

Appendix C

AQ/GHG Modeling

Summary of Average Daily Emissions of Criteria Air Pollutants and Precursors by Project Component

	ROG	CO	NO _x	SO _x	PM ₁₀ (Exhaust)	PM _{2.5} (Exhaust)	PM ₁₀ (Fugitive Dust)	PM _{2.5} (Fugitive Dust)	<u>units</u>	<u>Source</u>
Original Project (including R-619, R700, R-707)	5.05	58.51	44.94	0.16	1.93	1.80	72.66	7.63	lb/day	Table 3.3-3 on page 3-26 of the 2018 IS/MND

Year 2020

R-649 Component of Original Project Only	1.68	19.50	14.98	0.05	0.64	0.60	24.22	2.54	lb/day	Calculation. See Note 1.
R-893 Component of Amended Project	3.32	25.08	26.12	0.05	1.37	1.31	21.16	2.12	lb/day	Table A-1 (the first one)
Total of R-649 and R-893 Components	5.00	44.58	41.10	0.10	2.01	1.91	45.38	4.66	lb/day	Summation

Year 2021

D-915 Component of Amended Project	0.13	0.76	1.62	0.00	0.05	0.05	6.50	0.65	lb/day	Table A-1 (the second one)
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BAAQMD Thresholds	54.00	N/A	54.00	N/A	82.00	54.00	N/A	N/A	lb/day	BAAQMD 2017:2-2, See Note 2
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	<u>value</u>	<u>units</u>	<u>Source</u>
Number of components in Original Project	3	#	Project Description
Portion of emissions of Original Project attributable to the R-649 component	33.3%	%	assumption, See Note 1

Notes

- 1 It is assumed that approximately one third of the emissions associated with construction of the Original Project would be attributable to the construction of the R-649 component. This assumption is conservative because the R649 component would be substantially shorter than the other two components of the Original Project. The R-700 component would be approximately 4 miles long; the R-707 component would be approximately 1 mile long, and the R-649 component would be less than 1 mile long.
- 2 Bay Area Air Quality Management District. 2017 (May). California Environmental Quality Act Air Quality Guidelines. Available: https://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf?la=en. Accessed April 29, 2020.

Summary of GHG Emissions by Project Component

	<u>GHGs</u>	<u>units</u>	<u>Source</u>
Original Project			
Construction Activity	864	MT CO2-e	Table 3.7-2 on page 3-141 of the 2018 IS/MND
Venting of Natural Gas	390	MT CO2-e	Table 3.7-2 on page 3-141 of the 2018 IS/MND
Subtotal	1,254	MT CO2-e	Table 3.7-2 on page 3-141 of the 2018 IS/MND
R-893 Component of Amended Project	283	MT CO2-e	Table A-1 (the first one)
D-915 Component of Amended Project	16	MT CO2-e	Table A-1 (the second one)
Total	1,553	MT CO2-e	Summation

TABLE A-1

Construction Emissions Summary

Gas Line 131

Construction Emissions With Applicant Proposed Measures (Tier 4)

Construction Year	Criteria Pollutant Emissions ^{a, b}						Fugitive Dust	
	VOC	CO	NOx	SOx	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
Average Daily Emissions (lbs/day)	3.32	25.08	26.12	0.05	1.37	1.31	21.16	2.12
Project Emissions (tons/year)	0.19	1.42	1.48	0.00	0.08	0.07	1.20	0.12
BAAQMD Thresholds of Significance (lbs/day) ^d	54	N/A	54	N/A	82	54	N/A	N/A
Exceeds Threshold (Y/N)?	N	N	N	N	N	N	N	N
Construction Year	GHG Emissions ^{a, b}							
	CO ₂	CO ₂ e ^e						
Average Daily Emissions (lbs/day)	3,263	3,427						
Project Emissions (metric tons/year)	269	283						
CARB Thresholds of Significance (metric tons/year) ^f	N/A	7,000						
Exceeds Threshold (Y/N)?	N	N						

Notes:

^a It was assumed that all construction equipment and vehicles used for each construction activity could operate simultaneously on any given day during the

^b Per APM AQ-2, construction equipment with engines that meet or exceed the Tier 3 emission standards would be used. The following equipment will be Tier 4 emission standards: Welding rig, dozer, and grader.

