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**APPENDIX B2-4**

**EMISSION CALCULATIONS FOR  
LOSSAN CORRIDOR AND STAGE ROAD CROSSING  
ALTERNATIVE**

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## Emissions Summaries

### Criteria Emissions

Segment	Category	Criteria Emissions (lbs/d)				
		ROG	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
LOSSAN	Offroad equipment	1.112	7.889	9.292	0.382	0.359
	Onroad trucks	0.007	0.082	0.425	0.034	0.015
	Employees	0.004	0.299	0.018	0.020	0.008
<b>Maximum Daily</b>		<b>1.12</b>	<b>8.27</b>	<b>9.73</b>	<b>0.44</b>	<b>0.38</b>

### GHG Emissions

Segment	Category	GHG Emissions (tonnes)			
		CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
LOSSAN	Offroad equipment	15.218	0.00360	N/A	15.308
	Onroad trucks	0.938	0.00000	0.00009	0.966
	Employees	2.360	0.00002	0.00004	2.372
<b>Total for Alternate</b>		<b>18.52</b>	<b>0.0036</b>	<b>0.0001</b>	<b>18.65</b>

# Employees

## Segment Q Employees

Activity	Activity					Criteria Emissions (lbs/d)					GHG Emissions (tonnes)			
	# of days	# of employees	Round Trip	VMT/ day	total VMT	ROG	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
LOSSAN	43	10	20	200	8,600	0.004	0.299	0.018	0.020	0.008	2.360	0.00002	0.00004	2.372
<i>LOSSAN Totals</i>						<i>0.004</i>	<i>0.299</i>	<i>0.018</i>	<i>0.020</i>	<i>0.008</i>	<i>2.360</i>	<i>0.0000</i>	<i>0.0000</i>	<i>2.372</i>

# Onroad Trucks

## Segment Q - Onroad Trucks

Activity	Truck Type	Activity					Criteria Emissions (lbs/d)					GHG Emissions (tonnes)			
		# of days	Trucks /day	Round Trip	VMT/day	total VMT	ROG	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2e</sub>
LOSSAN	fill truck	15	1	24	24	360	0.002	0.024	0.034	0.005	0.002	0.232	0.00000	0.00001	0.236
	concrete truck	20	1	24	24	480	0.002	0.024	0.034	0.005	0.002	0.309	0.00000	0.00002	0.314
	product delivery	5	1	100	100	300	0.003	0.033	0.356	0.024	0.010	0.397	0.00000	0.00006	0.416
<b>LOSSAN Totals</b>							<b>0.007</b>	<b>0.082</b>	<b>0.425</b>	<b>0.034</b>	<b>0.015</b>	<b>0.938</b>	<b>0.0000</b>	<b>0.0001</b>	<b>0.97</b>

## Offroad Equipment

### Segment Q - Offroad Equipment

Activity	Equipment Type	Activity						Criteria Emissions (lbs/d)					GHG Emissions (tonnes)		
		BHP	Load Factor	# of days	# of pieces	hrs / day	total hours	ROG	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	CH <sub>4</sub>	CO <sub>2e</sub>
LOSSAN	concrete mixer	9	0.56	25	1	6	150	0.044	0.231	0.276	0.011	0.011	0.430	0.00004	0.43
	drilling rig	221	0.50	10	1	6	60	0.16	1.52	1.53	0.05	0.05	3.11	0.00101	3.14
	loader	97	0.37	35	1	8	280	0.441	2.909	2.463	0.096	0.096	5.711	0.00062	5.73
	roller	80	0.38	25	1	6	150	0.12	1.39	1.21	0.07	0.06	2.16	0.00070	2.18
	crane	231	0.29	15	1	8	120	0.35	1.83	3.82	0.16	0.15	3.80	0.00123	3.83
	<b>LOSSAN Totals</b>							<b>1.11</b>	<b>7.89</b>	<b>9.29</b>	<b>0.38</b>	<b>0.36</b>	<b>15.22</b>	<b>0.0036</b>	<b>15.31</b>

