.195	1.330	1.796	0.005	0.064	0.059	472.929	0.153	0.004
Other General Industrial Equipment	750	0.166	1.463	1.387	0.005	0.054	0.050	473.464	0.153	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO_x	SO_x	PM₁₀	PM_{2.5}	CO₂	CH₄	N₂O
Other General Industrial Equipment	1000	0.276	1.093	4.876	0.005	0.120	0.110	472.055	0.153	0.004
Other Material Handling Equipment	50	1.108	5.960	4.966	0.005	0.396	0.364	523.709	0.169	0.005
Other Material Handling Equipment	120	0.294	3.602	2.956	0.005	0.166	0.152	473.588	0.153	0.004
Other Material Handling Equipment	175	0.249	3.196	2.246	0.005	0.114	0.105	472.219	0.153	0.004
Other Material Handling Equipment	250	0.269	1.309	3.082	0.005	0.102	0.094	471.482	0.153	0.004
Other Material Handling Equipment	500	0.254	1.442	2.602	0.005	0.101	0.093	470.297	0.152	0.004
Other Material Handling Equipment	9999	0.073	0.972	2.318	0.005	0.020	0.018	472.055	0.153	0.004
Pavers	25	1.208	5.302	4.602	0.005	0.370	0.340	526.515	0.170	0.005
Pavers	50	1.208	5.302	4.602	0.005	0.370	0.340	526.515	0.170	0.005
Pavers	120	0.420	3.563	4.026	0.005	0.285	0.263	469.774	0.152	0.004
Pavers	175	0.256	3.016	2.695	0.005	0.130	0.120	472.555	0.153	0.004
Pavers	250	0.166	1.024	2.484	0.005	0.070	0.064	472.477	0.153	0.004
Pavers	500	0.164	0.988	2.053	0.005	0.074	0.068	465.591	0.151	0.004
Paving Equipment	25	0.587	4.211	3.882	0.005	0.200	0.184	520.397	0.168	0.005
Paving Equipment	50	0.587	4.211	3.882	0.005	0.200	0.184	520.397	0.168	0.005
Paving Equipment	120	0.355	3.554	3.451	0.005	0.219	0.202	473.221	0.153	0.004
Paving Equipment	175	0.229	3.032	2.315	0.005	0.114	0.105	470.650	0.152	0.004
Paving Equipment	250	0.211	1.209	2.582	0.005	0.092	0.085	472.151	0.153	0.004
Plate Compactors	15	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059	0.005

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Pressure Washers	15	0.634	3.531	4.441	0.008	0.201	0.201	568.299	0.057	0.005
Pressure Washers	25	0.712	2.446	4.497	0.007	0.196	0.196	568.299	0.064	0.005
Pressure Washers	50	0.439	3.329	3.765	0.007	0.136	0.136	568.299	0.039	0.005
Pressure Washers	120	0.264	3.210	2.766	0.006	0.129	0.129	568.299	0.023	0.004
Pressure Washers	175	0.238	2.907	2.118	0.006	0.093	0.093	568.299	0.021	0.004
Pressure Washers	250	0.098	0.986	0.265	0.006	0.009	0.009	568.299	0.008	0.004
Pumps	15	0.717	3.531	4.462	0.008	0.214	0.214	568.299	0.064	0.005
Pumps	25	0.752	2.446	4.497	0.007	0.201	0.201	568.299	0.067	0.005
Pumps	50	0.671	4.099	3.966	0.007	0.175	0.175	568.299	0.060	0.005
Pumps	120	0.347	3.412	2.928	0.006	0.162	0.162	568.300	0.031	0.004
Pumps	175	0.260	2.968	2.101	0.006	0.096	0.096	568.299	0.023	0.004
Pumps	250	0.197	1.031	1.759	0.006	0.052	0.052	568.299	0.017	0.004
Pumps	500	0.189	1.007	1.584	0.005	0.050	0.050	568.299	0.017	0.004
Pumps	750	0.191	1.007	1.618	0.005	0.050	0.050	568.299	0.017	0.004
Pumps	9999	0.233	1.074	3.409	0.005	0.072	0.072	568.300	0.021	0.004
Rollers	15	0.848	4.597	4.351	0.005	0.294	0.270	525.791	0.170	0.005
Rollers	25	0.848	4.597	4.351	0.005	0.294	0.270	525.791	0.170	0.005
Rollers	50	0.848	4.597	4.351	0.005	0.294	0.270	525.791	0.170	0.005
Rollers	120	0.353	3.507	3.589	0.005	0.219	0.202	473.901	0.153	0.004
Rollers	175	0.193	2.926	2.117	0.005	0.097	0.090	471.980	0.153	0.004
Rollers	250	0.197	1.228	2.493	0.005	0.081	0.075	473.470	0.153	0.004
Rollers	500	0.221	1.950	2.589	0.005	0.100	0.092	479.329	0.155	0.004
Rough Terrain Forklifts	50	0.969	4.657	4.411	0.005	0.304	0.280	525.384	0.170	0.005
Rough Terrain Forklifts	120	0.175	3.252	2.285	0.005	0.089	0.082	473.110	0.153	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Rough Terrain Forklifts	175	0.130	2.845	1.617	0.005	0.060	0.055	471.758	0.153	0.004
Rough Terrain Forklifts	250	0.115	0.984	1.612	0.005	0.037	0.034	472.547	0.153	0.004
Rough Terrain Forklifts	500	0.092	0.946	1.302	0.005	0.028	0.026	465.744	0.151	0.004
Rubber Tired Dozers	175	0.691	3.848	6.790	0.005	0.386	0.356	472.975	0.153	0.004
Rubber Tired Dozers	250	0.601	2.317	6.296	0.005	0.306	0.281	474.798	0.154	0.004
Rubber Tired Dozers	500	0.492	4.041	5.081	0.005	0.232	0.214	478.987	0.155	0.004
Rubber Tired Dozers	750	0.458	2.604	6.123	0.005	0.218	0.201	473.046	0.153	0.004
Rubber Tired Dozers	1000	0.497	2.057	5.095	0.005	0.150	0.150	568.299	0.044	0.004
Rubber Tired Loaders	25	1.326	6.449	4.974	0.005	0.409	0.377	524.551	0.170	0.005
Rubber Tired Loaders	50	1.326	6.449	4.974	0.005	0.409	0.377	524.551	0.170	0.005
Rubber Tired Loaders	120	0.498	3.892	4.215	0.005	0.316	0.291	466.421	0.151	0.004
Rubber Tired Loaders	175	0.346	3.354	3.119	0.005	0.171	0.157	471.080	0.152	0.004
Rubber Tired Loaders	250	0.266	1.240	2.998	0.005	0.100	0.092	469.564	0.152	0.004
Rubber Tired Loaders	500	0.264	1.529	2.610	0.005	0.097	0.090	467.928	0.151	0.004
Rubber Tired Loaders	750	0.271	1.397	2.641	0.005	0.102	0.094	462.055	0.149	0.004
Rubber Tired Loaders	1000	0.294	1.206	4.975	0.005	0.128	0.118	471.258	0.152	0.004
Scrapers	120	0.704	4.218	6.659	0.005	0.512	0.471	483.713	0.156	0.004
Scrapers	175	0.432	3.456	4.341	0.005	0.232	0.213	478.654	0.155	0.004
Scrapers	250	0.391	1.884	4.367	0.005	0.189	0.174	469.126	0.152	0.004
Scrapers	500	0.299	2.255	3.445	0.005	0.134	0.123	472.464	0.153	0.004
Scrapers	750	0.250	1.658	2.887	0.005	0.105	0.097	471.786	0.153	0.004
Signal Boards	15	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059	0.005
Signal Boards	50	0.714	4.380	4.002	0.007	0.179	0.179	568.299	0.064	0.005

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Signal Boards	120	0.363	3.493	2.889	0.006	0.162	0.162	568.299	0.032	0.004
Signal Boards	175	0.278	3.043	2.043	0.006	0.098	0.098	568.299	0.025	0.004
Signal Boards	250	0.260	1.273	2.053	0.007	0.063	0.063	686.695	0.023	0.004
Skid Steer Loaders	25	0.409	3.732	3.573	0.005	0.126	0.116	527.450	0.171	0.005
Skid Steer Loaders	50	0.409	3.732	3.573	0.005	0.126	0.116	527.450	0.171	0.005
Skid Steer Loaders	120	0.178	3.277	2.366	0.005	0.096	0.089	471.977	0.153	0.004
Surfacing Equipment	50	0.507	3.932	4.189	0.006	0.204	0.188	535.784	0.173	0.005
Surfacing Equipment	120	0.312	3.436	3.461	0.005	0.191	0.175	474.091	0.153	0.004
Surfacing Equipment	175	0.258	2.919	3.099	0.005	0.145	0.134	469.169	0.152	0.004
Surfacing Equipment	250	0.207	1.219	2.994	0.005	0.092	0.085	476.802	0.154	0.004
Surfacing Equipment	500	0.141	1.202	1.753	0.005	0.064	0.058	471.748	0.153	0.004
Surfacing Equipment	750	0.125	0.992	1.597	0.005	0.062	0.057	470.409	0.152	0.004
Sweepers/Scrubbers	15	1.219	5.900	4.849	0.005	0.412	0.379	525.328	0.170	0.005
Sweepers/Scrubbers	25	1.219	5.900	4.849	0.005	0.412	0.379	525.328	0.170	0.005
Sweepers/Scrubbers	50	1.219	5.900	4.849	0.005	0.412	0.379	525.328	0.170	0.005
Sweepers/Scrubbers	120	0.440	3.757	3.962	0.005	0.291	0.268	474.116	0.153	0.004
Sweepers/Scrubbers	175	0.385	3.247	3.707	0.005	0.187	0.172	473.122	0.153	0.004
Sweepers/Scrubbers	250	0.164	1.108	1.758	0.005	0.055	0.051	470.126	0.152	0.004
Tractors/Loaders/Backhoes	25	0.756	4.902	4.226	0.005	0.255	0.234	515.121	0.167	0.005
Tractors/Loaders/Backhoes	50	0.756	4.902	4.226	0.005	0.255	0.234	515.121	0.167	0.005
Tractors/Loaders/Backhoes	120	0.296	3.571	2.995	0.005	0.177	0.163	475.362	0.154	0.004
Tractors/Loaders/Backhoes	175	0.221	3.091	2.062	0.005	0.104	0.096	467.529	0.151	0.004

2021		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	MaxHP	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Tractors/Loaders/Backhoes	250	0.209	1.186	2.369	0.005	0.080	0.074	470.572	0.152	0.004
Tractors/Loaders/Backhoes	500	0.179	1.341	1.776	0.005	0.064	0.059	469.303	0.152	0.004
Tractors/Loaders/Backhoes	750	0.247	1.433	2.754	0.005	0.104	0.096	466.456	0.151	0.004
Trenchers	15	0.809	4.666	4.459	0.005	0.313	0.288	527.017	0.170	0.005
Trenchers	25	0.809	4.666	4.459	0.005	0.313	0.288	527.017	0.170	0.005
Trenchers	50	0.809	4.666	4.459	0.005	0.313	0.288	527.017	0.170	0.005
Trenchers	120	0.556	3.789	5.106	0.005	0.371	0.341	475.287	0.154	0.004
Trenchers	175	0.407	3.304	4.272	0.005	0.219	0.201	467.734	0.151	0.004
Trenchers	250	0.356	1.668	4.360	0.005	0.172	0.158	473.854	0.153	0.004
Trenchers	500	0.221	1.865	2.491	0.005	0.100	0.092	470.701	0.152	0.004
Trenchers	750	0.066	0.947	0.475	0.005	0.009	0.008	472.529	0.153	0.004
Welders	15	0.717	3.531	4.462	0.008	0.214	0.214	568.299	0.064	0.005
Welders	25	0.752	2.446	4.497	0.007	0.201	0.201	568.299	0.067	0.005
Welders	50	0.829	4.708	4.133	0.007	0.203	0.203	568.299	0.074	0.005
Welders	120	0.411	3.579	3.042	0.006	0.184	0.184	568.299	0.037	0.004
Welders	175	0.315	3.112	2.189	0.006	0.110	0.110	568.299	0.028	0.004
Welders	250	0.243	1.081	1.836	0.006	0.057	0.057	568.299	0.021	0.004
Welders	500	0.236	1.044	1.642	0.005	0.055	0.055	568.299	0.021	0.004
Water Trucks	175	0.278	3.324	2.246	0.005	0.113	0.104	470.290	0.152	0.004
Water Trucks	250	0.249	1.348	2.109	0.005	0.082	0.076	470.193	0.152	0.004
Water Trucks	500	0.225	1.338	1.954	0.005	0.072	0.066	474.542	0.154	0.004
Water Trucks	750	0.293	1.935	2.668	0.005	0.106	0.098	472.991	0.153	0.004
Water Trucks	1000	0.256	1.252	4.158	0.005	0.099	0.091	471.055	0.152	0.004

Default Horsepower and Load Factor

Default Horsepower and Load Factor		
OFFROAD Equipment Type	Horsepower	Load Factor
Aerial Lifts	63	0.31
Air Compressors	78	0.48
Bore/Drill Rigs	221	0.5
Cement and Mortar Mixers	9	0.56
Concrete/Industrial Saws	81	0.73
Cranes	231	0.29
Crawler Tractors	212	0.43
Crushing/Proc. Equipment	85	0.78
Excavators	158	0.38
Forklifts	89	0.2
Generator Sets	84	0.74
Graders	187	0.41
Off-Highway Tractors	124	0.44
Off-Highway Trucks	402	0.38
Other Construction Equipment	172	0.42
Other General Industrial Equipment	88	0.34
Other Material Handling Equipment	168	0.4
Pavers	130	0.42
Paving Equipment	132	0.36
Plate Compactors	8	0.43
Pressure Washers	13	0.3
Pumps	84	0.74
Rollers	80	0.38
Rough Terrain Forklifts	100	0.4

Default Horsepower and Load Factor		
OFFROAD Equipment Type	Horsepower	Load Factor
Rubber Tired Dozers	247	0.4
Rubber Tired Loaders	203	0.36
Scrapers	367	0.48
Signal Boards	6	0.82
Skid Steer Loaders	65	0.37
Surfacing Equipment	263	0.3
Sweepers/Scrubbers	64	0.46
Tractors/Loaders/Backhoes	97	0.37
Trenchers	78	0.5
Welders	46	0.45