^c Implementation of APM AQ-1 was assumed to reduce unpaved road dust from offroad trucks and fugitive dust from earthmoving activities. Reductions to

^d BAAQMD Thresholds of Significance taken from Table 2-1 of the *Draft CEQA Air Quality Guidelines* (BAAQMD 2017).

^e Only CO₂ emission factors were available for all types of construction equipment utilized for this project. Emissions of methane (CH₄) and nitrous oxide

^f CARB Thresholds of Significance taken as the statewide interim thresholds of significance for GHGs (CARB, 2008).

1 ton = 2,000 lbs
1 metric ton = 2,204.62 lbs

TABLE A-1

Construction Emissions Summary

Gas Line 131

Construction Emissions With Applicant Proposed Measures (Tier 4)

Construction Year	Criteria Pollutant Emissions ^{a, b}						Fugitive Dust	
	VOC	CO	NOx	SOx	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
Average Daily Emissions (lbs/day)	0.13	0.76	1.62	0.00	0.05	0.05	6.50	0.65
Project Emissions (tons/year)	0.01	0.04	0.09	0.00	0.00	0.00	0.37	0.04
BAAQMD Thresholds of Significance (lbs/day) ^d	54	N/A	54	N/A	82	54	N/A	N/A
Exceeds Threshold (Y/N)?	N	N	N	N	N	N	N	N
Construction Year	GHG Emissions ^{a, b}							
	CO ₂	CO ₂ e ^e						
Average Daily Emissions (lbs/day)	189	199						
Project Emissions (metric tons/year)	16	16						
CARB Thresholds of Significance (metric tons/year) ^f	N/A	7,000						
Exceeds Threshold (Y/N)?	N	N						

Notes:

^a It was assumed that all construction equipment and vehicles used for each construction activity could operate simultaneously on any given day during the

^b Per APM AQ-2, construction equipment with engines that meet or exceed the Tier 3 emission standards would be used. The following equipment will be Tier 4 emission standards: Welding rig, dozer, and grader.

^c Implementation of APM AQ-1 was assumed to reduce unpaved road dust from offroad trucks and fugitive dust from earthmoving activities. Reductions to

^d BAAQMD Thresholds of Significance taken from Table 2-1 of the *Draft CEQA Air Quality Guidelines* (BAAQMD 2017).

^e Only CO₂ emission factors were available for all types of construction equipment utilized for this project. Emissions of methane (CH₄) and nitrous oxide

^f CARB Thresholds of Significance taken as the statewide interim thresholds of significance for GHGs (CARB, 2008).