### 2023 Offroad Emission Factors

Equipment Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	CH <sub>4</sub>
Bore/Drill Rig	221	0.50	0.110	1.043	1.047	0.034	0.031	469.7	0.152
Cement and Mortar Mixer	9	0.56	0.661	3.469	4.142	0.161	0.161	568.3	0.059
Concrete/Industrial Saws	81	0.73	0.320	3.507	2.478	0.123	0.123	568.3	0.028
Crane	231	0.29	0.297	1.553	3.229	0.135	0.124	473.0	0.153
Excavator	158	0.38	0.178	3.076	1.462	0.072	0.066	472.3	0.153
Grader	187	0.41	0.284	1.252	3.441	0.111	0.103	473.9	0.153
Hydraulic Jack	221	0.50	0.110	1.043	1.047	0.034	0.031	469.7	0.152
Off-highway Truck	402	0.38	0.187	1.221	1.324	0.048	0.044	475.0	0.154
Paving Equipment	132	0.36	0.204	3.051	1.913	0.093	0.086	470.7	0.152
Roller	80	0.38	0.287	3.455	3.003	0.165	0.152	473.9	0.153
Signal Boards	6	0.82	0.661	3.469	4.142	0.161	0.161	568.3	0.059
Tractors/Loaders/Backhoes	97	0.37	0.239	3.525	2.426	0.120	0.110	476.4	0.154
Welder	46	0.45	0.697	4.596	3.891	0.151	0.151	568.3	0.062

*From: CalEEMod Users Guide - Appendix D (November 2017)*

### EMFAC2017 (v1.0.2) Emission Rates

#### Calendar Year 2023

EMFAC2011 Vehicle Categories

Orange County

Vehicle Info			Emission Factor (grams/mile)											
Type	Fuel	VMT	ROG	CO	NO <sub>x</sub>	PM <sub>10</sub>			PM <sub>2.5</sub>			CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
						Exhaust	TW+BW	Total	Exhaust	TW+BW	Total			
LDA	GAS	49,965,794	0.0077	0.6049	0.0305	0.0015	0.0448	0.0462	0.0014	0.0178	0.0191	256.70	0.0021	0.0039
LDA	DSL	521,945	0.0136	0.2272	0.0486	0.0056	0.0448	0.0504	0.0054	0.0178	0.0231	199.12	0.0006	0.0313
LDT1	GAS	5,324,604	0.0204	1.0343	0.0775	0.0020	0.0448	0.0467	0.0018	0.0178	0.0196	299.40	0.0048	0.0065
LDT1	DSL	970	0.1739	0.9704	0.8500	0.1360	0.0448	0.1808	0.1301	0.0178	0.1479	397.42	0.0081	0.0625
LDT2	GAS	16,860,834	0.0130	0.8015	0.0578	0.0015	0.0448	0.0462	0.0014	0.0178	0.0191	321.22	0.0033	0.0054
LDT2	DSL	131,714	0.0177	0.1576	0.0382	0.0049	0.0448	0.0497	0.0047	0.0178	0.0225	273.44	0.0008	0.0430
<b>Weighted Average for Employees</b>			<b>0.010</b>	<b>0.678</b>	<b>0.040</b>	<b>0.002</b>	<b>0.045</b>	<b>0.046</b>	<b>0.001</b>	<b>0.018</b>	<b>0.019</b>	<b>274.4</b>	<b>0.0026</b>	<b>0.0044</b>
LHD1	GAS	1,293,611	0.0226	0.5571	0.1550	0.0012	0.0844	0.0856	0.0011	0.0348	0.0358	786.39	0.0049	0.0100
LHD1	DSL	1,009,903	0.0641	0.3410	1.2884	0.0137	0.0884	0.1021	0.0131	0.0358	0.0488	460.69	0.0030	0.0724
<b>Weighted Average for LHD1</b>			<b>0.041</b>	<b>0.462</b>	<b>0.652</b>	<b>0.007</b>	<b>0.086</b>	<b>0.093</b>	<b>0.006</b>	<b>0.035</b>	<b>0.042</b>	<b>643.6</b>	<b>0.0041</b>	<b>0.0374</b>
T7 Single	DSL	171,547	0.014	0.1484	1.6143	0.0113	0.0977	0.1090	0.0108	0.0355	0.0462	1,324.3	0.0006	0.2082

Notes: - Criteria and GHG factors come from EMFAC2017 (v1.0.2) and represent Estimated Annual Emission Rates for Orange County in the South Coast Air Basin for the calendar year 2023

- Employee Weighted Average is 69.3% LDA + 7.3% LDT1 + 23.3% LDT2 based on VMT