Default Horsepower and Load Factor from CalEEMod2016
Appendix D: Table 3.3

EMFAC2017 (v1.0.2) Emission Rates

Region Type: County

Region: SISKIYOU

Calendar Year: 2021

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	Calendar Year
LDT1	LDA	LDA	LDA	All Other	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
GAS	ELEC	DSL	GAS	DSL	Fuel
6493.745	629.8629	551.1201	41325.63	13.54649	Population
213932.200	26624.6023	20733.4403	1618773.37	630.620465	VMT
28382.77	3150.871	2510.159	192286.2	113.7905	Trips
0.058568	0	0.035258	0.018198	0.3467	ROG_RUNEX
0	0	0	0	0.116345	ROG_IDLEX
0.767222	0	0	0.381252	0	ROG_STREX
0.403945	0.004888	0	0.161588	0	ROG_HOTSOAK
1.772539	0	0	0.325266	0	ROG_RUNLOSS
0.363384	0.002784	0	0.140527	0	ROG_RESTLOSS
0.675752	0.012444	0	0.236597	0	ROG_DIURN
0.085331	0	0.040139	0.026527	0.394692	TOG_RUNEX
0	0	0	0	0.13245	TOG_IDLEX
0.839994	0	0	0.417416	0	TOG_STREX
0.403945	0.004888	0	0.161588	0	TOG_HOTSOAK
1.772539	0	0	0.325266	0	TOG_RUNLOSS
0.363384	0.002784	0	0.140527	0	TOG_RESTLOSS
0.675752	0.012444	0	0.236597	0	TOG_DIURN
2.163202	0	0.46915	0.881059	0.937991	CO_RUNEX
0	0	0	0	2.331661	CO_IDLEX
3.601034	0	0	3.023508	0	CO_STREX
0.226779	0	0.23012	0.065113	4.662749	NOx_RUNEX
0	0	0	0	5.431978	NOx_IDLEX
0.439725	0	0	0.253953	1.570398	NOx_STREX
352.7034	0	239.8352	294.1118	1192.312	CO2_RUNEX
0	0	0	0	662.6157	CO2_IDLEX
72.64024	0	0	58.95729	0	CO2_STREX
0.012329	0	0.001638	0.004314	0.016103	CH4_RUNEX
0	0	0	0	0.005404	CH4_IDLEX
0.135405	0	0	0.077467	0	CH4_STREX
0.003475	0	0.016284	0.002083	0.121358	PM10_RUNEX
0	0	0	0	0.029865	PM10_IDLEX
0.003722	0	0	0.002255	0	PM10_STREX
0.008	0.008	0.008	0.008	0.012	PM10_PMTW
0.03675	0.03675	0.03675	0.03675	0.13034	PM10_PMBW
0.003196	0	0.01558	0.001915	0.116108	PM2_5_RUNEX
0	0	0	0	0.028573	PM2_5_IDLEX
0.003423	0	0	0.002074	0	PM2_5_STREX
0.002	0.002	0.002	0.002	0.003	PM2_5_PMTW
0.01575	0.01575	0.01575	0.01575	0.05586	PM2_5_PMBW
0.00349	0	0.002267	0.00291	0.011264	SOx_RUNEX
0	0	0	0	0.00626	SOx_IDLEX
0.000719	0	0	0.000583	0	SOx_STREX
0.014288	0	0.037699	0.006264	0.187415	N2O_RUNEX
0	0	0	0	0.104154	N2O_IDLEX
0.037379	0	0	0.030369	0	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	Calendar Year
LHD1	LDT2	LDT2	LDT2	LDT2	LDT1	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
GAS	ELEC	DSL	GAS	ELEC	DSL	Fuel
2141.3	96.57793	83.53884	18759.87	15.3165	12.08672	Population
66534.9674	3374.994291	3690.03427	665446.294	682.920487	193.446832	VMT
31902.18	488.5082	405.8739	84831.07	77.74882	40.57073	Trips
0.201782	0	0.031413	0.037307	0	0.224356	ROG_RUNEX
0.45712	0	0	0	0	0	ROG_IDLEX
0.190631	0	0	0.631273	0	0	ROG_STREX
0.299932	0.004888	0	0.251567	0.004888	0	ROG_HOTSOAK
3.084784	0	0	1.083292	0	0	ROG_RUNLOSS
0.027976	0.002784	0	0.240684	0.002784	0	ROG_RESTLOSS
0.083406	0.012444	0	0.399076	0.012444	0	ROG_DIURN
0.29444	0	0.035761	0.054389	0	0.255414	TOG_RUNEX
0.667029	0	0	0	0	0	TOG_IDLEX
0.208717	0	0	0.691158	0	0	TOG_STREX
0.299932	0.004888	0	0.251567	0.004888	0	TOG_HOTSOAK
3.084784	0	0	1.083292	0	0	TOG_RUNLOSS
0.027976	0.002784	0	0.240684	0.002784	0	TOG_RESTLOSS
0.083406	0.012444	0	0.399076	0.012444	0	TOG_DIURN
3.813434	0	0.262155	1.47838	0	1.25666	CO_RUNEX
3.677605	0	0	0	0	0	CO_IDLEX
2.739246	0	0	3.955734	0	0	CO_STREX
0.661992	0	0.098964	0.178706	0	0.927831	NOX_RUNEX
0.040159	0	0	0	0	0	NOX_IDLEX
0.557229	0	0	0.488833	0	0	NOX_STREX
1038.02	0	314.3951	384.621	0	465.3606	CO2_RUNEX
123.555	0	0	0	0	0	CO2_IDLEX
20.51714	0	0	79.48725	0	0	CO2_STREX
0.037484	0	0.001459	0.008209	0	0.010421	CH4_RUNEX
0.115787	0	0	0	0	0	CH4_IDLEX
0.03489	0	0	0.118905	0	0	CH4_STREX
0.004041	0	0.0091	0.002313	0	0.174392	PM10_RUNEX
0	0	0	0	0	0	PM10_IDLEX
0.000792	0	0	0.002401	0	0	PM10_STREX
0.008	0.008	0.008	0.008	0.008	0.008	PM10_PMTW
0.07644	0.03675	0.03675	0.03675	0.03675	0.03675	PM10_PMBW
0.003716	0	0.008706	0.002127	0	0.166848	PM2_5_RUNEX
0	0	0	0	0	0	PM2_5_IDLEX
0.000729	0	0	0.002208	0	0	PM2_5_STREX
0.002	0.002	0.002	0.002	0.002	0.002	PM2_5_PMTW
0.03276	0.01575	0.01575	0.01575	0.01575	0.01575	PM2_5_PMBW
0.010272	0	0.002972	0.003806	0	0.004399	SOx_RUNEX
0.001223	0	0	0	0	0	SOx_IDLEX
0.000203	0	0	0.000787	0	0	SOx_STREX
0.032809	0	0.049419	0.011675	0	0.073148	N2O_RUNEX
0.00278	0	0	0	0	0	N2O_IDLEX
0.039059	0	0	0.042694	0	0	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	Calendar Year
MDV	MDV	MCY	LHD2	LHD2	LHD1	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
DSL	GAS	GAS	DSL	GAS	DSL	Fuel
345.0198	15001.03	2967.996	829.0349	180.427	3314.154	Population
13573.9394	490875.146	19549.9445	29351.2750	6292.69812	105309.097	VMT
1614.523	66367.47	5935.991	10428.22	2688.093	41687.88	Trips
0.029651	0.06636	3.182717	0.183219	0.092269	0.234498	ROG_RUNEX
0	0	0	0.10976	0.454591	0.10976	ROG_IDLEX
0	0.855976	2.623521	0	0.161805	0	ROG_STREX
0	0.31054	0.86062	0	0.191882	0	ROG_HOTSOAK
0	1.254056	3.020838	0	1.770262	0	ROG_RUNLOSS
0	0.310036	0.625448	0	0.018401	0	ROG_RESTLOSS
0	0.506439	1.453317	0	0.052658	0	ROG_DIURN
0.033755	0.090237	3.85002	0.208583	0.134639	0.26696	TOG_RUNEX
0	0	0	0.124954	0.663338	0.124954	TOG_IDLEX
0	0.936739	2.852209	0	0.177156	0	TOG_STREX
0	0.31054	0.86062	0	0.191882	0	TOG_HOTSOAK
0	1.254056	3.020838	0	1.770262	0	TOG_RUNLOSS
0	0.310036	0.625448	0	0.018401	0	TOG_RESTLOSS
0	0.506439	1.453317	0	0.052658	0	TOG_DIURN
0.448591	2.171262	26.47457	0.865738	1.77046	1.087481	CO_RUNEX
0	0	0	0.909745	3.726611	0.909745	CO_IDLEX
0	5.714328	10.9474	0	2.359977	0	CO_STREX
0.150777	0.23148	1.285507	2.570124	0.424697	4.303648	NOx_RUNEX
0	0	0	2.461522	0.039762	2.505313	NOx_IDLEX
0	0.58414	0.294481	0	0.565589	0	NOx_STREX
430.3967	469.6	237.7508	649.8842	1172.625	584.6852	CO2_RUNEX
0	0	0	224.5373	141.4708	141.1621	CO2_IDLEX
0	99.58147	69.29684	0	22.67411	0	CO2_STREX
0.001377	0.012218	0.439083	0.00851	0.018255	0.010892	CH4_RUNEX
0	0	0	0.005098	0.122085	0.005098	CH4_IDLEX
0	0.149942	0.325807	0	0.03084	0	CH4_STREX
0.011862	0.002567	0.002466	0.03265	0.002668	0.044237	PM10_RUNEX
0	0	0	0.02791	0	0.029166	PM10_IDLEX
0	0.003288	0.004117	0	0.000479	0	PM10_STREX
0.008	0.008	0.004	0.012	0.008	0.012	PM10_PMTW
0.03675	0.03675	0.01176	0.08918	0.08918	0.07644	PM10_PMBW
0.011349	0.002365	0.002316	0.031238	0.002453	0.042324	PM2_5_RUNEX
0	0	0	0.026703	0	0.027905	PM2_5_IDLEX
0	0.003034	0.003902	0	0.00044	0	PM2_5_STREX
0.002	0.002	0.001	0.003	0.002	0.003	PM2_5_PMTW
0.01575	0.01575	0.00504	0.03822	0.03822	0.03276	PM2_5_PMBW
0.004069	0.004647	0.002353	0.006144	0.011604	0.005527	SOx_RUNEX
0	0	0	0.002123	0.0014	0.001334	SOx_IDLEX
0	0.000985	0.000686	0	0.000224	0	SOx_STREX
0.067652	0.014202	0.071468	0.102153	0.02337	0.091904	N2O_RUNEX
0	0	0	0.035294	0.002972	0.022189	N2O_IDLEX
0	0.046165	0.016086	0	0.041719	0	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	2021	Calendar Year
PTO	OBUS	Motor	MH	MH	MDV		Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated		Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated		Speed
DSL	GAS	DSL	DSL	GAS	ELEC		Fuel
0	46.47597	4.850295	145.7822	446.1112	38.87681		Population
1146.15030	1853.82902	631.383512	1282.758038	3594.60731	1420.99558		VMT
0	929.8913	70.81431	14.57822	44.62897	199.5343		Trips
0.412505	0.203757	0.171467	0.156935	0.13359	0		ROG_RUNEX
0	0.73263	5.523621	0	0	0		ROG_IDLEX
0	0.230161	0	0	0.172954	0		ROG_STREX
0	0.063848	0	0	0.129481	0.004888		ROG_HOTSOAK
0	1.077293	0	0	3.871211	0		ROG_RUNLOSS
0	0.019317	0	0	0.028713	0.002784		ROG_RESTLOSS
0	0.068763	0	0	0.120076	0.012444		ROG_DIURN
0.469605	0.297322	0.195202	0.17866	0.194934	0		TOG_RUNEX
0	1.069052	6.288222	0	0	0		TOG_IDLEX
0	0.251997	0	0	0.189363	0		TOG_STREX
0	0.063848	0	0	0.129481	0.004888		TOG_HOTSOAK
0	1.077293	0	0	3.871211	0		TOG_RUNLOSS
0	0.019317	0	0	0.028713	0.002784		TOG_RESTLOSS
0	0.068763	0	0	0.120076	0.012444		TOG_DIURN
1.501227	4.65731	0.615109	0.583286	3.68338	0		CO_RUNEX
0	5.69263	55.83211	0	0	0		CO_IDLEX
0	5.522274	0	0	4.11069	0		CO_STREX
12.13321	1.307148	3.929351	5.674409	0.836731	0		NOX_RUNEX
0	0.064154	80.78759	0	0	0		NOX_IDLEX
0	0.361785	1.601864	0	0.347167	0		NOX_STREX
2225.542	1837.918	1542.279	1062.791	1844.791	0		CO2_RUNEX
0	386.9834	11019.25	0	0	0		CO2_IDLEX
0	30.74533	0	0	28.37097	0		CO2_STREX
0.01916	0.039602	0.007964	0.007289	0.028467	0		CH4_RUNEX
0	0.176933	0.256558	0	0	0		CH4_IDLEX
0	0.039538	0	0	0.037691	0		CH4_STREX
0.141235	0.001444	0.091664	0.159604	0.002399	0		PM10_RUNEX
0	0	0.317586	0	0	0		PM10_IDLEX
0	0.000443	0	0	0.00048	0		PM10_STREX
0	0.012	0.012	0.016	0.012	0.008		PM10_PMTW
0	0.13034	0.13034	0.13034	0.13034	0.03675		PM10_PMBW
0.135125	0.001328	0.087699	0.1527	0.002206	0		PM2_5_RUNEX
0	0	0.303847	0	0	0		PM2_5_IDLEX
0	0.000407	0	0	0.000442	0		PM2_5_STREX
0	0.003	0.003	0.004	0.003	0.002		PM2_5_PMTW
0	0.05586	0.05586	0.05586	0.05586	0.01575		PM2_5_PMBW
0.021026	0.018188	0.014571	0.010047	0.018256	0		SOx_RUNEX
0	0.00383	0.104104	0	0	0		SOx_IDLEX
0	0.000304	0	0	0.000281	0		SOx_STREX
0.349824	0.054146	0.242425	0.167056	0.042799	0		N2O_RUNEX
0	0.004351	1.732073	0	0	0		N2O_IDLEX
0	0.023441	0	0	0.031876	0		N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	2021	Calendar Year
T6 instate	T6 CAIRP	T6 CAIRP	T6 Ag	SBUS	SBUS	SBUS	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
DSL	DSL	DSL	DSL	DSL	DSL	GAS	Fuel
22.51157	9.031651	17.79897	8.320638	78.79579	8.636471	8.636471	Population
1531.87339	474.141893	3538.40744	107.554936	2447.89076	419.505881	419.505881	VMT
101.7739	131.8621	259.865	36.61081	909.2925	34.54589	34.54589	Trips
0.408367	0.050005	0.029575	0.58344	0.131227	0.115886	0.115886	ROG_RUNEX
0.07429	0.069249	0.061874	0.800067	0.333512	10.64152	10.64152	ROG_IDLEX
0	0	0	0	0	0.498693	0.498693	ROG_STREX
0	0	0	0	0	0.085747	0.085747	ROG_HOTSOAK
0	0	0	0	0	0.750717	0.750717	ROG_RUNLOSS
0	0	0	0	0	0.007063	0.007063	ROG_RESTLOSS
0	0	0	0	0	0.021425	0.021425	ROG_DIURN
0.464895	0.056927	0.033668	0.664202	0.149392	0.169101	0.169101	TOG_RUNEX
0.084574	0.078835	0.070439	0.910816	0.379678	15.52808	15.52808	TOG_IDLEX
0	0	0	0	0	0.546007	0.546007	TOG_STREX
0	0	0	0	0	0.085747	0.085747	TOG_HOTSOAK
0	0	0	0	0	0.750717	0.750717	TOG_RUNLOSS
0	0	0	0	0	0.007063	0.007063	TOG_RESTLOSS
0	0	0	0	0	0.021425	0.021425	TOG_DIURN
0.909939	0.201549	0.134658	1.463417	0.331391	2.709958	2.709958	CO_RUNEX
1.899405	2.050848	2.023708	4.541228	5.318718	82.24088	82.24088	CO_IDLEX
0	0	0	0	0	15.55711	15.55711	CO_STREX
4.810712	1.517447	1.290101	7.525037	8.70026	0.838321	0.838321	NOx_RUNEX
5.082113	4.220246	3.850188	8.397917	46.77977	0.92653	0.92653	NOx_IDLEX
1.90878	1.101238	1.144847	1.002397	0.594938	0.528982	0.528982	NOx_STREX
1256.94	968.4167	917.4049	1084.928	1171.872	875.041	875.041	CO2_RUNEX
660.5245	628.2156	624.5381	637.6396	3683.483	2605.274	2605.274	CO2_IDLEX
0	0	0	0	0	60.53302	60.53302	CO2_STREX
0.018968	0.002323	0.001374	0.027099	0.006095	0.023211	0.023211	CH4_RUNEX
0.003451	0.003216	0.002874	0.037161	0.015491	2.417583	2.417583	CH4_IDLEX
0	0	0	0	0	0.085172	0.085172	CH4_STREX
0.121984	0.039373	0.02479	0.353723	0.056338	0.001189	0.001189	PM10_RUNEX
0.011811	0.009488	0.006414	0.251567	0.076786	0	0	PM10_IDLEX
0	0	0	0	0	0.000528	0.000528	PM10_STREX
0.012	0.012	0.012	0.012	0.012	0.008	0.008	PM10_PMTW
0.13034	0.13034	0.13034	0.13034	0.7448	0.7448	0.7448	PM10_PMBW
0.116707	0.03767	0.023717	0.338421	0.053901	0.001093	0.001093	PM2_5_RUNEX
0.0113	0.009078	0.006136	0.240684	0.073464	0	0	PM2_5_IDLEX
0	0	0	0	0	0.000486	0.000486	PM2_5_STREX
0.003	0.003	0.003	0.003	0.003	0.002	0.002	PM2_5_PMTW
0.05586	0.05586	0.05586	0.05586	0.3192	0.3192	0.3192	PM2_5_PMBW
0.011875	0.009149	0.008667	0.01025	0.011071	0.008659	0.008659	SOx_RUNEX
0.00624	0.005935	0.0059	0.006024	0.0348	0.025781	0.025781	SOx_IDLEX
0	0	0	0	0	0.000599	0.000599	SOx_STREX
0.197574	0.152222	0.144203	0.170536	0.184202	0.040103	0.040103	N2O_RUNEX
0.103825	0.098747	0.098169	0.100228	0.578992	0.082535	0.082535	N2O_IDLEX
0	0	0	0	0	0.046146	0.046146	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	Calendar Year
T6 Public	T6 OOS	T6 OOS	T6 instate	T6 instate	T6 instate	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
DSL	DSL	DSL	DSL	DSL	DSL	Fuel
80.74539	4.748618	10.03575	158.0594	70.24065	41.11833	Population
1196.90634	242.834628	2002.68172	6860.732185	6936.86525	2127.570852	VMT
244.9277	69.32982	146.5219	1823.984	810.5674	185.8944	Trips
0.140984	0.057954	0.023531	0.203736	0.212632	0.374762	ROG_RUNEX
0.584052	0.072483	0.058732	0.097452	0.099358	0.104559	ROG_IDLEX
0	0	0	0	0	0	ROG_STREX
0	0	0	0	0	0	ROG_HOTSOAK
0	0	0	0	0	0	ROG_RUNLOSS
0	0	0	0	0	0	ROG_RESTLOSS
0	0	0	0	0	0	ROG_DIURN
0.160499	0.065976	0.026788	0.231938	0.242065	0.426638	TOG_RUNEX
0.664898	0.082517	0.066862	0.110942	0.113111	0.119032	TOG_IDLEX
0	0	0	0	0	0	TOG_STREX
0	0	0	0	0	0	TOG_HOTSOAK
0	0	0	0	0	0	TOG_RUNLOSS
0	0	0	0	0	0	TOG_RESTLOSS
0	0	0	0	0	0	TOG_DIURN
0.317861	0.227369	0.120345	0.591936	0.598085	0.873424	CO_RUNEX
5.850266	2.04803	2.020541	1.964052	1.715555	2.115106	CO_IDLEX
0	0	0	0	0	0	CO_STREX
8.866738	1.645728	1.207304	3.607584	4.996915	3.934496	NOX_RUNEX
41.71008	4.433495	3.669687	6.3323	7.040351	6.199778	NOX_IDLEX
0.831181	1.069342	1.168332	1.265656	1.043947	1.697871	NOX_STREX
1252.585	975.7018	917.4086	1122.784	1103.014	1245.488	CO2_RUNEX
3342.673	633.8947	623.1447	678.1085	674.3345	662.838	CO2_IDLEX
0	0	0	0	0	0	CO2_STREX
0.006548	0.002692	0.001093	0.009463	0.009876	0.017407	CH4_RUNEX
0.027128	0.003367	0.002728	0.004526	0.004615	0.004856	CH4_IDLEX
0	0	0	0	0	0	CH4_STREX
0.06577	0.045084	0.022031	0.087872	0.093423	0.114664	PM10_RUNEX
0.156834	0.010934	0.00494	0.022142	0.02494	0.025611	PM10_IDLEX
0	0	0	0	0	0	PM10_STREX
0.012	0.012	0.012	0.012	0.012	0.012	PM10_PMTW
0.13034	0.13034	0.13034	0.13034	0.13034	0.13034	PM10_PMBW
0.062925	0.043134	0.021078	0.084071	0.089382	0.109704	PM2_5_RUNEX
0.150049	0.010461	0.004727	0.021185	0.023862	0.024503	PM2_5_IDLEX
0	0	0	0	0	0	PM2_5_STREX
0.003	0.003	0.003	0.003	0.003	0.003	PM2_5_PMTW
0.05586	0.05586	0.05586	0.05586	0.05586	0.05586	PM2_5_PMBW
0.011834	0.009218	0.008667	0.010608	0.010421	0.011767	SOx_RUNEX
0.03158	0.005989	0.005887	0.006406	0.006371	0.006262	SOx_IDLEX
0	0	0	0	0	0	SOx_STREX
0.196889	0.153367	0.144204	0.176486	0.173378	0.195773	N2O_RUNEX
0.525422	0.099639	0.09795	0.106589	0.105996	0.104189	N2O_IDLEX
0	0	0	0	0	0	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	Calendar Year
T7 NNOOS	T7 CAIRP	T7 CAIRP	T7 Ag	T6TS	T6 utility	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
DSL	DSL	DSL	DSL	GAS	DSL	Fuel
762.5854	6.089516	706.5492	6.190131	114.987	3.897006	Population
152974.361	1100.35796	125472.089	110.036681	5071.97577	65.4760839	VMT
11133.75	27.53047	10315.62	27.23657	2300.659	44.81557	Trips
0.047014	0.124957	0.056978	0.592621	0.188805	0.007343	ROG_RUNEX
13.31668	1.592945	10.6413	1.789732	1.003048	0.13558	ROG_IDLEX
0	0	0	0	0.264803	0	ROG_STREX
0	0	0	0	0.20273	0	ROG_HOTSOAK
0	0	0	0	1.641602	0	ROG_RUNLOSS
0	0	0	0	0.025765	0	ROG_RESTLOSS
0	0	0	0	0.073515	0	ROG_DIURN
0.053522	0.142254	0.064866	0.674654	0.275504	0.008359	TOG_RUNEX
15.16002	1.813446	12.11431	2.037474	1.463645	0.154348	TOG_IDLEX
0	0	0	0	0.289926	0	TOG_STREX
0	0	0	0	0.20273	0	TOG_HOTSOAK
0	0	0	0	1.641602	0	TOG_RUNLOSS
0	0	0	0	0.025765	0	TOG_RESTLOSS
0	0	0	0	0.073515	0	TOG_DIURN
0.272968	0.679873	0.29264	2.310031	4.25037	0.085936	CO_RUNEX
176.8057	21.82621	139.7776	11.007	16.2626	5.74113	CO_IDLEX
0	0	0	0	6.493699	0	CO_STREX
2.397239	4.774511	2.983016	8.59142	0.995542	1.004018	NOx_RUNEX
154.8445	20.61838	130.9065	19.91812	0.085097	7.847841	NOx_IDLEX
2.008365	4.055671	1.943343	2.801769	0.438698	1.945603	NOx_STREX
1318.046	1747.553	1381.368	1646.251	1782.863	1032.29	CO2_RUNEX
30714.74	3996.049	26085.57	1869.53	537.8649	1692.967	CO2_IDLEX
0	0	0	0	42.64725	0	CO2_STREX
0.002184	0.005804	0.002647	0.027526	0.035418	0.000341	CH4_RUNEX
0.618525	0.073988	0.494261	0.083128	0.237928	0.006297	CH4_IDLEX
0	0	0	0	0.045109	0	CH4_STREX
0.042582	0.03843	0.045201	0.417849	0.002037	0.003502	PM10_RUNEX
0.293827	0.013787	0.182549	0.221885	0	0.001959	PM10_IDLEX
0	0	0	0	0.000985	0	PM10_STREX
0.036	0.036	0.036	0.036	0.012	0.012	PM10_PMTW
0.06174	0.06174	0.06174	0.06174	0.13034	0.13034	PM10_PMBW
0.04074	0.036768	0.043246	0.399773	0.001873	0.00335	PM2_5_RUNEX
0.281116	0.01319	0.174652	0.212286	0	0.001874	PM2_5_IDLEX
0	0	0	0	0.000906	0	PM2_5_STREX
0.009	0.009	0.009	0.009	0.003	0.003	PM2_5_PMTW
0.02646	0.02646	0.02646	0.02646	0.05586	0.05586	PM2_5_PMBW
0.012452	0.01651	0.01305	0.015553	0.017643	0.009753	SOx_RUNEX
0.290178	0.037753	0.246444	0.017662	0.005323	0.015994	SOx_IDLEX
0	0	0	0	0.000422	0	SOx_STREX
0.207179	0.274691	0.217132	0.258768	0.042318	0.162262	N2O_RUNEX
4.82793	0.628123	4.100289	0.293864	0.005817	0.266111	N2O_IDLEX
0	0	0	0	0.02769	0	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	Calendar Year
T7 SWCV	T7 single construction	T7 Single	T7 Public	T7 NOOS	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
DSL	DSL	DSL	DSL	DSL	Fuel
8.95276	38.82324	103.0388	93.04876	277.4099	Population
365.7952508	2729.785722	5772.24202	1890.81963	49296.4230	VMT
34.91576	175.5183	1189.053	282.2479	4050.184	Trips
0.044602	0.426037	0.274287	0.261605	0.045966	ROG_RUNEX
1.351016	1.578025	1.858556	1.368963	13.08442	ROG_IDLEX
0	0	0	0	0	ROG_STREX
0	0	0	0	0	ROG_HOTSOAK
0	0	0	0	0	ROG_RUNLOSS
0	0	0	0	0	ROG_RESTLOSS
0	0	0	0	0	ROG_DIURN
0.050776	0.48501	0.312254	0.297817	0.052329	TOG_RUNEX
1.538029	1.796461	2.115824	1.55846	14.89562	TOG_IDLEX
0	0	0	0	0	TOG_STREX
0	0	0	0	0	TOG_HOTSOAK
0	0	0	0	0	TOG_RUNLOSS
0	0	0	0	0	TOG_RESTLOSS
0	0	0	0	0	TOG_DIURN
0.121404	1.137284	0.905094	0.818956	0.263895	CO_RUNEX
8.48321	20.04249	23.83207	4.971513	175.3735	CO_IDLEX
0	0	0	0	0	CO_STREX
13.393	6.537824	10.10741	18.703	2.866471	NOx_RUNEX
49.13177	22.67283	29.17221	44.75658	163.4921	NOx_IDLEX
1.062785	3.516605	2.443947	0.238515	1.971256	NOx_STREX
4378.391	1859.783	1732.607	2047.096	1380.199	CO2_RUNEX
4461.297	3917.792	4936.719	3468.444	32683.68	CO2_IDLEX
0	0	0	0	0	CO2_STREX
0.002072	0.019788	0.01274	0.012151	0.002135	CH4_RUNEX
0.062751	0.073295	0.086325	0.063585	0.607738	CH4_IDLEX
0	0	0	0	0	CH4_STREX
0.016057	0.115259	0.118254	0.134839	0.041133	PM10_RUNEX
0.120632	0.032354	0.039951	0.214693	0.163652	PM10_IDLEX
0	0	0	0	0	PM10_STREX
0.036	0.036	0.036	0.036	0.036	PM10_PMTW
0.06174	0.06174	0.06174	0.06174	0.06174	PM10_PMBW
0.015363	0.110273	0.113138	0.129005	0.039353	PM2_5_RUNEX
0.115413	0.030955	0.038222	0.205406	0.156572	PM2_5_IDLEX
0	0	0	0	0	PM2_5_STREX
0.009	0.009	0.009	0.009	0.009	PM2_5_PMTW
0.02646	0.02646	0.02646	0.02646	0.02646	PM2_5_PMBW
0.041365	0.01757	0.016369	0.01934	0.013039	SOx_RUNEX
0.042148	0.037013	0.04664	0.032768	0.308779	SOx_IDLEX
0	0	0	0	0	SOx_STREX
0.688222	0.292332	0.272342	0.321775	0.216948	N2O_RUNEX
0.701254	0.615822	0.775983	0.545191	5.137419	N2O_IDLEX
0	0	0	0	0	N2O_STREX

SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	SISKIYOU	Region
2021	2021	2021	2021	2021	2021	2021	Calendar Year
UBUS	UBUS	T7IS	T7 utility	T7 tractor	T7 tractor	T7 tractor	Vehicle Category
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Aggregated	Speed
DSL	GAS	GAS	DSL	DSL	DSL	DSL	Fuel
4.619643	4.690309	0.534383	2.990041	32.4197	175.4846	175.4846	Population
344.4210095	424.548503	31.5079662	60.66799974	2251.83288	19975.99546	19975.99546	VMT
18.47857	18.76123	10.69193	34.38547	146.5682	2228.655	2228.655	Trips
0.001599	0.022089	0.864589	0.015319	0.431013	0.164333	0.164333	ROG_RUNEX
0	0	0	0.635427	1.58845	1.6884	1.6884	ROG_IDLEX
0	0.643054	0.001239	0	0	0	0	ROG_STREX
0	0.052392	0.115713	0	0	0	0	ROG_HOTSOAK
0	0.367921	1.65391	0	0	0	0	ROG_RUNLOSS
0	0.005518	0.01861	0	0	0	0	ROG_RESTLOSS
0	0.012041	0.062859	0	0	0	0	ROG_DIURN
0.11424	0.032232	1.261606	0.01744	0.490675	0.187081	0.187081	TOG_RUNEX
0	0	0	0.723385	1.808329	1.922114	1.922114	TOG_IDLEX
0	0.704064	0.001356	0	0	0	0	TOG_STREX
0	0.052392	0.115713	0	0	0	0	TOG_HOTSOAK
0	0.367921	1.65391	0	0	0	0	TOG_RUNLOSS
0	0.005518	0.01861	0	0	0	0	TOG_RESTLOSS
0	0.012041	0.062859	0	0	0	0	TOG_DIURN
0.180242	0.379804	27.05351	0.199651	1.266172	0.614507	0.614507	CO_RUNEX
0	0	0	9.388957	20.14862	18.92599	18.92599	CO_IDLEX
0	11.32615	1.766989	0	0	0	0	CO_STREX
1.704875	0.338127	12.77736	1.767266	6.851013	5.920996	5.920996	NOx_RUNEX
0	0	0	7.508802	22.71467	28.13453	28.13453	NOx_IDLEX
0	0.992222	0.005378	3.265591	3.55795	1.076184	1.076184	NOx_STREX
1251.989	2263.981	2020.818	1648.087	1870.278	1445.856	1445.856	CO2_RUNEX
0	0	0	1704.278	4104.586	4296.839	4296.839	CO2_IDLEX
0	104.7814	43.06482	0	0	0	0	CO2_STREX
0.111937	0.006548	0.160162	0.000712	0.020019	0.007633	0.007633	CH4_RUNEX
0	0	0	0.029514	0.073779	0.078422	0.078422	CH4_IDLEX
0	0.148179	0.000238	0	0	0	0	CH4_STREX
0.005343	0.001452	0.002673	0.006319	0.102009	0.099242	0.099242	PM10_RUNEX
0	0	0	0.002704	0.022016	0.047724	0.047724	PM10_IDLEX
0	0.00057	0.000862	0	0	0	0	PM10_STREX
0.016992	0.012	0.02	0.036	0.036	0.036	0.036	PM10_PMTW
0.116071	0.13034	0.06174	0.06174	0.06174	0.06174	0.06174	PM10_PMBW
0.005112	0.001335	0.002458	0.006045	0.097596	0.094949	0.094949	PM2_5_RUNEX
0	0	0	0.002587	0.021064	0.04566	0.04566	PM2_5_IDLEX
0	0.000524	0.000792	0	0	0	0	PM2_5_STREX
0.004248	0.003	0.005	0.009	0.009	0.009	0.009	PM2_5_PMTW
0.049745	0.05586	0.02646	0.02646	0.02646	0.02646	0.02646	PM2_5_PMBW
0.011836	0.022404	0.019998	0.01557	0.017669	0.01366	0.01366	SOx_RUNEX
0	0	0	0.016101	0.038778	0.040594	0.040594	SOx_IDLEX
0	0.001037	0.000426	0	0	0	0	SOx_STREX
0.196795	0.027517	0.31365	0.259056	0.293982	0.227268	0.227268	N2O_RUNEX
0	0	0	0.267889	0.645184	0.675403	0.675403	N2O_IDLEX
0	0.081374	0.000258	0	0	0	0	N2O_STREX

SISKIYOU	SISKIYOU	Region
2021	2021	Calendar Year
UBUS	UBUS	Vehicle Category
Aggregated	Aggregated	Model Year
Aggregated	Aggregated	Speed
NG	ELEC	Fuel
5.705102	0.292347	Population
552.800564	6.2585146	VMT
22.82041	1.169389	Trips
0.121854	0	ROG_RUNEX
0	0	ROG_IDLEX
0	0	ROG_STREX
0	0	ROG_HOTSOAK
0	0	ROG_RUNLOSS
0	0	ROG_RESTLOSS
0	0	ROG_DIURN
8.703881	0	TOG_RUNEX
0	0	TOG_IDLEX
0	0	TOG_STREX
0	0	TOG_HOTSOAK
0	0	TOG_RUNLOSS
0	0	TOG_RESTLOSS
0	0	TOG_DIURN
12.13064	0	CO_RUNEX
0	0	CO_IDLEX
0	0	CO_STREX
6.883899	0	NOx_RUNEX
0	0	NOx_IDLEX
0	0	NOx_STREX
1606.809	0	CO2_RUNEX
0	0	CO2_IDLEX
0	0	CO2_STREX
8.528423	0	CH4_RUNEX
0	0	CH4_IDLEX
0	0	CH4_STREX
0.00726	0	PM10_RUNEX
0	0	PM10_IDLEX
0	0	PM10_STREX
0.023154	0.012	PM10_PMTW
0.098459	0.13034	PM10_PMBW
0.006946	0	PM2_5_RUNEX
0	0	PM2_5_IDLEX
0	0	PM2_5_STREX
0.005788	0.003	PM2_5_PMTW
0.042197	0.05586	PM2_5_PMBW
0	0	SOx_RUNEX
0	0	SOx_IDLEX
0	0	SOx_STREX
0.327559	0	N2O_RUNEX
0	0	N2O_IDLEX
0	0	N2O_STREX

Conversion Factors		
Grams	lb	453.59
lb	MT	0.000454

Gobal Warming Potential (GWP)		
IPCC Fourth Assessment Report		
CO2	1	
CH4	25	
N2O	298	

Fuel Use Summary

Construction Fuel Usage Summary

Proposed Project Fuel Use

Construction Fuel Usage Summary

Construction Phase	Diesel	Gasoline	Diesel	Diesel
	Off-road Equipment (gallons)	On-road (gallons)	On-road (gallons)	Total
Pre-Dam	59,982	0	0	59,982
Demolition - JC Boyle	774,678	39,076	25,736	800,414
Demolition - Copco No. 1	922,072	97,278	28,673	950,745
Demolition - Copco No. 2	133,580	34,657	9,175	142,754
Demolition - Iron Gate	1,771,932	75,849	160,111	1,932,044
Restoration - JC Boyle	295,104	0	45,984	341,088
Restoration - Copco No. 1	155,150	0	25,751	180,901
Restoration - Copco No. 2	66,493	0	11,012	77,505
Restoration - Iron Gate	268,488	0	36,411	304,899
TOTAL	4,447,479	246,859	342,853	4,790,332
Total Gasoline	246,859	gallons		
Total Diesel	4,790,332	gallons		

Proposed Project Pre-dam Removal Activities

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
IEV Control								
CAT 426 BACKHOE	94	Tractor/Loaders/ Backhoes	1	2.91	320	0.37	110	556.48
Tractor with Till/Disc Attachment (JD 6175)	175	Tractor/Loaders/ Backhoes	1	6.82	750	0.37	110	2428.125
TOTAL								
Construction access, road, bridge, and culvert improvements								
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/ Backhoes	1	0.56	80	0.37	142	71.04
Clamshell Bucket, 1 C.Y.	0	NA	1	4.49	637.12	0	142	0
Concrete Pump (Small)	84	Pump	1	4.56	647.49	0.74	142	2012.39892
Crawler Crane, 25 Ton	231	Cranes	1	4.49	637.12	0.29	142	2134.03344
Crawler Crane, 40 Ton	231	Cranes	1	2.66	378.06	0.29	142	1266.31197
Crawler Crane, 75 Ton	231	Cranes	1	0.84	119.82	0.29	142	401.33709
Dozer, 105 H.P.	105	Rubber Tired Dozer	1	2.61	370.46	0.4	142	777.966
Drill Rig, Truck-Mounted	221	Bore/Drill Rigs	1	14.88	2113.14	0.5	142	11675.0985
Gas Engine Vibrator	5.5	Cement and Motar Mixer	1	6.08	862.99	0.56	142	132.90046
Hammer, Diesel, 22k ft-lb	221	Bore/Drill Rigs	1	1.25	178.06	0.5	142	983.7815
Hammer, Diesel, 41k ft-lb	221	Bore/Drill Rigs	1	0.84	119.82	0.5	142	662.0055

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Hyd. Crane, 80 Ton	231	Cranes	1	1.50	212.75	0.29	142	712.606125
Lattice Boom Crane, 150 Ton	282	Cranes	1	5.40	767.23	0.29	142	3137.20347
Vibratory Hammer & Gen.	221	Bore/Drill Rigs	1	1.41	200	0.5	142	1105
TOTAL								
Recreation Facilities Removal								
20' Suction Hose, 6"	0	NA	1	4.00	480.14	0	120	0
50' Discharge Hoses, 6"	0	NA	1	8.00	960.27	0	120	0
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/ Backhoes	1	8.45	1014.22	0.37	120	900.62736
Brush Chipper, 12", 130 H.P.	130		1	1.58	189.18	1	120	1229.67
Centr. Water Pump, 6"	84	Pump	1	4.00	480.14	0.74	120	1492.27512
Chain Saw, Gas, 36" Long	7		1	3.15	378.37	1	120	132.4295
Clamshell Bucket, 1 C.Y.	0	NA	1	1.74	208.74		120	0
Crawler Loader, 3 C.Y.	97	Crawler Tractors	1	1.58	189.18	0.43	120	394.53489
Dozer, 200 H.P.	200	Rubber Tired Dozers	1	1.86	222.99	0.4	120	891.96
Dozer, 300 H.P.	300	Rubber Tired Dozers	1	0.39	46.81	0.4	120	280.86
Dozer, 80 H.P.	80	Rubber Tired Dozers	1	1.61	193.6	0.4	120	309.76
Earth Auger, Truck-Mtd.	221	Bore/Drill Rigs	1	0.44	52.93	0.5	120	292.43825
F.E. Loader, T.M., 2.25 C.Y.	97	Tractor/Loaders/ Backhoes	1	1.60	192.42	0.37	120	345.29769
F.E. Loader, W.M., 2.5 C.Y.	97	Tractor/Loaders/ Backhoes	1	5.25	629.86	0.37	120	1130.28377
Gas Engine Vibrator	5.5		1	1.73	207.84	0.56	120	32.00736

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Gradall, 5/8 C.Y.	158	Excavator	1	2.67	320	0.32	120	808.96
Grader, 30,000 Lbs.	187	Grader	1	10.51	1261.09	0.41	120	4834.388515
Heating Kettle, 115 Gallon	0	NA	1	0.84	100.8	0	120	0
Hyd. Crane, 12 Ton	231	Cranes	1	1.63	196.11	0.29	120	656.870445
Hyd. Crane, 25 Ton	231	Cranes	1	0.73	87.9	0.29	120	294.42105
Hyd. Excavator, 2 C.Y.	231	Excavator	1	0.34	40.51	0.38	120	177.79839
Hyd. Excavator, 2.5 C.Y.	231	Excavator	1	0.46	55.06	0.38	120	241.65834
Hyd. Excavator, 3.5 C.Y.	231	Excavator	1	1.74	208.74	0.38	120	916.15986
Line Rem., 11 H.P., Walk Behind	11		1	0.10	11.8	1	120	6.49
Loader, Skid Steer, 78 H.P.	78	Skid Steer Loaders	1	0.96	115.44	0.37	120	166.57992
Paint Striper, T.M., 120 Gal.	0	NA	1	0.84	100.8	0	120	0
Rammer/Tamper, Gas, 15"	6.5	Plate Compactors	1	1.14	137.36	0.43	120	19.19606
Road Sweeper, S.P., 8' wide	64		1	0.02	2.95	0.46	120	4.3424
Roller, Vibratory, 25 Ton	80	Roller	1	2.07	248.64	0.38	120	377.9328
Tandem Roller, 5 Ton	80	Roller	1	0.39	46.82	0.36	120	67.4208
Trowel, 48" Walk-Behind	11.7		1	0.39	46.82	0	120	0
Vibr. Roller, Towed, 12 Ton	80	Roller	1	4.39	526.75	0.38	120	800.66
Vibratory Roller, Towed, 23 Ton	80	Roller	1	1.39	166.99	0.38	120	253.8248
Welder, Gas Engine, 300 amp	23	Welder	1	0.01	1.1	0.45	120	0.56925
TOTAL								

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Yreka Water Supply Pipeline Relocation								
Air Compressor 600 cfm	300	Air Compressor	1	2.00	240	0.48	120	1728
Crawler Crane, 90 Ton	231	Cranes	1	4.01	480.6	0.29	120	1609.7697
Dozer (235hp)(CATD7)	235	Rubber Tired Dozers	1	1.34	160.4	0.4	120	753.88
Gas Engine Tamp	6.5	Plate Compactors	1	2.67	320.8	0.43	120	44.8318
Hydraulic Crane (17tn)	231	Cranes	1	2.01	240.8	0.29	120	806.5596
Microtunneling 36" ID Casing	0	NA	1	2.04	244.8	0	120	0
Roller, Dbl Drum (steel wheel, 5.0 - 7.9 MTn)	80	Roller	1	1.34	160.4	0.38	120	243.808
Welder, Portable	46	Welder	1	2.01	240.8	0.45	120	249.228
TOTAL								
Fall Creek Hatery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	1	2.40	366.6	0.48	153	431.1216
Hand Held Pavement Breaker 80-90 lbs	0	NA	1	2.40	366.6	0	153	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.01	1.44	0.3	153	0.1404
Crawler Mntd Asphalt Paver 5'-13' ABG Titan 125 21K	60	Pavers	1	0.00	0.533	0.42	153	0.67158
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.13	20.481	0.42	153	55.91313

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	0.21	32.65	0.43	153	5.6158
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.13	19.574	0.38	153	6.694308
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.11	16.118	0.38	153	24.49936
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP-11MT	142	Roller	1	0.19	28.571	0.38	153	77.084558
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.14	21.014	0.38	153	13.175778
Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	138	Roller	1	0.13	20.481	0.38	153	53.701182
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	0.03	5	0.73	153	0.5475
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.11	16.118	0.4	153	53.1894
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.28	43.281	0.4	153	121.1868
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	0.28	42.25	0.41	153	80.549625
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	1	0.62	94.926	0.35	153	161.136885