1 ton = 2,000 lbs
1 metric ton = 2,204.62 lbs

Equipment List ^a	Equipment / Vehicle Type	Quantity ^a	Quantity Units	Number of Days Used ^b	Hours per Day ^b	Miles per Day ^c	VOC	CO	NOx	SOx	PM _{10, Exhaust}	PM _{2.5, Exhaust}	PM _{10, Fugitive}	PM _{2.5, Fugitive}	CO ₂	VOC	CO	NOx	SOx	PM _{10, Exhaust}	PM _{2.5, Exhaust}	PM _{10, Fugitive}	PM _{2.5, Fugitive}	CO ₂ Emissions (metric tons/project) ^d	
2018: R649, R700, R707																									
L114 Project - 1																									
Excavation																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	4	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.002	0.007
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	4	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.006
Excavator	Construction Equipment	1	--	4	10	--	0.345	1.969	4.433	0.008	0.135	0.125	--	--	837.846	0.001	0.004	0.009	0.000	0.000	0.000	--	--	1.520	
TOTAL							0.346	1.988	4.442	0.008	0.135	0.125	12.248	1.225	844.850	0.001	0.004	0.009	0.000	0.000	0.000	0.024	0.002	1.533	
Coating Removal																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	2	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	2	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003	
Air Compressor	Construction Equipment	1	--	2	4	--	0.125	0.777	0.840	0.001	0.063	0.063	--	--	117.870	0.000	0.001	0.001	0.000	0.000	0.000	--	--	0.107	
Excavator	Construction Equipment	1	--	2	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.000	0.001	0.000	0.000	0.000	--	--	0.152	
TOTAL							0.195	1.189	1.736	0.003	0.090	0.088	12.248	1.225	292.443	0.000	0.001	0.002	0.000	0.000	0.000	0.012	0.001	0.265	
Inspection																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	2	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	2	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003	
Excavator	Construction Equipment	1	--	2	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.000	0.001	0.000	0.000	0.000	--	--	0.152	
TOTAL							0.070	0.413	0.896	0.002	0.027	0.025	12.248	1.225	174.573	0.000	0.000	0.001	0.000	0.000	0.000	0.012	0.001	0.158	
Repairs																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	6	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.003	0.010	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	6	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.001	0.009	
Excavator	Construction Equipment	1	--	6	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.001	0.003	0.000	0.000	0.000	--	--	0.456	
TOTAL							0.070	0.413	0.896	0.002	0.027	0.025	12.248	1.225	174.573	0.000	0.001	0.003	0.000	0.000	0.000	0.037	0.004	0.475	
Coat Pipe																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	3	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.001	0.005	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	3	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.004	
Air Compressor	Construction Equipment	1	--	3	4	--	0.125	0.777	0.840	0.001	0.063	0.063	--	--	117.870	0.000	0.001	0.001	0.000	0.000	0.000	--	--	0.160	
Excavator	Construction Equipment	1	--	3	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.001	0.001	0.000	0.000	0.000	--	--	0.228	
TOTAL							0.195	1.189	1.736	0.003	0.090	0.088	12.248	1.225	292.443	0.000	0.002	0.003	0.000	0.000	0.000	0.018	0.002	0.398	
Repairs																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	13	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.064	0.006	0.023	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	13	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.002	0.019	
Excavator	Construction Equipment	1	--	13	10	--	0.345	1.969	4.433	0.008	0.135	0.125	--	--	837.846	0.002	0.013	0.029	0.000	0.001	0.001	--	--	4.941	
TOTAL							0.346	1.988	4.442	0.008	0.135	0.125	12.248	1.225	844.850	0.002	0.013	0.029	0.000	0.001	0.001	0.080	0.008	4.982	
L114 Project - 2																									
Excavation																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	4	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.002	0.007	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	4	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.006	
Excavator	Construction Equipment	1	--	4	10	--	0.345	1.969	4.433	0.008	0.135	0.125	--	--	837.846	0.001	0.004	0.009	0.000	0.000	0.000	--	--	1.520	
TOTAL							0.346	1.988	4.442	0.008	0.135	0.125	12.248	1.225	844.850	0.001	0.004	0.009	0.000	0.000	0.000	0.024	0.002	1.533	
Coating Removal																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	2	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	2	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003	
Air Compressor	Construction Equipment	1	--	2	4	--	0.125	0.777	0.840	0.001	0.063	0.063	--	--	117.870	0.000	0.001	0.001	0.000	0.000	0.000	--	--	0.107	
Excavator	Construction Equipment	1	--	2	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.000	0.001	0.000	0.000	0.000	--	--	0.152	
TOTAL							0.195	1.189	1.736	0.003	0.090	0.088	12.248	1.225	292.443	0.000	0.001	0.002	0.000	0.000	0.000	0.012	0.001	0.265	
Inspection																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	2	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	2	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003	
Excavator	Construction Equipment	1	--	2	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.000	0.001	0.000	0.000	0.000	--	--	0.152	
TOTAL							0.070	0.413	0.896	0.002	0.027	0.025	12.248	1.225	174.573	0.000	0.000	0.001	0.000	0.000	0.000	0.012	0.001	0.158	
Repairs																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	6	--	1.25	0.000	0.017	0.001	0.000	0.000	0.000	9.798	0.980	3.834	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.003	0.010	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	6	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.001	0.009	
Excavator	Construction Equipment	1	--	6	2	--	0.069	0.394	0.887	0.002	0.027	0.025	--	--	167.569	0.000	0.001	0.003	0.000	0.000	0.000	--	--	0.456	
TOTAL							0.070	0.413	0.896	0.002	0.027	0.025	12.248	1.225	174.573	0.000	0.001	0.003	0.000	0.000	0.000	0.037	0.004	0.475	
Coat Pipe																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	4	--	3	--	1.25	0.000																		

1 ton =	2,000	lbs
1 yd ³ =	27	ft ³
1 acre =	43,560	ft ²

Equipment / Vehicle List		Quantity	Quantity Units	Number of Days Used	Hours per Day	Miles per Day	VOC	CO	NOx	SOx	PM _{10, Exhaust}	PM _{2.5, Exhaust}	PM _{10, Fugitive}	PM _{2.5, Fugitive}	CO ₂	VOC	CO	NOx	SOx	PM _{10, Exhaust}	PM _{2.5, Exhaust}	PM _{10, Fugitive}	PM _{2.5, Fugitive}	CO ₂ Emissions (metric tons/project)	
R893 Project																									
Mobilization																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	1	--	2	8	1.25	0.000	0.004	0.000	0.000	0.000	0.000	2.450	0.245	0.959	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.001
Tractor Trailer	HHDT	1	--	2	8	24.8	0.008	0.009	0.032	0.000	0.001	0.001	--	--	89.485	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.081
TOTAL							0.008	0.014	0.032	0.000	0.001	0.001	2.450	0.245	90.444	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	--	0.082
Setup Lay Down Area																									
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	2	--	2	8	1.25	0.001	0.003	0.016	0.000	0.001	0.001	4.899	0.490	6.340	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.006
Air Compressor	Construction Equipment	1	--	2	6	--	0.188	1.165	1.260	0.002	0.095	0.095	--	--	176.804	0.000	0.001	0.001	0.000	0.000	0.000	0.000	--	--	0.160
Backhoe	Construction Equipment	1	--	2	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.000	0.003	0.004	0.000	0.000	0.000	0.000	--	--	0.380
TOTAL							0.545	4.300	4.801	0.006	0.345	0.325	4.899	0.490	602.322	0.001	0.004	0.005	0.000	0.000	0.000	0.005	0.000	--	0.546
Patho Existing Utilities																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	2	--	4	8	1.25	0.000	0.009	0.001	0.000	0.000	0.000	4.899	0.490	1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003	
Air Compressor	Construction Equipment	1	--	4	6	--	0.188	1.165	1.260	0.002	0.095	0.095	--	--	176.804	0.000	0.002	0.003	0.000	0.000	0.000	0.000	--	--	0.321
Backhoe	Construction Equipment	1	--	4	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.001	0.006	0.007	0.000	0.000	0.000	0.000	--	--	0.761
TOTAL							0.544	4.305	4.785	0.006	0.344	0.324	4.899	0.490	597.899	0.001	0.009	0.010	0.000	0.001	0.001	0.010	0.001	--	1.085
Clear ROW/Grade TCE																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	2	--	4	8	1.25	0.000	0.009	0.001	0.000	0.000	0.000	4.899	0.490	1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	4	8	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.006
Excavator	Construction Equipment	1	--	4	8	--	0.276	1.575	3.546	0.007	0.108	0.100	--	--	670.277	0.001	0.003	0.007	0.000	0.000	0.000	0.000	--	--	1.216
Bulldozer	Construction Equipment	1	--	4	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.008	0.001	0.000	0.000	0.000	0.000	--	--	1.620
TOTAL							0.384	5.527	4.021	0.016	0.123	0.114	7.349	0.735	1,568.058	0.001	0.011	0.008	0.000	0.000	0.000	0.015	0.001	--	2.845
Sheet Pile Shoring Installation																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	15	8	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.147	0.015	0.052
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	2	--	15	8	1.25	0.001	0.003	0.016	0.000	0.001	0.001	4.899	0.490	6.340	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.004	0.043
Pile Driver	Construction Equipment	3	--	15	8	--	1.673	12.084	21.113	0.033	0.767	0.700	--	--	3,289.067	0.013	0.091	0.158	0.000	0.000	0.006	0.005	--	--	22.378
Air Compressor	Construction Equipment	2	--	15	8	--	0.500	3.106	3.360	0.005	0.252	0.252	--	--	471.479	0.004	0.023	0.025	0.000	0.002	0.002	--	--	--	3.208
Backhoe	Construction Equipment	1	--	15	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.003	0.023	0.026	0.000	0.002	0.002	--	--	--	2.852