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Standard Crawler Loader Cat. 963 158HP 3.20cy- 43K#	158	Crawler Tractor	1	0.49	74.723	0.4	153	236.12468
Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	160	Rubber Tired Loader	1	0.00	0.48	0.36	153	1.3824
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.08	12.735	0.38	153	33.39117
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	0.41	62.409	0.38	153	220.553406
80MT All/Rough Terrain Hydro Crane	231	Cranes	1	0.73	112.265	0.29	153	376.0316175
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.04	6.862	0.29	153	6.268437
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.06	8.427	0.29	153	7.6980645
Electric Submersible Pump 2HP/2"	2	Pump	1	0.49	75.413	0.74	153	5.580562
Discharge Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Suction Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Chain Saw, 20"bar Length	3	NA	1	0.49	74.723	1	153	11.20845
80 Ton 16 Wheel Equipment Trailer	0	NA	1	0.68	104	0	153	0
Trailer Mtd Brush Chipper, 16"dia	130	NA	1	0.49	74.723	1	153	485.6995

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Iron Gate Hattery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	2	16.27	732.016	0.48	45	1721.701632
Hand Held Pavement Breaker 80-90 lbs	0		2	16.27	732.016	0	45	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.26	11.604	0.3	45	1.13139
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.01	0.427	0.42	45	1.16571
Crawler Mntd Pavement Millers 84"-Terex-PR-800-7-Power Mode: Diesel	60	Pavers	1	0.10	4.575	0.42	45	5.7645
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	6.49	292.145	0.43	45	50.24894
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.97	43.522	0.38	45	14.884524
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.03	1.227	0.38	45	1.86504
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP-11MT	142	Roller	1	0.03	1.513	0.38	45	4.082074
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.01	0.427	0.38	45	0.267729

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	138	Roller	1	0.01	0.427	0.38	45	1.119594
Concrete Core Drill	221	Bore/Drill Rigs	1	0.36	16.312	0.5	45	90.1238
Trailer Mtd Concrete Pumps, 80cy/hr, 160hp	160	Pump	1	0.52	23.211	0.74	45	137.40912
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	4.16	187.354	0.73	45	20.515263
Standard Crawler Dozer Cat. D4C 81HP	81	Rubber Tired Dozer	1	0.01	0.276	0.4	45	0.44712
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.01	0.339	0.4	45	1.1187
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.05	2.067	0.41	45	5.93229
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/ Backhoes	1	2.44	109.98	0.37	45	189.22059
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/ Backhoes	2	9.81	441.453	0.37	45	1584.374817
Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	160	Rubber Tired Loader	1	0.09	4.235	0.36	45	12.1968
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.48	21.562	0.38	45	56.535564
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	3.77	169.818	0.38	45	600.136812

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
20MT All/Rough Terrain Hydro Crane	231	Crane	1	0.89	40	0.29	45	133.98
40MT All/Rough Terrain Hydro Crane	231	Crane	1	1.36	61.421	0.29	45	205.7296395
80MT All/Rough Terrain Hydro Crane	231	Crane	1	7.97	358.45	0.29	45	1200.628275
100MT All/Rough Terrain Hydro Crane	231	Crane	1	0.15	6.789	0.29	45	22.7397555
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.56	25.375	0.31	45	24.7786875
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.83	37.34	0.31	45	36.46251
1cy Standard Clamshell Bucket	0		1	1.33	59.951	0	45	0
Vibratory Hammer/Extractor 134.0 Ton 503Hydraulic HP	221	Bore/Drill Rigs	1	0.39	17.424	0.5	45	96.2676
Electric Submersible Pump 2HP/2"	2	Pump	1	3.04	137.013	0.74	45	10.138962
Discharge Hose 2.0 in	0		1	3.04	137.013	0	45	0
Suction Hose 2.0 in	0		1	3.04	137.013	0	45	0
Self Propelled Pavement Brooms 96" 76HP	76		1	0.10	4.575	0.46	45	7.9971
Portable welder Diesel 300 amps	22	Welder	1	6.20	279.062	0.45	45	138.13569

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Torch Cutting Acetylene-Oxygen 150'	0		1	2.80	126.163	0	45	0
80 Ton 16 Wheel Equipment Trailer	0		1	2.13	96	0	45	0
Hydraulic Impact Breaker 2K 620bpm	221	Bore/Drill Rigs	1	1.17	52.842	1	45	583.9041
TOTAL								59,982

Proposed Project Dam and Powerhouse Removal

			JC Boyle			Copco No. 1		Copco No. 2		Iron Gate				Diesel Fuel Usage			
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	Number of Days	Copco No. 1&2 - Demolition	Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days	Approximate Operating Hours/Day	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
SEMI TRACTOR	510	Tractors/Loaders/ Backhoes	1	195		0	355	0	120		344	20	0.37	36796.5	0	0	0
D6 DOZER	215	Rubber Tired Dozers	2	195	1	0.7	355	0.3	120	2	344	20	0.4	33540	21371	3096	59168
D8 DOZER	354	Rubber Tired Dozers	2	195	1	0.7	355	0.3	120	3	344	20	0.4	55224	35187.6	5097.6	146131.2
CAT 426 BACKHOE	94	Tractors/Loaders/ Backhoes	1	195	1	0.7	355	0.3	120	0	344	20	0.37	6782.1	8642.83	1252.08	0
CAT 14H MOTORGRADER	250	Graders	1	195	1	0.7	355	0.3	120	2	344	20	0.41	19987.5	25471.25	3690	70520
CAT 336/330, JD 330 EXCAVATOR	273	Excavators	2	195	1	0.7	355	0.3	120	1	344	20	0.38	40458.6	25779.39	3734.64	35686.56
CAT 349/EX400 EXCAVATOR	275	Excavators	2	195	2	1.4	355	0.6	120	3	344	20	0.38	40755	51936.5	7524	107844
CAT 374/365 EXCAVATOR	472	Excavators		195		0	355	0	120	1	344	20	0.38	0	0	0	61699.84
EX1100/1250 EXCAVATOR	600	Excavators		195		0	355	0	120	2	344	20	0.38	0	0	0	156864
CAT 563 - 84"ROLLER	137	Roller	1	195	1	0.7	355	0.3	120	1	344	20	0.38	10151.7	12936.91	1874.16	17908.64
WALK BEHIND ROLLER	20	Roller	1	195	1	0.7	355	0.3	120	1	344	20	0.38	1482	1888.6	273.6	2614.4
S15-60T RT CRANE	365	Cranes	1	195	2	1.4	355	0.6	120	1	344	20	0.29	20640.75	52607.45	7621.2	36412.4
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	Cranes	1	195	1	0.7	355	0.3	120	1	344	20	0.29	17982.9	22916.67	3319.92	31723.68
3900 W 140T CRANE	287	Cranes		195	1	0.7	355	0.3	120		344	20	0.29	0	20682.655	2996.28	0
S15-222 100 TN MANITOWOC CRANE	318	Cranes	1	195		0	355	0	120		344	20	0.29	17982.9	0	0	0
4100 SERIES 2 200T CRANE	231	Cranes	1	195		0	355	0	120		344	20	0.29	13063.05	0	0	0
S15-777 175 TN MANITOWOC CRANE	231	Cranes		195	1	0.7	355	0.3	120		344	20	0.29	0	16647.015	2411.64	0
A40/CAT 740 HAUL TRUCK	496	Off-Highway Trucks	5	195	3	2.1	355	0.9	120	2	344	20	0.38	183768	140511.84	20355.84	129674.24

			JC Boyle			Copco No. 1		Copco No. 2		Iron Gate				Diesel Fuel Usage			
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	Number of Days	Copco No. 1&2 - Demolition	Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days	Approximate Operating Hours/Day	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
CAT 773 HAUL TRUCK	775	Off-Highway Trucks		195		0	355	0	120	4	344	20	0.38	0	0	0	405232
175 COMPRESSOR	0	NA	1	195	2	1.4	355	0.6	120	1	344	24	0	0	0	0	0
400 COMPRESSOR	0	NA		195	1	0.7	355	0.3	120		344	24	0	0	0	0	0
200 - 250 AMP DIESEL WELDER	50	Welder	1	195	1	0.7	355	0.3	120	1	344	24	0.74	8658	11033.4	1598.4	15273.6
25 - 49 KW GENERATOR - 75 HP	75	Generator Sets	1	195	2	1.4	355	0.6	120	2	344	24	0.74	12987	33100.2	4795.2	45820.8
125 - 174 KW GENERATOR - 250 HP	250	Generator Sets	1	195	1	0.7	355	0.3	120	1	344	24	0.74	43290	55167	7992	76368
5 KW GENERATORS - 10 HP	10	Generator Sets	5	195	9	6.3	355	2.7	120	6	344	20	0.74	7215	16550.1	2397.6	15273.6
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	Generator Sets	5	195	5	3.5	355	1.5	120	5	344	20	0.74	61327.5	78153.25	11322	108188
6" TRASH PUMP	84	Pumps	2	195	3	2.1	355	0.9	120	2	344	24	0.74	29090.88	55608.336	8055.936	51319.296
6" SUB PUMP	84	Pumps	2	195	2	1.4	355	0.6	120	1	344	24	0.74	29090.88	37072.224	5370.624	25659.648
GROUT PUMP	84	Pumps	1	195	1	0.7	355	0.3	120	1	344	20	0.74	12121.2	15446.76	2237.76	21383.04
950 LOADER	240	Rubber Tired Loaders	1	195	1	0.7	355	0.3	120		344	20	0.36	16848	21470.4	3110.4	0
966F LOADER	280	Rubber Tired Loaders	1	195	2	1.4	355	0.6	120	1	344	20	0.36	19656	50097.6	7257.6	34675.2
980G LOADER	431	Rubber Tired Loaders		195		0	355	0	120	1	344	20	0.36	0	0	0	53375.04
MANLIFT 60'	89	Aerial Lifts	2	195	3	2.1	355	0.9	120	2	344	20	0.31	10760.1	20568.345	2979.72	18981.92
D19-42 PILE HAMMER (42,000 FT-LB)	0	NA	1	195		0	355	0	120		344	20	0	0	0	0	0
>10,000 LB EXTENDABLE FORKLIFT	89	Forklift	1	195	2	1.4	355	0.6	120	1	344	20	0.2	3471	8846.6	1281.6	6123.2

			JC Boyle			Copco No. 1		Copco No. 2		Iron Gate				Diesel Fuel Usage			
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	Number of Days	Copco No. 1&2 - Demolition	Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days	Approximate Operating Hours/Day	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
OSR SM HYD DRL/CMP (2-1/2" - 4- 1/2") - ROCK DRILL	221	Bore/Drill Rigs	1	195	3	2.1	355	0.9	120	1	344	20	0.5	21547.5	82377.75	11934	38012
CONCRETE SHEAR	0	NA	1	195		0	355	0	120		344	20	0	0	0	0	0
HOE RAM 330/349	0	NA	1	195	1	0.7	355	0.3	120	1	344	20	0	0	0	0	0
MAXI HEATER	0	NA	1	195		0	355	0	120		344	24	0	0	0	0	0
FLEXI FLOAT 10 X 40 X 7	0	NA	6	195	20	14	355	6	120	6	344	24	0	0	0	0	0
WORK BOAT	250	Work boat		195	1	0.7	355	0.3	120		344	20					
TOTAL														774,678	922,072	133,580	1,771,932

Proposed Project Restoration

Description	Power Rating (HP)	Comparable OFFROAD Equipment	JC Boyle		Copco No. 1&2 - Demolition	Copco No. 1		Copco No. 2		Iron Gate		Approximate Operating Hours/Day	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
			Quantity	Number of Days		Quantity	Number of Days	Quantity	Number of Days	Quantity	Number of Days						
SEMI TRACTOR	510	Tractors/Loaders/B ackhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	32739.45	22917.615	9821.835	32739.45
HONDA PIONEER 1000 SIDE BY SIDE	72	NA	3	347	3	2.1	347	0.9	347	3	347	10	0	0	0	0	0
GODWIN 3" PUMP	84	Pumps	1	347	1	0.7	347	0.3	347	1	347	10	0.74	10784.76	7549.332	3235.428	10784.76
GODWIN 6" PUMP	84	Pumps	1	347	1	0.7	347	0.3	347	1	347	10	0.74	10784.76	7549.332	3235.428	10784.76
CAT 323 EXCAVATOR	164	Excavators	1	347	1	0.7	347	0.3	347	1	347	10	0.38	10812.52	7568.764	3243.756	10812.52
CAT 330 EXCAVATOR	275	Excavators	1	347	1	0.7	347	0.3	347	1	347	10	0.38	18130.75	12691.525	5439.225	18130.75
CAT 336 EXCAVATOR	311	Excavators	1	347		0	347	0	347		347	10	0.38	20504.23	0	0	0
CAT 304 EXCAVATOR	40	Excavators	1	347	1	0.7	347	0.3	347	1	347	10	0.38	2637.2	1846.04	791.16	2637.2
CAT D6 DOZER	215	Rubber Tired Dozers	1	347	1	0.7	347	0.3	347	1	347	10	0.4	14921	10444.7	4476.3	14921
CAT 299 SKID STEER	110	Skid Steer Loader	2	347	1	0.7	347	0.3	347	1	347	10	0.37	14122.9	4943.015	2118.435	7061.45
CAT 735 HAUL TRUCK	424	Off-Highway Trucks	2	347	2	1.4	347	0.6	347	2	347	10	0.38	55908.64	39136.048	16772.592	55908.64
MAROOKA MST2200VDR TRACK TRUCK	250	Off-Highway Trucks	1	347	1	0.7	347	0.3	347	1	347	10	0.38	16482.5	11537.75	4944.75	16482.5
JOHN DEERE 6150M TRACTOR	150	Tractors/Loaders/B ackhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	9629.25	6740.475	2888.775	9629.25
JOHN DEERE 5125R TRACTOR	125	Tractors/Loaders/B ackhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	8024.375	5617.0625	2407.3125	8024.375
CASE 340 TRACTOR	340	Tractors/Loaders/B ackhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	21826.3	15278.41	6547.89	21826.3
HONDA EM6500S GENERATOR	7.4	Generator Sets	1	347	2	1.4	347	0.6	347	2	347	10	0.74	950.086	1330.1204	570.0516	1900.172
BELL 206L LONG RANGER HELICOPTER	450	Helicopter	1	347		0	347	0	347	1	347	6	1	46845	0	0	46845
TOTAL														295,104	155,150	66,493	268,488

Notes: Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Proposed Project Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Hauling Trips	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Pre-Dam	0	0	0	675	0	0	0	10.00	6.50	0.00	0	0	-	0	0
Demolition - JC Boyle	90	0	49	190	17,100	0	9300	58.60	58.60	14.60	1,002,060.00	0.00	135,780.00	39,076	25,736
Demolition - Copco No. 1	110	0	13	387	42,570	0	5163	58.60	58.60	29.30	2,494,602.00	0.00	151,275.90	97,278	28,673
Demolition - Copco No. 2	80	0	12	190	15,200	0	2294	58.47	58.47	21.10	888,744.00	0.00	48,403.40	34,657	9,175
Demolition - Iron Gate	160	0	224	262	41,920	0	58661	46.40	46.40	14.40	1,945,088.00	0.00	844,718.40	75,849	160,111
Restoration - JC Boyle	0	10	0	414	0	4,140	0	58.60	58.60	0.00	0.00	242,604.00	-	0	45,984
Restoration - Copco No. 1	0	5.6	0	414	0	2,318	0	58.60	58.60	0.00	0.00	135,858.24	-	0	25,751
Restoration - Copco No. 2	0	2.4	0	414	0	994	0	58.47	58.47	0.00	0.00	58,095.79	-	0	11,012
Restoration - Iron Gate	0	10	0	414	0	4,140	0	46.40	46.40	0.00	0.00	192,096.00	-	0	36,411
TOTAL														246,859	342,853

Notes:
Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7). Daily woker trips based on the number of works multiplied by two. Daily Vendor trips based on quantity of trucks provided in equipment list. Daily Hauling trip based on total phase trips. Haul trip length based on average of material hauling trips.

Partial Removal Alternative Fuel Use

Partial Removal Construction Fuel Usage Summary

Construction Phase	Diesel	Gasoline	Diesel	Diesel
	Off-road Equipment (gallons)	On-road (gallons)	On-road (gallons)	Total
Pre-Dam	59,982	0	0	59,982
Demolition - JC Boyle	542,275	39,076	17,462	559,737
Demolition - Copco No. 1	829,865	97,278	26,935	856,800
Demolition - Copco No. 2	106,864	34,657	6,267	113,131
Demolition - Iron Gate	1,417,546	75,849	159,265	1,576,811
Restoration - JC Boyle	295,104	0	45,984	341,088
Restoration - Copco No. 1	155,150	0	25,751	180,901
Restoration - Copco No. 2	66,493	0	11,012	77,505
Restoration - Iron Gate	268,488	0	36,411	304,899
TOTAL	3,741,766	246,859	329,087	4,070,853
Total Gasoline	246,859	gallons		
Total Diesel	4,070,853	gallons		

Partial Removal Pre-dam Removal Activities

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
IEV Control								
CAT 426 BACKHOE	94	Tractor/Loaders/Backhoes	1	2.91	320	0.37	110	556.48
Tractor with Till/Disc Attachment (JD 6175)	175	Tractor/Loaders/Backhoes	1	6.82	750	0.37	110	2428.125
TOTAL								
Construction access, road, bridge, and culvert improvements								
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/Backhoes	1	0.56	80	0.37	142	71.04
Clamshell Bucket, 1 C.Y.	0	NA	1	4.49	637.12	0	142	0
Concrete Pump (Small)	84	Pump	1	4.56	647.49	0.74	142	2012.39892
Crawler Crane, 25 Ton	231	Cranes	1	4.49	637.12	0.29	142	2134.03344
Crawler Crane, 40 Ton	231	Cranes	1	2.66	378.06	0.29	142	1266.31197
Crawler Crane, 75 Ton	231	Cranes	1	0.84	119.82	0.29	142	401.33709
Dozer, 105 H.P.	105	Rubber Tired Dozer	1	2.61	370.46	0.4	142	777.966
Drill Rig, Truck-Mounted	221	Bore/Drill Rigs	1	14.88	2113.14	0.5	142	11675.0985
Gas Engine Vibrator	5.5	Cement and Motar Mixer	1	6.08	862.99	0.56	142	132.90046
Hammer, Diesel, 22k ft-lb	221	Bore/Drill Rigs	1	1.25	178.06	0.5	142	983.7815
Hammer, Diesel, 41k ft-lb	221	Bore/Drill Rigs	1	0.84	119.82	0.5	142	662.0055
Hyd. Crane, 80 Ton	231	Cranes	1	1.50	212.75	0.29	142	712.606125
Lattice Boom Crane, 150 Ton	282	Cranes	1	5.40	767.23	0.29	142	3137.20347
Vibratory Hammer & Gen.	221	Bore/Drill Rigs	1	1.41	200	0.5	142	1105
TOTAL								
Recreation Facilities Removal								
20' Suction Hose, 6"	0	NA	1	4.00	480.14	0	120	0
50' Discharge Hoses, 6"	0	NA	1	8.00	960.27	0	120	0
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/Backhoes	1	8.45	1014.22	0.37	120	900.62736
Brush Chipper, 12", 130 H.P.	130		1	1.58	189.18	1	120	1229.67
Centr. Water Pump, 6"	84	Pump	1	4.00	480.14	0.74	120	1492.27512
Chain Saw, Gas, 36" Long	7		1	3.15	378.37	1	120	132.4295
Clamshell Bucket, 1 C.Y.	0	NA	1	1.74	208.74		120	0
Crawler Loader, 3 C.Y.	97	Crawler Tractors	1	1.58	189.18	0.43	120	394.53489
Dozer, 200 H.P.	200	Rubber Tired Dozers	1	1.86	222.99	0.4	120	891.96
Dozer, 300 H.P.	300	Rubber Tired Dozers	1	0.39	46.81	0.4	120	280.86
Dozer, 80 H.P.	80	Rubber Tired Dozers	1	1.61	193.6	0.4	120	309.76