Bulldozer	Construction Equipment	1	--	15	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.001	0.030	0.003	0.000	0.000	0.000	--	--	--	6.074
Loader	Construction Equipment	1	--	15	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.001	0.030	0.003	0.000	0.000	0.000	--	--	--	6.074
Excavator	Construction Equipment	2	--	15	8	--	0.552	3.150	7.092	0.013	0.216	0.200	--	--	1,340.554	0.004	0.024	0.053	0.000	0.002	0.001	--	--	--	9.121
Forklift	Construction Equipment	2	--	15	10	--	0.508	3.972	5.274	0.006	0.287	0.264	--	--	583.888	0.004	0.030	0.040	0.000	0.002	0.002	--	--	--	3.973
Generator	Construction Equipment	1	--	15	8	--	0.379	2.810	3.085	0.005	0.197	0.197	--	--	467.268	0.003	0.021	0.023	0.000	0.001	0.001	--	--	--	3.179
Welder	Construction Equipment	2	--	15	8	--	0.960	4.041	3.656	0.006	0.247	0.247	--	--	451.031	0.007	0.030	0.027	0.000	0.002	0.002	--	--	--	3.069
TOTAL							5.146	40.218	48.055	0.090	2.244	2.119	24.496	2.450	8,821.859	0.039	0.302	0.360	0.001	0.017	0.016	0.184	0.018	--	60.023
Guided Auger Bore																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	10	8	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.010	0.035
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	2	--	10	8	1.25	0.001	0.003	0.016	0.000	0.001	0.001	4.899	0.490	6.340	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.002	0.029
Welder	Construction Equipment	4	--	10	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.010	0.040	0.037	0.000	0.002	0.002	--	--	--	4.092
Air Compressor	Construction Equipment	2	--	10	8	--	0.500	3.106	3.360	0.005	0.252	0.252	--	--	471.479	0.003	0.016	0.017	0.000	0.001	0.001	--	--	--	2.139
Generator	Construction Equipment	1	--	10	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.002	0.018	0.019	0.000	0.001	0.001	--	--	--	2.649
Forklift	Construction Equipment	1	--	10	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.001	0.008	0.011	0.000	0.001	0.001	--	--	--	1.059
Bore Machine	Construction Equipment	2	--	10	8	--	0.914	4.137	9.251	0.013	0.378	0.349	--	--	1,307.241	0.005	0.021	0.046	0.000	0.002	0.002	--	--	--	5.930
Boom Truck	Construction Equipment	1	--	10	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.007	0.005	0.000	0.000	0.000	--	--	--	3.493
TOTAL							4.111	21.936	26.903	0.046	1.499	1.459	24.496	2.450	4,282.472	0.021	0.110	0.135	0.000	0.007	0.007	0.122	0.012	--	19.425
Install/Coat Bore Closures																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	10	1	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.010	0.035
Backhoe	Construction Equipment	1	--	10	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.002	0.016	0.018	0.000	0.001	0.001	--	--	--	1.901
Boom Truck	Construction Equipment	1	--	10	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.007	0.005	0.000	0.000	0.000	--	--	--	3.493
Bulldozer	Construction Equipment	1	--	10	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.001	0.020	0.002	0.000	0.000	0.000	--	--	--	4.049
Crane	Construction Equipment	1	--	10	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.007	0.005	0.000	0.000	0.000	--	--	--	3.493
Loader	Construction Equipment	1	--	10	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.001	0.020	0.002	0.000	0.000	0.000	--	--	--	4.049
Excavator	Construction Equipment	2	--	10	8	--	0.552	3.150	7.092	0.013	0.216	0.200	--	--	1,340.554	0.003	0.016	0.035	0.000	0.001	0.001	--	--	--	6.081
Welder	Construction Equipment	4	--	10	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.010	0.040	0.037	0.000	0.002	0.002	--	--	--	4.092
Air Compressor	Construction Equipment	2	--	10	6	--	0.375	2.330	2.520	0.004	0.189	0.189	--	--	353.609	0.002	0.012	0.013	0.000	0.001	0.001	--	--	--	1.604
Generator	Construction Equipment	1	--	10	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.002	0.018	0.019	0.000	0.001	0.001				

Welder	Construction Equipment	4	--	4	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.004	0.016	0.015	0.000	0.001	0.001	--	--	1.637	
Air Compressor	Construction Equipment	2	--	4	6	--	0.375	2.330	2.520	0.004	0.189	0.189	--	--	353.609	0.001	0.005	0.005	0.000	0.000	0.000	--	--	0.642	
Backhoe	Construction Equipment	1	--	4	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.001	0.006	0.007	0.000	0.000	0.000	--	--	0.761	
Boom Truck	Construction Equipment	1	--	4	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.003	0.002	0.000	0.000	0.000	--	--	1.397	
Bulldozer	Construction Equipment	1	--	4	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.008	0.001	0.000	0.000	0.000	--	--	1.620	
Crane	Construction Equipment	1	--	4	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.003	0.002	0.000	0.000	0.000	--	--	1.397	
Excavator	Construction Equipment	2	--	4	8	--	0.552	3.150	7.092	0.013	0.216	0.200	--	--	1,340.554	0.001	0.006	0.014	0.000	0.000	0.000	--	--	2.432	
Forklift	Construction Equipment	1	--	4	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.000	0.003	0.004	0.000	0.000	0.000	--	--	0.424	
Generator	Construction Equipment	1	--	4	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.001	0.007	0.008	0.000	0.000	0.000	--	--	1.060	
Loader	Construction Equipment	1	--	4	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.008	0.001	0.000	0.000	0.000	--	--	1.620	
TOTAL							4.293	32.659	29.356	0.074	1.566	1.518	24.496	2.450	7,172.522	0.009	0.065	0.059	0.000	0.003	0.003	0.049	0.005	13.014	
Trench/Install 1+00 - 4+00, ~300'																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	10	--	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.010	0.035	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	2	--	10	--	1.25	0.001	0.003	0.016	0.000	0.001	0.001	4.899	0.490	6.340	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.002	0.029	
Welder	Construction Equipment	4	--	10	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.010	0.040	0.037	0.000	0.002	0.002	--	--	4.092	
Air Compressor	Construction Equipment	2	--	10	6	--	0.375	2.330	2.520	0.004	0.189	0.189	--	--	353.609	0.002	0.012	0.013	0.000	0.001	0.001	--	--	1.604	
Backhoe	Construction Equipment	1	--	10	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.002	0.016	0.018	0.000	0.001	0.001	--	--	1.901	
Boom Truck	Construction Equipment	1	--	10	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.007	0.005	0.000	0.000	0.000	--	--	3.493	
Bulldozer	Construction Equipment	1	--	10	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.001	0.020	0.002	0.000	0.000	0.000	--	--	4.049	
Crane	Construction Equipment	1	--	10	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.007	0.005	0.000	0.000	0.000	--	--	3.493	
Excavator	Construction Equipment	2	--	10	8	--	0.552	3.150	7.092	0.013	0.216	0.200	--	--	1,340.554	0.003	0.016	0.035	0.000	0.001	0.001	--	--	6.081	
Forklift	Construction Equipment	1	--	10	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.001	0.008	0.011	0.000	0.001	0.001	--	--	1.059	
Generator	Construction Equipment	1	--	10	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.002	0.018	0.019	0.000	0.001	0.001	--	--	2.649	
Loader	Construction Equipment	1	--	10	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.001	0.020	0.002	0.000	0.000	0.000	--	--	4.049	
TOTAL							4.293	32.659	29.356	0.074	1.566	1.518	24.496	2.450	7,172.522	0.021	0.163	0.147	0.000	0.008	0.008	0.122	0.012	32.534	
Hydro Test																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	9	--	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.088	0.009	0.031	
Dryer	Construction Equipment	1	--	9	8	--	0.458	2.213	2.187	0.002	0.180	0.166	--	--	241.782	0.002	0.010	0.010	0.000	0.001	0.001	--	--	0.987	
Forklift	Construction Equipment	1	--	9	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.001	0.007	0.009	0.000	0.001	0.001	--	--	0.953	
Generator	Construction Equipment	1	--	9	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.002	0.016	0.017	0.000	0.001	0.001	--	--	2.384	