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Earth Auger, Truck-Mtd.	221	Bore/Drill Rigs	1	0.44	52.93	0.5	120	292.43825
F.E. Loader, T.M., 2.25 C.Y.	97	Tractor/Loaders/Backhoes	1	1.60	192.42	0.37	120	345.29769
F.E. Loader, W.M., 2.5 C.Y.	97	Tractor/Loaders/Backhoes	1	5.25	629.86	0.37	120	1130.28377
Gas Engine Vibrator	5.5		1	1.73	207.84	0.56	120	32.00736
Gradall, 5/8 C.Y.	158	Excavator	1	2.67	320	0.32	120	808.96
Grader, 30,000 Lbs.	187	Grader	1	10.51	1261.09	0.41	120	4834.388515
Heating Kettle, 115 Gallon	0	NA	1	0.84	100.8	0	120	0
Hyd. Crane, 12 Ton	231	Cranes	1	1.63	196.11	0.29	120	656.870445
Hyd. Crane, 25 Ton	231	Cranes	1	0.73	87.9	0.29	120	294.42105
Hyd. Excavator, 2 C.Y.	231	Excavator	1	0.34	40.51	0.38	120	177.79839
Hyd. Excavator, 2.5 C.Y.	231	Excavator	1	0.46	55.06	0.38	120	241.65834
Hyd. Excavator, 3.5 C.Y.	231	Excavator	1	1.74	208.74	0.38	120	916.15986
Line Rem.,11 H.P.,Walk Behind	11		1	0.10	11.8	1	120	6.49
Loader, Skid Steer, 78 H.P.	78	Skid Steer Loaders	1	0.96	115.44	0.37	120	166.57992
Paint Striper, T.M., 120 Gal.	0	NA	1	0.84	100.8	0	120	0
Rammer/Tamper, Gas, 15"	6.5	Plate Compactors	1	1.14	137.36	0.43	120	19.19606
Road Sweeper, S.P., 8' wide	64		1	0.02	2.95	0.46	120	4.3424
Roller, Vibratory, 25 Ton	80	Roller	1	2.07	248.64	0.38	120	377.9328
Tandem Roller, 5 Ton	80	Roller	1	0.39	46.82	0.36	120	67.4208
Trowel, 48" Walk-Behind	11.7		1	0.39	46.82	0	120	0
Vibr. Roller, Towed, 12 Ton	80	Roller	1	4.39	526.75	0.38	120	800.66
Vibratory Roller, Towed, 23 Ton	80	Roller	1	1.39	166.99	0.38	120	253.8248
Welder, Gas Engine, 300 amp	23	Welder	1	0.01	1.1	0.45	120	0.56925
TOTAL								
Yreka Water Supply Pipeline Relocation								
Air Compressor 600 cfm	300	Air Compressor	1	2.00	240	0.48	120	1728
Crawler Crane, 90 Ton	231	Cranes	1	4.01	480.6	0.29	120	1609.7697
Dozer (235hp)(CATD7)	235	Rubber Tired Dozers	1	1.34	160.4	0.4	120	753.88
Gas Engine Tamp	6.5	Plate Compactors	1	2.67	320.8	0.43	120	44.8318
Hydraulic Crane (17tn)	231	Cranes	1	2.01	240.8	0.29	120	806.5596
Microtunneling 36" ID Casing	0	NA	1	2.04	244.8	0	120	0
Roller, Dbl Drum (steel wheel, 5.0 - 7.9 MTn)	80	Roller	1	1.34	160.4	0.38	120	243.808
Welder, Portable	46	Welder	1	2.01	240.8	0.45	120	249.228
TOTAL								

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Fall Creek Hattery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	1	2.40	366.6	0.48	153	431.1216
Hand Held Pavement Breaker 80-90 lbs	0	NA	1	2.40	366.6	0	153	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.01	1.44	0.3	153	0.1404
Crawler Mntd Asphalt Paver 5'-13' ABG Titan 125 21K	60	Pavers	1	0.00	0.533	0.42	153	0.67158
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.13	20.481	0.42	153	55.91313
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	0.21	32.65	0.43	153	5.6158
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.13	19.574	0.38	153	6.694308
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.11	16.118	0.38	153	24.49936
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	142	Roller	1	0.19	28.571	0.38	153	77.084558
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.14	21.014	0.38	153	13.175778
Tandem Vibratory Comp. Cat. CB634C 84" 138HP-11.3MT	138	Roller	1	0.13	20.481	0.38	153	53.701182
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	0.03	5	0.73	153	0.5475
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.11	16.118	0.4	153	53.1894
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.28	43.281	0.4	153	121.1868
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	0.28	42.25	0.41	153	80.549625
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	1	0.62	94.926	0.35	153	161.136885
Standard Crawler Loader Cat. 963 158HP 3.20cy-43K#	158	Crawler Tractor	1	0.49	74.723	0.4	153	236.12468
Loader Articulated Wheel Cat 938G 160HP 3.00cy-33K#	160	Rubber Tired Loader	1	0.00	0.48	0.36	153	1.3824
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.08	12.735	0.38	153	33.39117
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	0.41	62.409	0.38	153	220.553406
80MT All/Rough Terrain Hydro Crane	231	Cranes	1	0.73	112.265	0.29	153	376.0316175
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.04	6.862	0.29	153	6.268437
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.06	8.427	0.29	153	7.6980645
Electric Submersible Pump 2HP/2"	2	Pump	1	0.49	75.413	0.74	153	5.580562
Discharge Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Suction Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Chain Saw, 20"bar Length	3	NA	1	0.49	74.723	1	153	11.20845
80 Ton 16 Wheel Equipment Trailer	0	NA	1	0.68	104	0	153	0

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Trailer Mtd Brush Chipper, 16"dia	130	NA	1	0.49	74.723	1	153	485.6995
Iron Gate Hattery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	2	16.27	732.016	0.48	45	1721.701632
Hand Held Pavement Breaker 80-90 lbs	0		2	16.27	732.016	0	45	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.26	11.604	0.3	45	1.13139
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.01	0.427	0.42	45	1.16571
Crawler Mntd Pavement Millers 84"-Terex-PR-800-7-Power Mode: Diesel	60	Pavers	1	0.10	4.575	0.42	45	5.7645
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	6.49	292.145	0.43	45	50.24894
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.97	43.522	0.38	45	14.884524
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.03	1.227	0.38	45	1.86504
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	142	Roller	1	0.03	1.513	0.38	45	4.082074
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.01	0.427	0.38	45	0.267729
Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	138	Roller	1	0.01	0.427	0.38	45	1.119594
Concrete Core Drill	221	Bore/Drill Rigs	1	0.36	16.312	0.5	45	90.1238
Trailer Mtd Concrete Pumps, 80cy/hr, 160hp	160	Pump	1	0.52	23.211	0.74	45	137.40912
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	4.16	187.354	0.73	45	20.515263
Standard Crawler Dozer Cat. D4C 81HP	81	Rubber Tired Dozer	1	0.01	0.276	0.4	45	0.44712
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.01	0.339	0.4	45	1.1187
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.05	2.067	0.41	45	5.93229
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	2.44	109.98	0.37	45	189.22059
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	2	9.81	441.453	0.37	45	1584.374817
Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	160	Rubber Tired Loader	1	0.09	4.235	0.36	45	12.1968
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.48	21.562	0.38	45	56.535564
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	3.77	169.818	0.38	45	600.136812
20MT All/Rough Terrain Hydro Crane	231	Crane	1	0.89	40	0.29	45	133.98
40MT All/Rough Terrain Hydro Crane	231	Crane	1	1.36	61.421	0.29	45	205.7296395
80MT All/Rough Terrain Hydro Crane	231	Crane	1	7.97	358.45	0.29	45	1200.628275
100MT All/Rough Terrain Hydro Crane	231	Crane	1	0.15	6.789	0.29	45	22.7397555
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.56	25.375	0.31	45	24.7786875

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.83	37.34	0.31	45	36.46251
1cy Standard Clamshell Bucket	0		1	1.33	59.951	0	45	0
Vibratory Hammer/Extractor 134.0 Ton 503Hydraulic HP	221	Bore/Drill Rigs	1	0.39	17.424	0.5	45	96.2676
Electric Submersible Pump 2HP/2"	2	Pump	1	3.04	137.013	0.74	45	10.138962
Discharge Hose 2.0 in	0		1	3.04	137.013	0	45	0
Suction Hose 2.0 in	0		1	3.04	137.013	0	45	0
Self Propelled Pavement Brooms 96" 76HP	76		1	0.10	4.575	0.46	45	7.9971
Portable welder Diesel 300 amps	22	Welder	1	6.20	279.062	0.45	45	138.13569
Torch Cutting Acetylene-Oxygen 150'	0		1	2.80	126.163	0	45	0
80 Ton 16 Wheel Equipment Trailer	0		1	2.13	96	0	45	0
Hydraulic Impact Breaker 2K 620bpm	221	Bore/Drill Rigs	1	1.17	52.842	1	45	583.9041
TOTAL								59,982

Partial Removal Dam and Powerhouse Removal

			JC Boyle			Copco No. 1		Copco No. 2		Iron Gate			Hour Proportion					Diesel Fuel Usage			
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	Number of Days	Copco No. 1&2 - Number of Days	Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days	Approximate Operating	JC Boyle	Copco No 1	Copco No 2	Iron Gate	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
SEMI TRACTOR	510	Tractors/Loaders/ Backhoes	1	195		0	355	0	120		344	20	14	18	16	16	0.37	25757.55	0	0	0
D6 DOZER	215	Rubber Tired Dozers	2	195	1	0.7	355	0.3	120	2	344	20	14	18	16	16	0.4	23478	19233.9	2476.8	47334.4
D8 DOZER	354	Rubber Tired Dozers	2	195	1	0.7	355	0.3	120	3	344	20	14	18	16	16	0.4	38656.8	31668.84	4078.08	116904.96
CAT 426 BACKHOE	94	Tractors/Loaders/ Backhoes	1	195	1	0.7	355	0.3	120	0	344	20	14	18	16	16	0.37	4747.47	7778.547	1001.664	0
CAT 14H MOTORGRADER	250	Graders	1	195	1	0.7	355	0.3	120	2	344	20	14	18	16	16	0.41	13991.25	22924.125	2952	56416
CAT 336/330, JD 330 EXCAVATOR	273	Excavators	2	195	1	0.7	355	0.3	120	1	344	20	14	18	16	16	0.38	28321.02	23201.451	2987.712	28549.248
CAT 349/EX400 EXCAVATOR	275	Excavators	2	195	2	1.4	355	0.6	120	3	344	20	14	18	16	16	0.38	28528.5	46742.85	6019.2	86275.2
CAT 374/365 EXCAVATOR	472	Excavators		195		0	355	0	120	1	344	20	14	18	16	16	0.38	0	0	0	49359.872
EX1100/1250 EXCAVATOR	600	Excavators		195		0	355	0	120	2	344	20	14	18	16	16	0.38	0	0	0	125491.2
CAT 563 - 84"ROLLER	137	Roller	1	195	1	0.7	355	0.3	120	1	344	20	14	18	16	16	0.38	7106.19	11643.219	1499.328	14326.912
WALK BEHIND ROLLER	20	Roller	1	195	1	0.7	355	0.3	120	1	344	20	14	18	16	16	0.38	1037.4	1699.74	218.88	2091.52
S15-60T RT CRANE	365	Cranes	1	195	2	1.4	355	0.6	120	1	344	20	14	18	16	16	0.29	14448.525	47346.705	6096.96	29129.92
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	Cranes	1	195	1	0.7	355	0.3	120	1	344	20	14	18	16	16	0.29	12588.03	20625.003	2655.936	25378.944
3900 W 140T CRANE	287	Cranes		195	1	0.7	355	0.3	120		344	20	14	18	16	16	0.29	0	18614.3895	2397.024	0
S15-222 100 TN MANITOWOC CRANE	318	Cranes	1	195		0	355	0	120		344	20	14	18	16	16	0.29	12588.03	0	0	0
4100 SERIES 2 200T CRANE	231	Cranes	1	195		0	355	0	120		344	20	14	18	16	16	0.29	9144.135	0	0	0
S15-777 175 TN MANITOWOC CRANE	231	Cranes		195	1	0.7	355	0.3	120		344	20	14	18	16	16	0.29	0	14982.3135	1929.312	0
A40/CAT 740 HAUL TRUCK	496	Off-Highway Trucks	5	195	3	2.1	355	0.9	120	2	344	20	14	18	16	16	0.38	128637.6	126460.656	16284.672	103739.392
CAT 773 HAUL TRUCK	775	Off-Highway Trucks		195		0	355	0	120	4	344	20	14	18	16	16	0.38	0	0	0	324185.6
175 COMPRESSOR	0	NA	1	195	2	1.4	355	0.6	120	1	344	24	16.8	21.6	19.2	19.2	0	0	0	0	0
400 COMPRESSOR	0	NA		195	1	0.7	355	0.3	120		344	24	16.8	21.6	19.2	19.2	0	0	0	0	0
200 - 250 AMP DIESEL WELDER	50	Welder	1	195	1	0.7	355	0.3	120	1	344	24	16.8	21.6	19.2	19.2	0.74	6060.6	9930.06	1278.72	12218.88

			JC Boyle			Copco No. 1		Copco No. 2		Iron Gate			Hour Proportion					Diesel Fuel Usage			
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	Number of Days	Copco No. 1&2 -	Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days	Approximate Operating	JC Boyle	Copco No 1	Copco No 2	Iron Gate	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
25 - 49 KW GENERATOR - 75 HP	75	Generator Sets	1	195	2	1.4	355	0.6	120	2	344	24	16.8	21.6	19.2	19.2	0.74	9090.9	29790.18	3836.16	36656.64
125 - 174 KW GENERATOR - 250 HP	250	Generator Sets	1	195	1	0.7	355	0.3	120	1	344	24	16.8	21.6	19.2	19.2	0.74	30303	49650.3	6393.6	61094.4
5 KW GENERATORS - 10 HP	10	Generator Sets	5	195	9	6.3	355	2.7	120	6	344	20	14	18	16	16	0.74	5050.5	14895.09	1918.08	12218.88
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	Generator Sets	5	195	5	3.5	355	1.5	120	5	344	20	14	18	16	16	0.74	42929.25	70337.925	9057.6	86550.4
6" TRASH PUMP	84	Pumps	2	195	3	2.1	355	0.9	120	2	344	24	16.8	21.6	19.2	19.2	0.74	20363.616	50047.5024	6444.7488	41055.4368
6" SUB PUMP	84	Pumps	2	195	2	1.4	355	0.6	120	1	344	24	16.8	21.6	19.2	19.2	0.74	20363.616	33365.0016	4296.4992	20527.7184
GROUT PUMP	84	Pumps	1	195	1	0.7	355	0.3	120	1	344	20	14	18	16	16	0.74	8484.84	13902.084	1790.208	17106.432
950 LOADER	240	Rubber Tired Loaders	1	195	1	0.7	355	0.3	120		344	20	14	18	16	16	0.36	11793.6	19323.36	2488.32	0
966F LOADER	280	Rubber Tired Loaders	1	195	2	1.4	355	0.6	120	1	344	20	14	18	16	16	0.36	13759.2	45087.84	5806.08	27740.16
980G LOADER	431	Rubber Tired Loaders		195		0	355	0	120	1	344	20	14	18	16	16	0.36	0	0	0	42700.032
MANLIFT 60'	89	Aerial Lifts	2	195	3	2.1	355	0.9	120	2	344	20	14	18	16	16	0.31	7532.07	18511.5105	2383.776	15185.536
D19-42 PILE HAMMER (42,000 FT-LB)	0	NA	1	195		0	355	0	120		344	20	14	18	16	16	0	0	0	0	0
>10,000 LB EXTENDABLE FORKLIFT	89	Forklift	1	195	2	1.4	355	0.6	120	1	344	20	14	18	16	16	0.2	2429.7	7961.94	1025.28	4898.56
OSR SM HYD DRL/CMP (2-1/2" - 4-1/2") - ROCK DRILL	221	Bore/Drill Rigs	1	195	3	2.1	355	0.9	120	1	344	20	14	18	16	16	0.5	15083.25	74139.975	9547.2	30409.6
CONCRETE SHEAR	0	NA	1	195		0	355	0	120		344	20	14	18	16	16	0	0	0	0	0
HOE RAM 330/349	0	NA	1	195	1	0.7	355	0.3	120	1	344	20	14	18	16	16	0	0	0	0	0
MAXI HEATER	0	NA	1	195		0	355	0	120		344	24	16.8	21.6	19.2	19.2	0	0	0	0	0
FLEXI FLOAT 10 X 40 X 7	0	NA	6	195	20	14	355	6	120	6	344	24	16.8	21.6	19.2	19.2	0	0	0	0	0
WORK BOAT	250	Work boat		195	1	0.7	355	0.3	120		344	20	14	18	16	16		0	0	0	0
TOTAL													14	18	16	16		542,275	829,865	106,864	1,417,546

Partial Removal Restoration

Description	Power Rating (HP)	Comparable OFFROAD Equipment	JC Boyle		Copco No. 1&2 - Demolition	Copco No. 1		Copco No. 2		Iron Gate		Approximate Operating Hours/Day	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
			Quantity	Number of Days		Quantity	Number of Days	Quantity	Number of Days	Quantity	Number of Days						
SEMI TRACTOR	510	Tractors/Loaders/ Backhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	32739.45	22917.615	9821.835	32739.45
HONDA PIONEER 1000 SIDE BY SIDE	72	NA	3	347	3	2.1	347	0.9	347	3	347	10	0	0	0	0	0
GODWIN 3" PUMP	84	Pumps	1	347	1	0.7	347	0.3	347	1	347	10	0.74	10784.76	7549.332	3235.428	10784.76
GODWIN 6" PUMP	84	Pumps	1	347	1	0.7	347	0.3	347	1	347	10	0.74	10784.76	7549.332	3235.428	10784.76
CAT 323 EXCAVATOR	164	Excavators	1	347	1	0.7	347	0.3	347	1	347	10	0.38	10812.52	7568.764	3243.756	10812.52
CAT 330 EXCAVATOR	275	Excavators	1	347	1	0.7	347	0.3	347	1	347	10	0.38	18130.75	12691.525	5439.225	18130.75
CAT 336 EXCAVATOR	311	Excavators	1	347		0	347	0	347		347	10	0.38	20504.23	0	0	0
CAT 304 EXCAVATOR	40	Excavators	1	347	1	0.7	347	0.3	347	1	347	10	0.38	2637.2	1846.04	791.16	2637.2
CAT D6 DOZER	215	Rubber Tired Dozers	1	347	1	0.7	347	0.3	347	1	347	10	0.4	14921	10444.7	4476.3	14921
CAT 299 SKID STEER	110	Skid Steer Loader	2	347	1	0.7	347	0.3	347	1	347	10	0.37	14122.9	4943.015	2118.435	7061.45
CAT 735 HAUL TRUCK	424	Off-Highway Trucks	2	347	2	1.4	347	0.6	347	2	347	10	0.38	55908.64	39136.048	16772.592	55908.64
MAROOKA MST2200VDR TRACK TRUCK	250	Off-Highway Trucks	1	347	1	0.7	347	0.3	347	1	347	10	0.38	16482.5	11537.75	4944.75	16482.5
JOHN DEERE 6150M TRACTOR	150	Tractors/Loaders/ Backhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	9629.25	6740.475	2888.775	9629.25
JOHN DEERE 5125R TRACTOR	125	Tractors/Loaders/ Backhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	8024.375	5617.0625	2407.3125	8024.375
CASE 340 TRACTOR	340	Tractors/Loaders/ Backhoes	1	347	1	0.7	347	0.3	347	1	347	10	0.37	21826.3	15278.41	6547.89	21826.3
HONDA EM6500S GENERATOR	7.4	Generator Sets	1	347	2	1.4	347	0.6	347	2	347	10	0.74	950.086	1330.1204	570.0516	1900.172
BELL 206L LONG RANGER HELICOPTER	450	Helicopter	1	347		0	347	0	347	1	347	6	1	46845	0	0	46845
TOTAL														295,104	155,150	66,493	268,488

Notes: Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Partial Removal Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Hauling Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Pre-Dam	0	0	0	675	0	0	0	10.00	6.50	0.00	0	0	-	0	0
Demolition - JC Boyle	90	0	33	190	17,100	0	6310	58.60	58.60	14.60	1,002,060.00	0.00	92,126.00	39,076	17,462
Demolition - Copco No. 1	110	0	13	387	42,570	0	4850	58.60	58.60	29.30	2,494,602.00	0.00	142,105.00	97,278	26,935
Demolition - Copco No. 2	80	0	8	190	15,200	0	1567	58.47	58.47	21.10	888,744.00	0.00	33,063.70	34,657	6,267
Demolition - Iron Gate	160	0	223	262	41,920	0	58351	46.40	46.40	14.40	1,945,088.00	0.00	840,254.40	75,849	159,265
Restoration - JC Boyle	0	10	0	414	0	4,140	0	58.60	58.60	0.00	0.00	242,604.00	-	0	45,984
Restoration - Copco No. 1	0	5.6	0	414	0	2,318	0	58.60	58.60	0.00	0.00	135,858.24	-	0	25,751
Restoration - Copco No. 2	0	2.4	0	414	0	994	0	58.47	58.47	0.00	0.00	58,095.79	-	0	11,012
Restoration - Iron Gate	0	10	0	414	0	4,140	0	46.40	46.40	0.00	0.00	192,096.00	-	0	36,411
TOTAL														246,859	329,087

Notes:
Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7). Daily woker trips based on the number of works multiplied by two. Daily Vendor trips based on quantity of trucks provided in equipment list. Daily Hauling trip based on total phase trips. Haul trip length based on average of material hauling trips.