Test Pump	Construction Equipment	1	--	9	6	--	0.344	1.659	1.640	0.002	0.135	0.125	--	--	181.336	0.002	0.007	0.007	0.000	0.001	0.001	--	--	0.740	
Air Compressor	Construction Equipment	6	--	9	6	--	1.126	6.989	7.560	0.011	0.567	0.567	--	--	1,060.827	0.005	0.031	0.034	0.000	0.003	0.003	--	--	4.331	
TOTAL							2.605	15.997	17.356	0.024	1.243	1.210	19.597	1.960	2,309.253	0.012	0.072	0.078	0.000	0.006	0.005	0.088	0.009	9.427	
Fabricate Tie-in Pieces																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	4	--	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.004	0.014	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	4	--	1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.006	
Welder	Construction Equipment	4	--	4	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.004	0.016	0.015	0.000	0.001	0.001	--	--	1.637	
Air Compressor	Construction Equipment	1	--	4	6	--	0.188	1.165	1.260	0.002	0.095	0.095	--	--	176.804	0.000	0.002	0.003	0.000	0.000	0.000	--	--	0.321	
Boom Truck	Construction Equipment	1	--	4	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.003	0.002	0.000	0.000	0.000	--	--	1.397	
Crane	Construction Equipment	1	--	4	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.003	0.002	0.000	0.000	0.000	--	--	1.397	
Forklift	Construction Equipment	1	--	4	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.000	0.003	0.004	0.000	0.000	0.000	--	--	0.424	
Generator	Construction Equipment	1	--	4	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.001	0.007	0.008	0.000	0.000	0.000	--	--	1.060	
TOTAL							2.981	17.326	16.539	0.037	0.977	0.965	22.046	2.205	3,447.429	0.006	0.035	0.033	0.000	0.002	0.002	0.044	0.004	6.255	
Perform Final Tie-in																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	2	--	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.002	0.007	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	2	--	2	--	1.25	0.001	0.003	0.016	0.000	0.001	0.001	4.899	0.490	6.340	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.006	
Welder	Construction Equipment	4	--	2	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.002	0.008	0.007	0.000	0.000	0.000	--	--	0.818	
Air Compressor	Construction Equipment	2	--	2	6	--	0.375	2.330	2.520	0.004	0.189	0.189	--	--	353.609	0.000	0.002	0.003	0.000	0.000	0.000	--	--	0.321	
Backhoe	Construction Equipment	1	--	2	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.000	0.003	0.004	0.000	0.000	0.000	--	--	0.380	
Boom Truck	Construction Equipment	1	--	2	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.001	0.001	0.000	0.000	0.000	--	--	0.699	
Bulldozer	Construction Equipment	1	--	2	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.004	0.000	0.000	0.000	0.000	--	--	0.810	
Crane	Construction Equipment	1	--	2	8	--	0.097	1.471	0.995	0.008	0.014	0.013	--	--	770.042	0.000	0.001	0.001	0.000	0.000	0.000	--	--	0.699	
Excavator	Construction Equipment	2	--	2	8	--	0.552	3.150	7.092	0.013	0.216	0.200	--	--	1,340.554	0.001	0.003	0.007	0.000	0.000	0.000	--	--	1.216	
Forklift	Construction Equipment	1	--	2	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.000	0.002	0.002	0.000	0.000	0.000	--	--	0.424	
Generator	Construction Equipment	1	--	2	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.000	0.004	0.004	0.000	0.000	0.000	--	--	0.530	
Loader	Construction Equipment	1	--	2	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.004	0.000	0.000	0.000	0.000	--	--	0.810	
TOTAL							4.293	32.659	29.356	0.074	1.566	1.518	24.496	2.450	7,172.522	0.004	0.033	0.029	0.000	0.002	0.002	0.024	0.002	6.507	
Final Coating																									
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	3	--	1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.003	0.010	
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	2	--	3	--	1.25	0.001	0.003	0.016	0.000	0.001	0.001	4.899	0.490	6.340	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.001	0.009	
Welder	Construction Equipment	4	--	3	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.003	0.012	0.011	0.000	0.001	0.001	--	--	1.228	
Air Compressor	Construction Equipment	2	--	3	6	--	0.375	2.330	2.520	0.004	0.1														

Backhoe	Construction Equipment	1	--	6	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.001	0.009	0.011	0.000	0.001	0.001	--	--	1.141		
Air Compressor	Construction Equipment	2	--	6	6	--	0.375	2.330	2.520	0.004	0.189	0.189	--	--	353.609	0.001	0.007	0.008	0.000	0.001	0.001	--	--	0.962		
Generator	Construction Equipment	1	--	6	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.001	0.011	0.012	0.000	0.001	0.001	--	--	1.590		
Forklift	Construction Equipment	1	--	6	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.001	0.005	0.006	0.000	0.000	0.000	--	--	0.636		
Loader	Construction Equipment	1	--	6	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.012	0.001	0.000	0.000	0.000	--	--	2.430		
Welder	Construction Equipment	4	--	6	8	--	1.921	8.083	7.313	0.011	0.494	0.494	--	--	902.062	0.006	0.024	0.022	0.000	0.001	0.001	--	--	2.455		
TOTAL							3.437	22.622	19.791	0.036	1.307	1.278	19.597	1.960	3,392.850	0.010	0.068	0.059	0.000	0.004	0.004	0.059	0.006	9.234		
Restoration Work																										
Onsite Pick-Up (Light Duty)	Light-duty Truck	8	--	6			1.25	0.001	0.034	0.003	0.000	0.000	0.000	19.597	1.960	7.668	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.059	0.006	0.021
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	6			1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.001	0.009
Backhoe	Construction Equipment	1	--	6	8	--	0.356	3.132	3.524	0.004	0.249	0.230	--	--	419.177	0.001	0.009	0.011	0.000	0.001	0.001	--	--	1.141		
Bulldozer	Construction Equipment	1	--	6	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.012	0.001	0.000	0.000	0.000	--	--	2.430		
Generator	Construction Equipment	1	--	6	10	--	0.474	3.513	3.856	0.006	0.246	0.246	--	--	584.085	0.001	0.011	0.012	0.000	0.001	0.001	--	--	1.590		
Forklift	Construction Equipment	1	--	6	8	--	0.203	1.589	2.109	0.002	0.115	0.106	--	--	233.555	0.001	0.005	0.006	0.000	0.000	0.000	--	--	0.636		
Loader	Construction Equipment	1	--	6	8	--	0.108	3.942	0.466	0.009	0.014	0.014	--	--	892.693	0.000	0.012	0.001	0.000	0.000	0.000	--	--	2.430		
TOTAL							1.142	12.212	9.967	0.022	0.624	0.596	22.046	2.205	2,140.349	0.003	0.037	0.030	0.000	0.002	0.002	0.066	0.007	5.825		
Demobilization																										
Onsite Pick-Up (Light Duty)	Light-duty Truck	1	--	2			1.25	0.000	0.004	0.000	0.000	0.000	0.000	2.450	0.245	0.959	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.001
Onsite Pick-Up (Heavy Duty)	Heavy-duty Truck	1	--	2			1.25	0.000	0.002	0.008	0.000	0.000	0.000	2.450	0.245	3.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003
TOTAL							0.001	0.006	0.009	0.000	0.000	0.000	4.899	0.490	4.128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.004	
Entire Project																										
Fugitive Dust ^m	Onsite Cut/Fill	733	yd ³ /project	28	--	--	--	--	--	--	--	--	0.958	0.199	--	--	--	--	--	--	--	--	0.013	0.003	--	
Fugitive Dust ⁿ	Disturbed Surface	0.83	acres/day	28	--	--	--	--	--	--	--	--	5.463	1.136	--	--	--	--	--	--	--	--	0.076	0.016	--	
Fugitive Dust ^o	Open Stockpiles	0.83	acres/day	28	--	--	--	--	--	--	--	--	7.105	1.478	--	--	--	--	--	--	--	--	0.099	0.021	--	
Offsite Worker Commutes ¹	Light-duty Auto/Truck	60	--	125	--	24.8	0.075	4.218	0.317	0.016	0.005	0.005	--	--	1,029.383	0.005	0.264	0.020	0.001	0.000	0.000	--	--	58.365		
2018 PROJECT TOTAL							51.422	387.923	393.192	0.832	20.942	20.118	340.492	34.049	80,752.817	0.188	1.417	1.476	0.003	0.077	0.074	1.195	0.120	269.401		

Notes:

-- = Parameter not required for computing emissions.

^a Unless otherwise noted, Equipment / Vehicle List, quantity, hours per day, and activity schedule provided by PG&E.

^b Hours per Day were provided by PG&E

^c Onsite vehicles were assumed to travel up to 25% of the total project length (5 miles) each day. Distances for offsite vehicles, including the Diesel Fuel Delivery Truck, 1-Ton Pick-Ups, and Worker Commutes, were taken from Table 4.2 of Appendix A of the CalEEMod User's Guide (ENVIRON, 2013). The Diesel Fuel Delivery Truck and 1-Ton Pick-Up distances were taken as the urban

^d The following conversion factors were used to estimate emissions:

1 lb =	453.6	g
1 metric ton =	2,204.62	lbs
1 ton =	2,000	lbs
1 yd ³ =	27	ft ³
1 acre =	43,560	ft ²