Continued Operations with Fish Passage Alternative Fuel Use

Continued Operations with Fish Passage Construction Fuel Usage Summary

Construction Phase	Diesel	Gasoline	Diesel	Diesel
	Off-road Equipment (gallons)	On-road (gallons)	On-road (gallons)	Total
JC Boyle - Fish Ladder	80,301	39,076	25,736	106,038
Copco No. 1 - Fish Ladder	284,582	97,278	28,673	313,256
Copco No. 2 - Fish Ladder	36,883	34,657	9,175	46,057
Iron Gate - Fish Ladder	262,334	75,849	160,111	422,445
TOTAL	664,101	246,859	223,696	887,796
Total Gasoline	246,859	gallons		
Total Diesel	887,796	gallons		

Continued Operations with Fish Passage Construction Fish Ladder Construction

			JC Boyle		Copco No. 1		Copco No. 2		Iron Gate			Diesel Fuel Usage			
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	JC Boyle Number of Hours	Quantity	Copco No. 1 Number of Hours	Quantity	Copco No. 2 Number of Hours	Quantity	Iron Gate Number of Hours	Load Factor	JC Boyle	Copco No 1	Copco No 2	Iron Gate
Lattice boom crane, 160'	335	Crane	1	968	1	1896	1	440	1	2280	0.29	4702.06	9209.82	2137.3	11075.10
Hydraulic yard crane, 40'-60'	130	Crane	2	1456	2	2848	2	656	2	3424	0.29	5489.12	10736.96	2473.12	12908.48
Hydraulic excavator w/ hoe ram attachment	321	Excavator	1	240	1	472	1	112	1	568	0.38	1463.76	2878.728	683.088	3464.23
Hydraulic excavator, CAT 244-321 hp	321	Excavator	1	728	1	1424	1	328	1	1712	0.38	4440.072	8684.976	2000.472	10441.49
Wheel-loader, CAT 966, 5 yd3	246	Tractors/Loaders/Backhoes	1	728	1	1424	1	328	1	1712	0.37	3313.128	6480.624	1492.728	7791.31
Crawler dozer, CAT 238	238	Rubber Tired Dozers	1	240	1	472	1	112	1	568	0.4	1142.4	2246.72	533.12	2703.68
Water tank truck, off-highway	175	Water truck	1	448	1	952	1	224	1	1144	1	3920	8330	1960	10010.00
Concrete pump truck w/ boom and hosing	235	Pump	4	1536	5	5320	4	704	5	4560	0.74	53422.08	231287	24485.12	198246.00
Vibratory compactor	138	Bore/Drill Rigs	1	240	1	472	1	112	1	568	0.5	828	1628.4	386.4	1959.60
Engine generator, 6.5 KW	13	Generator Sets	1	872	1	1704	1	400	1	2056	0.74	419.432	819.624	192.4	988.94
Portable generator, 1 KW	2.75	Generator Sets	2	1744	2	3408	2	800	2	4112	0.74	354.904	693.528	162.8	836.79
Air compressor, 160 cfm, 100 psi	60	Air compressor	1	240	1	472	1	112	1	568	0.48	345.6	679.68	161.28	817.92
Air compressor, 250 cfm, 100 psi	80	Air compressor	1	240	1	472	1	112	1	568	0.48	460.8	906.24	215.04	1090.56
TOTAL												80,301	284,582	36,883	262,334

Continued Operations with Fish Passage Construction Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Hauling Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
JC Boyle - Fish Ladder	90	0	49	190	17,100	0	9300	58.60	58.60	14.60	1,002,060.00	0.00	135,780.00	39,076	25,736
Copco No. 1 - Fish Ladder	110	0	13	387	42,570	0	5163	58.60	58.60	29.30	2,494,602.00	0.00	151,275.90	97,278	28,673
Copco No. 2 - Fish Ladder	80	0	12	190	15,200	0	2294	58.47	58.47	21.10	888,744.00	0.00	48,403.40	34,657	9,175
Iron Gate - Fish Ladder	160	0	224	262	41,920	0	58661	46.40	46.40	14.40	1,945,088.00	0.00	844,718.40	75,849	160,111
TOTAL														246,859	223,696

Notes:
Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7). Daily woker trips based on the number of works multiplied by two. Daily Vendor trips based on quantity of trucks provided in equipment list. Daily Hauling trip based on total phase trips. Haul trip length based on average of material hauling trips.

Two Dam Removal Alternative Fuel Use

Two Dam Removal Construction Fuel Usage Summary

Construction Phase	Diesel	Gasoline	Diesel	Diesel
	Off-road Equipment (gallons)	On-road (gallons)	On-road (gallons)	Total
Pre-Dam	59,982	0	0	59,982
Demolition - Copco No. 1	922,072	97,278	28,673	950,745
Demolition - Iron Gate	1,771,932	75,849	160,111	1,932,044
JC Boyle - Fish Ladder	80,301	39,076	25,736	106,038
Copco No. 2 - Fish Ladder	36,883	34,657	9,175	46,057
Restoration - Copco No. 1	155,150	0	25,751	180,901
Restoration - Iron Gate	268,488	0	36,411	304,899
Total Gasoline	246,859	gallons		
Total Diesel	3,580,666	gallons		

Two Dam Removal Pre-dam Removal Activities

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
IEV Control								
CAT 426 BACKHOE	94	Tractor/Loaders/Backhoes	1	2.91	320	0.37	110	556.48
Tractor with Till/Disc Attachment (JD 6175)	175	Tractor/Loaders/Backhoes	1	6.82	750	0.37	110	2428.125
TOTAL								
Construction access, road, bridge, and culvert improvements								
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/Backhoes	1	0.56	80	0.37	142	71.04
Clamshell Bucket, 1 C.Y.	0	NA	1	4.49	637.12	0	142	0
Concrete Pump (Small)	84	Pump	1	4.56	647.49	0.74	142	2012.39892
Crawler Crane, 25 Ton	231	Cranes	1	4.49	637.12	0.29	142	2134.03344
Crawler Crane, 40 Ton	231	Cranes	1	2.66	378.06	0.29	142	1266.31197
Crawler Crane, 75 Ton	231	Cranes	1	0.84	119.82	0.29	142	401.33709
Dozer, 105 H.P.	105	Rubber Tired Dozer	1	2.61	370.46	0.4	142	777.966
Drill Rig, Truck-Mounted	221	Bore/Drill Rigs	1	14.88	2113.14	0.5	142	11675.0985
Gas Engine Vibrator	5.5	Cement and Motar Mixer	1	6.08	862.99	0.56	142	132.90046
Hammer, Diesel, 22k ft-lb	221	Bore/Drill Rigs	1	1.25	178.06	0.5	142	983.7815
Hammer, Diesel, 41k ft-lb	221	Bore/Drill Rigs	1	0.84	119.82	0.5	142	662.0055
Hyd. Crane, 80 Ton	231	Cranes	1	1.50	212.75	0.29	142	712.606125
Lattice Boom Crane, 150 Ton	282	Cranes	1	5.40	767.23	0.29	142	3137.20347
Vibratory Hammer & Gen.	221	Bore/Drill Rigs	1	1.41	200	0.5	142	1105
TOTAL								
Recreation Facilities Removal								
20' Suction Hose, 6"	0	NA	1	4.00	480.14	0	120	0
50' Discharge Hoses, 6"	0	NA	1	8.00	960.27	0	120	0
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/Backhoes	1	8.45	1014.22	0.37	120	900.62736
Brush Chipper, 12", 130 H.P.	130		1	1.58	189.18	1	120	1229.67
Centr. Water Pump, 6"	84	Pump	1	4.00	480.14	0.74	120	1492.27512
Chain Saw, Gas, 36" Long	7		1	3.15	378.37	1	120	132.4295
Clamshell Bucket, 1 C.Y.	0	NA	1	1.74	208.74		120	0
Crawler Loader, 3 C.Y.	97	Crawler Tractors	1	1.58	189.18	0.43	120	394.53489
Dozer, 200 H.P.	200	Rubber Tired Dozers	1	1.86	222.99	0.4	120	891.96
Dozer, 300 H.P.	300	Rubber Tired Dozers	1	0.39	46.81	0.4	120	280.86

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Dozer, 80 H.P.	80	Rubber Tired Dozers	1	1.61	193.6	0.4	120	309.76
Earth Auger, Truck-Mtd.	221	Bore/Drill Rigs	1	0.44	52.93	0.5	120	292.43825
F.E. Loader, T.M., 2.25 C.Y.	97	Tractor/Loaders/Backhoes	1	1.60	192.42	0.37	120	345.29769
F.E. Loader, W.M., 2.5 C.Y.	97	Tractor/Loaders/Backhoes	1	5.25	629.86	0.37	120	1130.28377
Gas Engine Vibrator	5.5		1	1.73	207.84	0.56	120	32.00736
Gradall, 5/8 C.Y.	158	Excavator	1	2.67	320	0.32	120	808.96
Grader, 30,000 Lbs.	187	Grader	1	10.51	1261.09	0.41	120	4834.388515
Heating Kettle, 115 Gallon	0	NA	1	0.84	100.8	0	120	0
Hyd. Crane, 12 Ton	231	Cranes	1	1.63	196.11	0.29	120	656.870445
Hyd. Crane, 25 Ton	231	Cranes	1	0.73	87.9	0.29	120	294.42105
Hyd. Excavator, 2 C.Y.	231	Excavator	1	0.34	40.51	0.38	120	177.79839
Hyd. Excavator, 2.5 C.Y.	231	Excavator	1	0.46	55.06	0.38	120	241.65834
Hyd. Excavator, 3.5 C.Y.	231	Excavator	1	1.74	208.74	0.38	120	916.15986
Line Rem.,11 H.P.,Walk Behind	11		1	0.10	11.8	1	120	6.49
Loader, Skid Steer, 78 H.P.	78	Skid Steer Loaders	1	0.96	115.44	0.37	120	166.57992
Paint Striper, T.M., 120 Gal.	0	NA	1	0.84	100.8	0	120	0
Rammer/Tamper, Gas, 15"	6.5	Plate Compactors	1	1.14	137.36	0.43	120	19.19606
Road Sweeper, S.P., 8' wide	64		1	0.02	2.95	0.46	120	4.3424
Roller, Vibratory, 25 Ton	80	Roller	1	2.07	248.64	0.38	120	377.9328
Tandem Roller, 5 Ton	80	Roller	1	0.39	46.82	0.36	120	67.4208
Trowel, 48" Walk-Behind	11.7		1	0.39	46.82	0	120	0
Vibr. Roller, Towed, 12 Ton	80	Roller	1	4.39	526.75	0.38	120	800.66
Vibratory Roller, Towed, 23 Ton	80	Roller	1	1.39	166.99	0.38	120	253.8248
Welder, Gas Engine, 300 amp	23	Welder	1	0.01	1.1	0.45	120	0.56925
TOTAL								
Yreka Water Supply Pipeline Relocation								
Air Compressor 600 cfm	300	Air Compressor	1	2.00	240	0.48	120	1728
Crawler Crane, 90 Ton	231	Cranes	1	4.01	480.6	0.29	120	1609.7697
Dozer (235hp)(CATD7)	235	Rubber Tired Dozers	1	1.34	160.4	0.4	120	753.88
Gas Engine Tamp	6.5	Plate Compactors	1	2.67	320.8	0.43	120	44.8318
Hydraulic Crane (17tn)	231	Cranes	1	2.01	240.8	0.29	120	806.5596
Microtunneling 36" ID Casing	0	NA	1	2.04	244.8	0	120	0
Roller, Dbl Drum (steel wheel, 5.0 - 7.9 MTn)	80	Roller	1	1.34	160.4	0.38	120	243.808

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Welder, Portable	46	Welder	1	2.01	240.8	0.45	120	249.228
TOTAL								
Fall Creek Hattery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	1	2.40	366.6	0.48	153	431.1216
Hand Held Pavement Breaker 80-90 lbs	0	NA	1	2.40	366.6	0	153	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.01	1.44	0.3	153	0.1404
Crawler Mntd Asphalt Paver 5'-13' ABG Titan 125 21K	60	Pavers	1	0.00	0.533	0.42	153	0.67158
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.13	20.481	0.42	153	55.91313
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	0.21	32.65	0.43	153	5.6158
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.13	19.574	0.38	153	6.694308
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.11	16.118	0.38	153	24.49936
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	142	Roller	1	0.19	28.571	0.38	153	77.084558
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.14	21.014	0.38	153	13.175778
Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	138	Roller	1	0.13	20.481	0.38	153	53.701182
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	0.03	5	0.73	153	0.5475
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.11	16.118	0.4	153	53.1894
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.28	43.281	0.4	153	121.1868
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	0.28	42.25	0.41	153	80.549625
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	1	0.62	94.926	0.35	153	161.136885
Standard Crawler Loader Cat. 963 158HP 3.20cy- 43K#	158	Crawler Tractor	1	0.49	74.723	0.4	153	236.12468
Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	160	Rubber Tired Loader	1	0.00	0.48	0.36	153	1.3824
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.08	12.735	0.38	153	33.39117
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	0.41	62.409	0.38	153	220.553406
80MT All/Rough Terrain Hydro Crane	231	Cranes	1	0.73	112.265	0.29	153	376.0316175
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.04	6.862	0.29	153	6.268437
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.06	8.427	0.29	153	7.6980645
Electric Submersible Pump 2HP/2"	2	Pump	1	0.49	75.413	0.74	153	5.580562

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Discharge Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Suction Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Chain Saw, 20"bar Length	3	NA	1	0.49	74.723	1	153	11.20845
80 Ton 16 Wheel Equipment Trailer	0	NA	1	0.68	104	0	153	0
Trailer Mtd Brush Chipper, 16"dia	130	NA	1	0.49	74.723	1	153	485.6995
Iron Gate Hattery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	2	16.27	732.016	0.48	45	1721.701632
Hand Held Pavement Breaker 80-90 lbs	0		2	16.27	732.016	0	45	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.26	11.604	0.3	45	1.13139
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.01	0.427	0.42	45	1.16571
Crawler Mntd Pavement Millers 84"-Terex-PR-800-7-Power Mode: Diesel	60	Pavers	1	0.10	4.575	0.42	45	5.7645
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	6.49	292.145	0.43	45	50.24894
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.97	43.522	0.38	45	14.884524
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.03	1.227	0.38	45	1.86504
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	142	Roller	1	0.03	1.513	0.38	45	4.082074
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.01	0.427	0.38	45	0.267729
Tandem Vibratory Comp. Cat. CB634C 84" 138HP-11.3MT	138	Roller	1	0.01	0.427	0.38	45	1.119594
Concrete Core Drill	221	Bore/Drill Rigs	1	0.36	16.312	0.5	45	90.1238
Trailer Mtd Concrete Pumps, 80cy/hr, 160hp	160	Pump	1	0.52	23.211	0.74	45	137.40912
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	4.16	187.354	0.73	45	20.515263
Standard Crawler Dozer Cat. D4C 81HP	81	Rubber Tired Dozer	1	0.01	0.276	0.4	45	0.44712
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.01	0.339	0.4	45	1.1187
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.05	2.067	0.41	45	5.93229
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	2.44	109.98	0.37	45	189.22059
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	2	9.81	441.453	0.37	45	1584.374817
Loader Articulated Wheel Cat 938G 160HP 3.00cy-33K#	160	Rubber Tired Loader	1	0.09	4.235	0.36	45	12.1968
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.48	21.562	0.38	45	56.535564

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	3.77	169.818	0.38	45	600.136812
20MT All/Rough Terrain Hydro Crane	231	Crane	1	0.89	40	0.29	45	133.98
40MT All/Rough Terrain Hydro Crane	231	Crane	1	1.36	61.421	0.29	45	205.7296395
80MT All/Rough Terrain Hydro Crane	231	Crane	1	7.97	358.45	0.29	45	1200.628275
100MT All/Rough Terrain Hydro Crane	231	Crane	1	0.15	6.789	0.29	45	22.7397555
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.56	25.375	0.31	45	24.7786875
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.83	37.34	0.31	45	36.46251
1cy Standard Clamshell Bucket	0		1	1.33	59.951	0	45	0
Vibratory Hammer/Extractor 134.0 Ton 503Hydraulic HP	221	Bore/Drill Rigs	1	0.39	17.424	0.5	45	96.2676
Electric Submersible Pump 2HP/2"	2	Pump	1	3.04	137.013	0.74	45	10.138962
Discharge Hose 2.0 in	0		1	3.04	137.013	0	45	0
Suction Hose 2.0 in	0		1	3.04	137.013	0	45	0
Self Propelled Pavement Brooms 96" 76HP	76		1	0.10	4.575	0.46	45	7.9971
Portable welder Diesel 300 amps	22	Welder	1	6.20	279.062	0.45	45	138.13569
Torch Cutting Acetylene-Oxygen 150'	0		1	2.80	126.163	0	45	0
80 Ton 16 Wheel Equipment Trailer	0		1	2.13	96	0	45	0
Hydraulic Impact Breaker 2K 620bpm	221	Bore/Drill Rigs	1	1.17	52.842	1	45	583.9041
TOTAL								59,982

Two Dam Removal Dam and Powerhouse Removal

Description	Power Rating (HP)	Comparable OFFROAD Equipment	Copco No. 1&2 - Demolition	Copco No. 1		Iron Gate		Approximate Operating Hours/Day	Load Factor	Diesel Fuel Usage	
				Quantity	Copco No. 1 Number of Days	Quantity	Iron Gate Number of			Copco No 1	Iron Gate
SEMI TRACTOR	510	Tractors/Loaders/Backhoes		0	355		344	20	0.37	0	0
D6 DOZER	215	Rubber Tired Dozers	1	0.7	355	2	344	20	0.4	21371	59168
D8 DOZER	354	Rubber Tired Dozers	1	0.7	355	3	344	20	0.4	35187.6	146131.2
CAT 426 BACKHOE	94	Tractors/Loaders/Backhoes	1	0.7	355	0	344	20	0.37	8642.83	0
CAT 14H MOTORGRADER	250	Graders	1	0.7	355	2	344	20	0.41	25471.25	70520
CAT 336/330, JD 330 EXCAVATOR	273	Excavators	1	0.7	355	1	344	20	0.38	25779.39	35686.56
CAT 349/EX400 EXCAVATOR	275	Excavators	2	1.4	355	3	344	20	0.38	51936.5	107844
CAT 374/365 EXCAVATOR	472	Excavators		0	355	1	344	20	0.38	0	61699.84
EX1100/1250 EXCAVATOR	600	Excavators		0	355	2	344	20	0.38	0	156864
CAT 563 - 84"ROLLER	137	Roller	1	0.7	355	1	344	20	0.38	12936.91	17908.64
WALK BEHIND ROLLER	20	Roller	1	0.7	355	1	344	20	0.38	1888.6	2614.4
S15-60T RT CRANE	365	Cranes	2	1.4	355	1	344	20	0.29	52607.45	36412.4
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	Cranes	1	0.7	355	1	344	20	0.29	22916.67	31723.68
3900 W 140T CRANE	287	Cranes	1	0.7	355		344	20	0.29	20682.655	0
S15-222 100 TN MANITOWOC CRANE	318	Cranes		0	355		344	20	0.29	0	0
4100 SERIES 2 200T CRANE	231	Cranes		0	355		344	20	0.29	0	0
S15-777 175 TN MANITOWOC CRANE	231	Cranes	1	0.7	355		344	20	0.29	16647.015	0
A40/CAT 740 HAUL TRUCK	496	Off-Highway Trucks	3	2.1	355	2	344	20	0.38	140511.84	129674.24
CAT 773 HAUL TRUCK	775	Off-Highway Trucks		0	355	4	344	20	0.38	0	405232
175 COMPRESSOR	0	NA	2	1.4	355	1	344	24	0	0	0
400 COMPRESSOR	0	NA	1	0.7	355		344	24	0	0	0
200 - 250 AMP DIESEL WELDER	50	Welder	1	0.7	355	1	344	24	0.74	11033.4	15273.6
25 - 49 KW GENERATOR - 75 HP	75	Generator Sets	2	1.4	355	2	344	24	0.74	33100.2	45820.8
125 - 174 KW GENERATOR - 250 HP	250	Generator Sets	1	0.7	355	1	344	24	0.74	55167	76368
5 KW GENERATORS - 10 HP	10	Generator Sets	9	6.3	355	6	344	20	0.74	16550.1	15273.6
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	Generator Sets	5	3.5	355	5	344	20	0.74	78153.25	108188
6" TRASH PUMP	84	Pumps	3	2.1	355	2	344	24	0.74	55608.336	51319.296
6" SUB PUMP	84	Pumps	2	1.4	355	1	344	24	0.74	37072.224	25659.648
GROUT PUMP	84	Pumps	1	0.7	355	1	344	20	0.74	15446.76	21383.04
950 LOADER	240	Rubber Tired Loaders	1	0.7	355		344	20	0.36	21470.4	0
966F LOADER	280	Rubber Tired Loaders	2	1.4	355	1	344	20	0.36	50097.6	34675.2
980G LOADER	431	Rubber Tired Loaders		0	355	1	344	20	0.36	0	53375.04

				Copco No. 1		Iron Gate				Diesel Fuel Usage	
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Copco No. 1&2 - Demolition	Quantity	Copco No. 1 Number of Days	Quantity	Iron Gate Number of	Approximate Operating Hours/Day	Load Factor	Copco No 1	Iron Gate
MANLIFT 60'	89	Aerial Lifts	3	2.1	355	2	344	20	0.31	20568.345	18981.92
D19-42 PILE HAMMER (42,000 FT-LB)	0	NA		0	355		344	20	0	0	0
>10,000 LB EXTENDABLE FORKLIFT	89	Forklift	2	1.4	355	1	344	20	0.2	8846.6	6123.2
OSR SM HYD DRL/CMP (2-1/2" - 4-1/2") - ROCK DRILL	221	Bore/Drill Rigs	3	2.1	355	1	344	20	0.5	82377.75	38012
CONCRETE SHEAR	0	NA		0	355		344	20	0	0	0
HOE RAM 330/349	0	NA	1	0.7	355	1	344	20	0	0	0
MAXI HEATER	0	NA		0	355		344	24	0	0	0
FLEXI FLOAT 10 X 40 X 7	0	NA	20	14	355	6	344	24	0	0	0
WORK BOAT	250	Work boat	1	0.7	355		344	20			
TOTAL										922,072	1,771,932

Two Dam Removal Fish Ladder Construction									
Description	Power Rating (HP)	Comparable OFFROAD Equipment	JC Boyle		Copco No. 2		Load Factor	Diesel Fuel Usage	
			Quantity	JC Boyle Number of Hours	Quantity	Copco No. 2 Number of Hours		JC Boyle	Copco No 2
Lattice boom crane, 160'	335	Crane	1	968	1	440	0.29	4702.06	2137.3
Hydraulic yard crane, 40'-60'	130	Crane	2	1456	2	656	0.29	5489.12	2473.12
Hydraulic excavator w/ hoe ram attachment	321	Excavator	1	240	1	112	0.38	1463.76	683.088
Hydraulic excavator, CAT 244-321 hp	321	Excavator	1	728	1	328	0.38	4440.072	2000.472
Wheel-loader, CAT 966, 5 yd3	246	Tractors/Loaders/Backhoes	1	728	1	328	0.37	3313.128	1492.728
Crawler dozer, CAT 238	238	Rubber Tired Dozers	1	240	1	112	0.4	1142.4	533.12
Water tank truck, off-highway	175	Water truck	1	448	1	224	1	3920	1960
Concrete pump truck w/ boom and hosing	235	Pump	4	1536	4	704	0.74	53422.08	24485.12
Vibratory compactor	138	Bore/Drill Rigs	1	240	1	112	0.5	828	386.4
Engine generator, 6.5 KW	13	Generator Sets	1	872	1	400	0.74	419.432	192.4
Portable generator, 1 KW	2.75	Generator Sets	2	1744	2	800	0.74	354.904	162.8
Air compressor, 160 cfm, 100 psi	60	Air compressor	1	240	1	112	0.48	345.6	161.28
Air compressor, 250 cfm, 100 psi	80	Air compressor	1	240	1	112	0.48	460.8	215.04
TOTAL								80,301	36,883

Two Dam Removal Restoration

Description	Power Rating (HP)	Comparable OFFROAD Equipment	Copco No. 1&2 - Demolition	Copco No. 1		Iron Gate		Approximate Operating Hours/Day	Load Factor	Copco No 1	Iron Gate
				Quantity	Number of Days	Quantity	Number of Days				
SEMI TRACTOR	510	Tractors/Loaders/Backhoes	1	0.7	347	1	347	10	0.37	22917.615	32739.45
HONDA PIONEER 1000 SIDE BY SIDE	72	NA	3	2.1	347	3	347	10	0	0	0
GODWIN 3" PUMP	84	Pumps	1	0.7	347	1	347	10	0.74	7549.332	10784.76
GODWIN 6" PUMP	84	Pumps	1	0.7	347	1	347	10	0.74	7549.332	10784.76
CAT 323 EXCAVATOR	164	Excavators	1	0.7	347	1	347	10	0.38	7568.764	10812.52
CAT 330 EXCAVATOR	275	Excavators	1	0.7	347	1	347	10	0.38	12691.525	18130.75
CAT 336 EXCAVATOR	311	Excavators		0	347		347	10	0.38	0	0
CAT 304 EXCAVATOR	40	Excavators	1	0.7	347	1	347	10	0.38	1846.04	2637.2
CAT D6 DOZER	215	Rubber Tired Dozers	1	0.7	347	1	347	10	0.4	10444.7	14921
CAT 299 SKID STEER	110	Skid Steer Loader	1	0.7	347	1	347	10	0.37	4943.015	7061.45
CAT 735 HAUL TRUCK	424	Off-Highway Trucks	2	1.4	347	2	347	10	0.38	39136.048	55908.64
MAROOKA MST2200VDR TRACK TRUCK	250	Off-Highway Trucks	1	0.7	347	1	347	10	0.38	11537.75	16482.5
JOHN DEERE 6150M TRACTOR	150	Tractors/Loaders/Backhoes	1	0.7	347	1	347	10	0.37	6740.475	9629.25
JOHN DEERE 5125R TRACTOR	125	Tractors/Loaders/Backhoes	1	0.7	347	1	347	10	0.37	5617.0625	8024.375
CASE 340 TRACTOR	340	Tractors/Loaders/Backhoes	1	0.7	347	1	347	10	0.37	15278.41	21826.3
HONDA EM6500S GENERATOR	7.4	Generator Sets	2	1.4	347	2	347	10	0.74	1330.1204	1900.172
BELL 206L LONG RANGER HELICOPTER	450	Helicopter		0	347	1	347	6	1	0	46845
TOTAL										155,150	268,488

Notes: Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Two Dam Removal Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Hauling Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Pre-Dam	0	0	0	675	0	0	0	10.00	6.50	0.00	0	0	-	0	0
Demolition - Copco No. 1	110	0	13	387	42,570	0	5163	58.60	58.60	29.30	2,494,602.00	0.00	151,275.90	97,278	28,673
Demolition - Iron Gate	160	0	224	262	41,920	0	58661	46.40	46.40	14.40	1,945,088.00	0.00	844,718.40	75,849	160,111
JC Boyle - Fish Ladder	90	0	49	190	17,100	0	9300	58.60	58.60	14.60	1,002,060.00	0.00	135,780.00	39,076	25,736
Copco No. 2 - Fish Ladder	80	0	12	190	15,200	0	2294	58.47	58.47	21.10	888,744.00	0.00	48,403.40	34,657	9,175
Restoration - Copco No. 1	0	5.6	0	414	0	2,318	0	58.60	58.60	0.00	0.00	135,858.24	-	0	25,751
Restoration - Iron Gate	0	10	0	414	0	4,140	0	46.40	46.40	0.00	0.00	192,096.00	-	0	36,411
TOTAL														246,859	285,857

Notes:
Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7). Daily woker trips based on the number of works multiplied by two. Daily Vendor trips based on quantity of trucks provided in equipment list. Daily Hauling trip based on total phase trips. Haul trip length based on average of material hauling trips.

Three Dam Removal Fuel Use

Three Dam Removal Construction Fuel Usage Summary

Construction Phase	Diesel	Gasoline	Diesel	Diesel
	Off-road Equipment (gallons)	On-road (gallons)	On-road (gallons)	Total
Pre-Dam	59,982	0	0	59,982
JC Boyle - Fish Ladder Construction	80,301	39,076	25,736	106,038
Demolition - Copco No. 1	922,072	97,278	28,673	950,745
Demolition - Copco No. 2	133,580	34,657	9,175	142,754
Demolition - Iron Gate	1,771,932	75,849	160,111	1,932,044
Restoration - Copco No. 1	155,150	0	25,751	180,901
Restoration - Copco No. 2	66,493	0	11,012	77,505
Restoration - Iron Gate	268,488	0	36,411	304,899
TOTAL	3,457,998	246,859	296,869	3,754,867
Total Gasoline	246,859	gallons		
Total Diesel	3,754,867	gallons		

Three Dam Removal Pre-dam Removal Activities

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
IEV Control								
CAT 426 BACKHOE	94	Tractor/Loaders/Backhoes	1	2.91	320	0.37	110	556.48
Tractor with Till/Disc Attachment (JD 6175)	175	Tractor/Loaders/Backhoes	1	6.82	750	0.37	110	2428.125
TOTAL								
Construction access, road, bridge, and culvert improvements								
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/Backhoes	1	0.56	80	0.37	142	71.04
Clamshell Bucket, 1 C.Y.	0	NA	1	4.49	637.12	0	142	0
Concrete Pump (Small)	84	Pump	1	4.56	647.49	0.74	142	2012.39892
Crawler Crane, 25 Ton	231	Cranes	1	4.49	637.12	0.29	142	2134.03344
Crawler Crane, 40 Ton	231	Cranes	1	2.66	378.06	0.29	142	1266.31197
Crawler Crane, 75 Ton	231	Cranes	1	0.84	119.82	0.29	142	401.33709
Dozer, 105 H.P.	105	Rubber Tired Dozer	1	2.61	370.46	0.4	142	777.966
Drill Rig, Truck-Mounted	221	Bore/Drill Rigs	1	14.88	2113.14	0.5	142	11675.0985
Gas Engine Vibrator	5.5	Cement and Motar Mixer	1	6.08	862.99	0.56	142	132.90046
Hammer, Diesel, 22k ft-lb	221	Bore/Drill Rigs	1	1.25	178.06	0.5	142	983.7815
Hammer, Diesel, 41k ft-lb	221	Bore/Drill Rigs	1	0.84	119.82	0.5	142	662.0055
Hyd. Crane, 80 Ton	231	Cranes	1	1.50	212.75	0.29	142	712.606125
Lattice Boom Crane, 150 Ton	282	Cranes	1	5.40	767.23	0.29	142	3137.20347
Vibratory Hammer & Gen.	221	Bore/Drill Rigs	1	1.41	200	0.5	142	1105
TOTAL								
Recreation Facilities Removal								
20' Suction Hose, 6"	0	NA	1	4.00	480.14	0	120	0
50' Discharge Hoses, 6"	0	NA	1	8.00	960.27	0	120	0
Backhoe Loader, 48 H.P.	48	Tractor/Loaders/Backhoes	1	8.45	1014.22	0.37	120	900.62736
Brush Chipper, 12", 130 H.P.	130		1	1.58	189.18	1	120	1229.67
Centr. Water Pump, 6"	84	Pump	1	4.00	480.14	0.74	120	1492.27512
Chain Saw, Gas, 36" Long	7		1	3.15	378.37	1	120	132.4295
Clamshell Bucket, 1 C.Y.	0	NA	1	1.74	208.74		120	0
Crawler Loader, 3 C.Y.	97	Crawler Tractors	1	1.58	189.18	0.43	120	394.53489
Dozer, 200 H.P.	200	Rubber Tired Dozers	1	1.86	222.99	0.4	120	891.96
Dozer, 300 H.P.	300	Rubber Tired Dozers	1	0.39	46.81	0.4	120	280.86
Dozer, 80 H.P.	80	Rubber Tired Dozers	1	1.61	193.6	0.4	120	309.76

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Earth Auger, Truck-Mtd.	221	Bore/Drill Rigs	1	0.44	52.93	0.5	120	292.43825
F.E. Loader, T.M., 2.25 C.Y.	97	Tractor/Loaders/Backhoes	1	1.60	192.42	0.37	120	345.29769
F.E. Loader, W.M., 2.5 C.Y.	97	Tractor/Loaders/Backhoes	1	5.25	629.86	0.37	120	1130.28377
Gas Engine Vibrator	5.5		1	1.73	207.84	0.56	120	32.00736
Gradall, 5/8 C.Y.	158	Excavator	1	2.67	320	0.32	120	808.96
Grader, 30,000 Lbs.	187	Grader	1	10.51	1261.09	0.41	120	4834.388515
Heating Kettle, 115 Gallon	0	NA	1	0.84	100.8	0	120	0
Hyd. Crane, 12 Ton	231	Cranes	1	1.63	196.11	0.29	120	656.870445
Hyd. Crane, 25 Ton	231	Cranes	1	0.73	87.9	0.29	120	294.42105
Hyd. Excavator, 2 C.Y.	231	Excavator	1	0.34	40.51	0.38	120	177.79839
Hyd. Excavator, 2.5 C.Y.	231	Excavator	1	0.46	55.06	0.38	120	241.65834
Hyd. Excavator, 3.5 C.Y.	231	Excavator	1	1.74	208.74	0.38	120	916.15986
Line Rem.,11 H.P.,Walk Behind	11		1	0.10	11.8	1	120	6.49
Loader, Skid Steer, 78 H.P.	78	Skid Steer Loaders	1	0.96	115.44	0.37	120	166.57992
Paint Striper, T.M., 120 Gal.	0	NA	1	0.84	100.8	0	120	0
Rammer/Tamper, Gas, 15"	6.5	Plate Compactors	1	1.14	137.36	0.43	120	19.19606
Road Sweeper, S.P., 8' wide	64		1	0.02	2.95	0.46	120	4.3424
Roller, Vibratory, 25 Ton	80	Roller	1	2.07	248.64	0.38	120	377.9328
Tandem Roller, 5 Ton	80	Roller	1	0.39	46.82	0.36	120	67.4208
Trowel, 48" Walk-Behind	11.7		1	0.39	46.82	0	120	0
Vibr. Roller, Towed, 12 Ton	80	Roller	1	4.39	526.75	0.38	120	800.66
Vibratory Roller, Towed, 23 Ton	80	Roller	1	1.39	166.99	0.38	120	253.8248
Welder, Gas Engine, 300 amp	23	Welder	1	0.01	1.1	0.45	120	0.56925
TOTAL								
Yreka Water Supply Pipeline Relocation								
Air Compressor 600 cfm	300	Air Compressor	1	2.00	240	0.48	120	1728
Crawler Crane, 90 Ton	231	Cranes	1	4.01	480.6	0.29	120	1609.7697
Dozer (235hp)(CATD7)	235	Rubber Tired Dozers	1	1.34	160.4	0.4	120	753.88
Gas Engine Tamp	6.5	Plate Compactors	1	2.67	320.8	0.43	120	44.8318
Hydraulic Crane (17tn)	231	Cranes	1	2.01	240.8	0.29	120	806.5596
Microtunneling 36" ID Casing	0	NA	1	2.04	244.8	0	120	0
Roller, Dbl Drum (steel wheel, 5.0 - 7.9 MTn)	80	Roller	1	1.34	160.4	0.38	120	243.808
Welder, Portable	46	Welder	1	2.01	240.8	0.45	120	249.228
TOTAL								

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
Fall Creek Hattery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	1	2.40	366.6	0.48	153	431.1216
Hand Held Pavement Breaker 80-90 lbs	0	NA	1	2.40	366.6	0	153	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.01	1.44	0.3	153	0.1404
Crawler Mntd Asphalt Paver 5'-13' ABG Titan 125 21K	60	Pavers	1	0.00	0.533	0.42	153	0.67158
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.13	20.481	0.42	153	55.91313
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	0.21	32.65	0.43	153	5.6158
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.13	19.574	0.38	153	6.694308
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.11	16.118	0.38	153	24.49936
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	142	Roller	1	0.19	28.571	0.38	153	77.084558
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.14	21.014	0.38	153	13.175778
Tandem Vibratory Comp. Cat. CB634C 84" 138HP- 11.3MT	138	Roller	1	0.13	20.481	0.38	153	53.701182
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	0.03	5	0.73	153	0.5475
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.11	16.118	0.4	153	53.1894
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.28	43.281	0.4	153	121.1868
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	0.28	42.25	0.41	153	80.549625
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	1	0.62	94.926	0.35	153	161.136885
Standard Crawler Loader Cat. 963 158HP 3.20cy- 43K#	158	Crawler Tractor	1	0.49	74.723	0.4	153	236.12468
Loader Articulated Wheel Cat 938G 160HP 3.00cy- 33K#	160	Rubber Tired Loader	1	0.00	0.48	0.36	153	1.3824
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.08	12.735	0.38	153	33.39117
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	0.41	62.409	0.38	153	220.553406
80MT All/Rough Terrain Hydro Crane	231	Cranes	1	0.73	112.265	0.29	153	376.0316175
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.04	6.862	0.29	153	6.268437
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.06	8.427	0.29	153	7.6980645
Electric Submersible Pump 2HP/2"	2	Pump	1	0.49	75.413	0.74	153	5.580562
Discharge Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Suction Hose 2.0 in	0	NA	1	0.49	75.413	0	153	0
Chain Saw, 20"bar Length	3	NA	1	0.49	74.723	1	153	11.20845

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
80 Ton 16 Wheel Equipment Trailer	0	NA	1	0.68	104	0	153	0
Trailer Mtd Brush Chipper, 16"dia	130	NA	1	0.49	74.723	1	153	485.6995
Iron Gate Hatery								
Air Comp Portable 185 cfm Diesel	49	Air Compressor	2	16.27	732.016	0.48	45	1721.701632
Hand Held Pavement Breaker 80-90 lbs	0		2	16.27	732.016	0	45	0
Pressure Washer- 3000 psi	6.5	Pressure Washer	1	0.26	11.604	0.3	45	1.13139
Wheel Mntd Asphalt Pavers 10'-30' Barber-Greene-BG-260	130	Pavers	1	0.01	0.427	0.42	45	1.16571
Crawler Mntd Pavement Millers 84"-Terex-PR-800-7-Power Mode: Diesel	60	Pavers	1	0.10	4.575	0.42	45	5.7645
Hand Held Vibratory Plate 25" 8.0HP	8	Plate Compactors	1	6.49	292.145	0.43	45	50.24894
Trench Compactor Wacker RT820 3K#/32" 18HP 4-Drum	18	Roller	1	0.97	43.522	0.38	45	14.884524
Cat CP/CS323 Pad/Smooth Vibratory Compactor 80HP-4.6MT	80	Roller	1	0.03	1.227	0.38	45	1.86504
Cat CP/CS563 Pad/Smooth Vibratory Compactor 142HP- 11MT	142	Roller	1	0.03	1.513	0.38	45	4.082074
Tandem Vibratory Comp. BOMAG 40" 33HP- 2.4MT	33	Roller	1	0.01	0.427	0.38	45	0.267729
Tandem Vibratory Comp. Cat. CB634C 84" 138HP-11.3MT	138	Roller	1	0.01	0.427	0.38	45	1.119594
Concrete Core Drill	221	Bore/Drill Rigs	1	0.36	16.312	0.5	45	90.1238
Trailer Mtd Concrete Pumps, 80cy/hr, 160hp	160	Pump	1	0.52	23.211	0.74	45	137.40912
Concrete Saw 20" Gasoline	3	Concrete/Industrial Saw	1	4.16	187.354	0.73	45	20.515263
Standard Crawler Dozer Cat. D4C 81HP	81	Rubber Tired Dozer	1	0.01	0.276	0.4	45	0.44712
Standard Crawler Dozer Cat. D6R 165HP	165	Rubber Tired Dozer	1	0.01	0.339	0.4	45	1.1187
Articulated Frame Grader Cat 12H 140HP	140	Grader	1	0.05	2.067	0.41	45	5.93229
Loader Backhoe C420-93HP 1.25cy- 15' depth	93	Tractors/Loaders/Backhoes	1	2.44	109.98	0.37	45	189.22059
Loader Backhoe C446- 1.50cy- 17'+ Depth	97	Tractors/Loaders/Backhoes	2	9.81	441.453	0.37	45	1584.374817
Loader Articulated Wheel Cat 938G 160HP 3.00cy-33K#	160	Rubber Tired Loader	1	0.09	4.235	0.36	45	12.1968
Hydraulic Excavator Cat. 320 138HP 1.25cy	138	Excavator	1	0.48	21.562	0.38	45	56.535564
Hydraulic Excavator Cat. 325 186HP 1.50cy	186	Excavator	1	3.77	169.818	0.38	45	600.136812
20MT All/Rough Terrain Hydro Crane	231	Crane	1	0.89	40	0.29	45	133.98
40MT All/Rough Terrain Hydro Crane	231	Crane	1	1.36	61.421	0.29	45	205.7296395
80MT All/Rough Terrain Hydro Crane	231	Crane	1	7.97	358.45	0.29	45	1200.628275

Description	Power Rating (HP)	Comparable OFFROAD Equipment	# of Units	Approximate Operating Hours/Day	Total Hours	Load Factor	Number of Days	Diesel Fuel Usage
100MT All/Rough Terrain Hydro Crane	231	Crane	1	0.15	6.789	0.29	45	22.7397555
Telescopic Boom Lift Truck Grad 534 -6Kips	63	Aerial Lift	1	0.56	25.375	0.31	45	24.7786875
Telescopic Boom Lift Truck Grad 534 -10Kips	63	Aerial Lift	1	0.83	37.34	0.31	45	36.46251
1cy Standard Clamshell Bucket	0		1	1.33	59.951	0	45	0
Vibratory Hammer/Extractor 134.0 Ton 503Hydraulic HP	221	Bore/Drill Rigs	1	0.39	17.424	0.5	45	96.2676
Electric Submersible Pump 2HP/2"	2	Pump	1	3.04	137.013	0.74	45	10.138962
Discharge Hose 2.0 in	0		1	3.04	137.013	0	45	0
Suction Hose 2.0 in	0		1	3.04	137.013	0	45	0
Self Propelled Pavement Brooms 96" 76HP	76		1	0.10	4.575	0.46	45	7.9971
Portable welder Diesel 300 amps	22	Welder	1	6.20	279.062	0.45	45	138.13569
Torch Cutting Acetylene-Oxygen 150'	0		1	2.80	126.163	0	45	0
80 Ton 16 Wheel Equipment Trailer	0		1	2.13	96	0	45	0
Hydraulic Impact Breaker 2K 620bpm	221	Bore/Drill Rigs	1	1.17	52.842	1	45	583.9041
TOTAL								59,982

Three Dam Removal Dam and Powerhouse Removal

Description	Power Rating (HP)	Comparable OFFROAD Equipment	Copco No. 1&2 - Demolition	Copco No. 1		Copco No. 2		Iron Gate		Approximate Operating Hours/Day	Load Factor	Diesel Fuel Usage		
				Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days			Copco No 1	Copco No 2	Iron Gate
SEMI TRACTOR	510	Tractors/Loaders/Backhoes		0	355	0	120		344	20	0.37	0	0	0
D6 DOZER	215	Rubber Tired Dozers	1	0.7	355	0.3	120	2	344	20	0.4	21371	3096	59168
D8 DOZER	354	Rubber Tired Dozers	1	0.7	355	0.3	120	3	344	20	0.4	35187.6	5097.6	146131.2
CAT 426 BACKHOE	94	Tractors/Loaders/Backhoes	1	0.7	355	0.3	120	0	344	20	0.37	8642.83	1252.08	0
CAT 14H MOTORGRADER	250	Graders	1	0.7	355	0.3	120	2	344	20	0.41	25471.25	3690	70520
CAT 336/330, JD 330 EXCAVATOR	273	Excavators	1	0.7	355	0.3	120	1	344	20	0.38	25779.39	3734.64	35686.56
CAT 349/EX400 EXCAVATOR	275	Excavators	2	1.4	355	0.6	120	3	344	20	0.38	51936.5	7524	107844
CAT 374/365 EXCAVATOR	472	Excavators		0	355	0	120	1	344	20	0.38	0	0	61699.84
EX1100/1250 EXCAVATOR	600	Excavators		0	355	0	120	2	344	20	0.38	0	0	156864
CAT 563 - 84"ROLLER	137	Roller	1	0.7	355	0.3	120	1	344	20	0.38	12936.91	1874.16	17908.64
WALK BEHIND ROLLER	20	Roller	1	0.7	355	0.3	120	1	344	20	0.38	1888.6	273.6	2614.4
S15-60T RT CRANE	365	Cranes	2	1.4	355	0.6	120	1	344	20	0.29	52607.45	7621.2	36412.4
LINKBELT HC 218A/Hyr. Trtuck Crane (100 TN)	318	Cranes	1	0.7	355	0.3	120	1	344	20	0.29	22916.67	3319.92	31723.68
3900 W 140T CRANE	287	Cranes	1	0.7	355	0.3	120		344	20	0.29	20682.655	2996.28	0
S15-222 100 TN MANITOWOC CRANE	318	Cranes		0	355	0	120		344	20	0.29	0	0	0
4100 SERIES 2 200T CRANE	231	Cranes		0	355	0	120		344	20	0.29	0	0	0
S15-777 175 TN MANITOWOC CRANE	231	Cranes	1	0.7	355	0.3	120		344	20	0.29	16647.015	2411.64	0
A40/CAT 740 HAUL TRUCK	496	Off-Highway Trucks	3	2.1	355	0.9	120	2	344	20	0.38	140511.84	20355.84	129674.24
CAT 773 HAUL TRUCK	775	Off-Highway Trucks		0	355	0	120	4	344	20	0.38	0	0	405232
175 COMPRESSOR	0	NA	2	1.4	355	0.6	120	1	344	24	0	0	0	0
400 COMPRESSOR	0	NA	1	0.7	355	0.3	120		344	24	0	0	0	0
200 - 250 AMP DIESEL WELDER	50	Welder	1	0.7	355	0.3	120	1	344	24	0.74	11033.4	1598.4	15273.6
25 - 49 KW GENERATOR - 75 HP	75	Generator Sets	2	1.4	355	0.6	120	2	344	24	0.74	33100.2	4795.2	45820.8
125 - 174 KW GENERATOR - 250 HP	250	Generator Sets	1	0.7	355	0.3	120	1	344	24	0.74	55167	7992	76368
5 KW GENERATORS - 10 HP	10	Generator Sets	9	6.3	355	2.7	120	6	344	20	0.74	16550.1	2397.6	15273.6
MUSCO LIGHT PLANT/ GENERATORS - 85 HP	85	Generator Sets	5	3.5	355	1.5	120	5	344	20	0.74	78153.25	11322	108188
6" TRASH PUMP	84	Pumps	3	2.1	355	0.9	120	2	344	24	0.74	55608.336	8055.936	51319.296
6" SUB PUMP	84	Pumps	2	1.4	355	0.6	120	1	344	24	0.74	37072.224	5370.624	25659.648
GROUT PUMP	84	Pumps	1	0.7	355	0.3	120	1	344	20	0.74	15446.76	2237.76	21383.04

				Copco No. 1		Copco No. 2		Iron Gate				Diesel Fuel Usage		
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Copco No. 1&2 - Demolition	Quantity	Copco No. 1 Number of Days	Quantity	Copco No. 2 Number of Days	Quantity	Iron Gate Number of Days	Approximate Operating Hours/Day	Load Factor	Copco No 1	Copco No 2	Iron Gate
950 LOADER	240	Rubber Tired Loaders	1	0.7	355	0.3	120		344	20	0.36	21470.4	3110.4	0
966F LOADER	280	Rubber Tired Loaders	2	1.4	355	0.6	120	1	344	20	0.36	50097.6	7257.6	34675.2
980G LOADER	431	Rubber Tired Loaders		0	355	0	120	1	344	20	0.36	0	0	53375.04
MANLIFT 60'	89	Aerial Lifts	3	2.1	355	0.9	120	2	344	20	0.31	20568.345	2979.72	18981.92
D19-42 PILE HAMMER (42,000 FT-LB)	0	NA		0	355	0	120		344	20	0	0	0	0
>10,000 LB EXTENDABLE FORKLIFT	89	Forklift	2	1.4	355	0.6	120	1	344	20	0.2	8846.6	1281.6	6123.2
OSR SM HYD DRL/CMP (2-1/2" - 4-1/2") - ROCK DRILL	221	Bore/Drill Rigs	3	2.1	355	0.9	120	1	344	20	0.5	82377.75	11934	38012
CONCRETE SHEAR	0	NA		0	355	0	120		344	20	0	0	0	0
HOE RAM 330/349	0	NA	1	0.7	355	0.3	120	1	344	20	0	0	0	0
MAXI HEATER	0	NA		0	355	0	120		344	24	0	0	0	0
FLEXI FLOAT 10 X 40 X 7	0	NA	20	14	355	6	120	6	344	24	0	0	0	0
WORK BOAT	250	Work boat	1	0.7	355	0.3	120		344	20				
TOTAL												922,072	133,580	1,771,932

Three Dam Removal Fish Ladder Construction

			JC Boyle			Diesel Fuel Usage
Description	Power Rating (HP)	Comparable OFFROAD Equipment	Quantity	JC Boyle Number of Hours	Load Factor	JC Boyle
Lattice boom crane, 160'	335	Crane	1	968	0.29	4702.06
Hydraulic yard crane, 40'-60'	130	Crane	2	1456	0.29	5489.12
Hydraulic excavator w/ hoe ram attachment	321	Excavator	1	240	0.38	1463.76
Hydraulic excavator, CAT 244-321 hp	321	Excavator	1	728	0.38	4440.072
Wheel-loader, CAT 966, 5 yd3	246	Tractors/Loaders/Backhoes	1	728	0.37	3313.128
Crawler dozer, CAT 238	238	Rubber Tired Dozers	1	240	0.4	1142.4
Water tank truck, off-highway	175	Water truck	1	448	1	3920
Concrete pump truck w/ boom and hosing	235	Pump	4	1536	0.74	53422.08
Vibratory compactor	138	Bore/Drill Rigs	1	240	0.5	828
Engine generator, 6.5 KW	13	Generator Sets	1	872	0.74	419.432
Portable generator, 1 KW	2.75	Generator Sets	2	1744	0.74	354.904
Air compressor, 160 cfm, 100 psi	60	Air compressor	1	240	0.48	345.6
Air compressor, 250 cfm, 100 psi	80	Air compressor	1	240	0.48	460.8
TOTAL						80,301

Three Dam Removal Restoration

Description	Power Rating (HP)	Comparable OFFROAD Equipment	Copco No. 1&2 - Demolition	Copco No. 1		Copco No. 2		Iron Gate		Approximate Operating Hours/Day	Load Factor	Copco No 1	Copco No 2	Iron Gate
				Quantity	Number of Days	Quantity	Number of Days	Quantity	Number of Days					
SEMI TRACTOR	510	Tractors/Loaders/Backhoes	1	0.7	347	0.3	347	1	347	10	0.37	22917.615	9821.835	32739.45
HONDA PIONEER 1000 SIDE BY SIDE	72	NA	3	2.1	347	0.9	347	3	347	10	0	0	0	0
GODWIN 3" PUMP	84	Pumps	1	0.7	347	0.3	347	1	347	10	0.74	7549.332	3235.428	10784.76
GODWIN 6" PUMP	84	Pumps	1	0.7	347	0.3	347	1	347	10	0.74	7549.332	3235.428	10784.76
CAT 323 EXCAVATOR	164	Excavators	1	0.7	347	0.3	347	1	347	10	0.38	7568.764	3243.756	10812.52
CAT 330 EXCAVATOR	275	Excavators	1	0.7	347	0.3	347	1	347	10	0.38	12691.525	5439.225	18130.75
CAT 336 EXCAVATOR	311	Excavators		0	347	0	347		347	10	0.38	0	0	0
CAT 304 EXCAVATOR	40	Excavators	1	0.7	347	0.3	347	1	347	10	0.38	1846.04	791.16	2637.2
CAT D6 DOZER	215	Rubber Tired Dozers	1	0.7	347	0.3	347	1	347	10	0.4	10444.7	4476.3	14921
CAT 299 SKID STEER	110	Skid Steer Loader	1	0.7	347	0.3	347	1	347	10	0.37	4943.015	2118.435	7061.45
CAT 735 HAUL TRUCK	424	Off-Highway Trucks	2	1.4	347	0.6	347	2	347	10	0.38	39136.048	16772.592	55908.64
MAROOKA MST2200VDR TRACK TRUCK	250	Off-Highway Trucks	1	0.7	347	0.3	347	1	347	10	0.38	11537.75	4944.75	16482.5
JOHN DEERE 6150M TRACTOR	150	Tractors/Loaders/Backhoes	1	0.7	347	0.3	347	1	347	10	0.37	6740.475	2888.775	9629.25
JOHN DEERE 5125R TRACTOR	125	Tractors/Loaders/Backhoes	1	0.7	347	0.3	347	1	347	10	0.37	5617.0625	2407.3125	8024.375
CASE 340 TRACTOR	340	Tractors/Loaders/Backhoes	1	0.7	347	0.3	347	1	347	10	0.37	15278.41	6547.89	21826.3
HONDA EM6500S GENERATOR	7.4	Generator Sets	2	1.4	347	0.6	347	2	347	10	0.74	1330.1204	570.0516	1900.172
BELL 206L LONG RANGER HELICOPTER	450	Helicopter		0	347	0	347	1	347	6	1	0	0	46845
TOTAL												155,150	66,493	268,488

Notes: Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Three Dam Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Daily Hauling Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Haul Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Total Haul Trip Length (miles)	Total gallons of gasoline	Total gallons of diesel
Pre-Dam	0	0	0	675	0	0	0	10.00	6.50	0.00	0	0	-	0	0
JC Boyle - Fish Ladder	90	0	49	190	17,100	0	9300	58.60	58.60	14.60	1,002,060.00	0.00	135,780.00	39,076	25,736
Demolition - Copco No. 1	110	0	13	387	42,570	0	5163	58.60	58.60	29.30	2,494,602.00	0.00	151,275.90	97,278	28,673
Demolition - Copco No. 2	80	0	12	190	15,200	0	2294	58.47	58.47	21.10	888,744.00	0.00	48,403.40	34,657	9,175
Demolition - Iron Gate	160	0	224	262	41,920	0	58661	46.40	46.40	14.40	1,945,088.00	0.00	844,718.40	75,849	160,111
Restoration - Copco No. 1	0	5.6	0	414	0	2,318	0	58.60	58.60	0.00	0.00	135,858.24	-	0	25,751
Restoration - Copco No. 2	0	2.4	0	414	0	994	0	58.47	58.47	0.00	0.00	58,095.79	-	0	11,012
Restoration - Iron Gate	0	10	0	414	0	4,140	0	46.40	46.40	0.00	0.00	192,096.00	-	0	36,411
TOTAL														246,859	296,869

Notes:
Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy-Duty Trucks (T7). Daily woker trips based on the number of works multiplied by two. Daily Vendor trips based on quantity of trucks provided in equipment list. Daily Hauling trip based on total phase trips. Haul trip length based on average of material hauling trips.

EMFAC 2017

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: SISKIYOU
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Populati on	VMT	Trips	Fuel gas	Diesel gas	Miles per gallon	Gasoline miles per gallon	Diesel miles per gallon
				miles/hr		vehicles	miles/day	trips/day	1,000 gallons/day	1,000 gallons/day			
SISKIYOU	2021	LDA	Aggregated	Aggregated	GAS	41,326	1,618,773	192,286	56.71	0.00	28.54	25.64	5.28
SISKIYOU	2021	LDT1	Aggregated	Aggregated	GAS	6,494	213,932	28,383	9.02	0.00	23.72		
SISKIYOU	2021	LDT2	Aggregated	Aggregated	GAS	18,760	665,446	84,831	30.56	0.00	21.77		
SISKIYOU	2021	T7 tractor construction	Aggregated	Aggregated	DSL	32	2,252	147	0.00	0.43	5.28		