Land Use Statistics - Fountain Valley, Orange County

	Existing Conditions 2021	Proposed GP 2045	Net change Total	%	Current GP 2045
Housing Units	19,395	25,633	6,238	3%	20,165
Population	57,595	73,668	16,073	27%	59,775
Non-Residential SQFT	11,925,652	13,231,538	1,305,886	9%	13,923,084
Employment	32,485	36,542	4,057	11%	38,355
Service Population	**90,080**	**110,210**	**20,130**	21%	**98,130**

AQMP Consistency Analysis

Comparison of the Change in Population and VMT in Fountain Valley (O-D Method)

Category	2021 Existing	2045 Current GP	2045 Proposed Project	Change from Existing		Change from the Current GP	
				Change	%	Change	%
Population	57,595	59,775	73,668	16,073	28%	13,893	23%
Employment	32,485	38,355	36,542	4,057	12%	-1,813	-5%
SP	90,080	98,130	110,210	20,130	22%	12,080	12%
VMT per Day[a]	1,374,016	1,542,393	1,562,196	188,180	14%	19,803	1%
VMT/SP	15.25	15.72	14.17	-1.1	-7%	-1.5	-10%

Note Origin-Destination (O-D) Methodology is not the same methodology for SB 743, which considers only commute-trip VMT. Modeling of vehicle miles traveled (VMT) provided by Fehr and Peers is based on OCTA's OCTAM. VMT from passenger vehicles and trucks that have an origin or destination in the City using a transportation origin-destination methodology. Accounting of VMT is based on the recommendations of CARB's Regional Targets Advisory Committee (RTAC) created under Senate Bill 375 (SB 375).

Fountain Valley Community GHG Emissions Inventory and Forecast

Category	Existing 2021		General Plan Update 2045		Increase	
	TOTAL		**TOTAL**		**TOTAL**	
Building Electricity	47,167	15%	48,276	16%	1,110	2%
Building Natural Gas	55,166	17%	68,694	22%	13,528	25%
On-Road Transportation	171,891	54%	134,279	43%	-37,612	-22%
Off-Road Vehicles and Equipment	1,902	1%	2,009	1%	107	6%
Solid Waste/Landfills	5,436	2%	6,651	2%	1,215	22%
Refrigerants	27,121	9%	34,689	11%	7,569	28%
Water Use	3,105	1%	2,618	1%	-487	-16%
Wastewater Treatment	6,845	2%	13,502	4%	6,657	97%
Total Community Emissions	**318,633**	100%	**310,718**	100%	**-7,914**	**-2%**
Service Population (SP)	90,080		110,210		20,130	22%
$MTCO_2e/SP$	3.5		2.8		-0.7	-20%
Trajectory to AB 1279	**47,795**	-85%	**Does not Achieve Target**			

Notes: Emissions may not total to 100 percent due to rounding. Based on GWPs in the IPCC Fifth Assessment Report (AR5).

The emissions inventory and forecast is based on activity data for the City of Fountain Valley. This emissions inventory methodology identifies GHG emissions produced within a jurisdiction and captures direct and indirect emissions generated by land uses in a community. The activity data methodology allows a direct comparison between a community's GHG emissions and that identified by CARB in the AB 32 and SB 32 inventory and forecast prepared for the scoping plan. Unlike a "consumption-based" GHG emissions inventory, an activity-based emissions inventory does not capture lifecycle emissions associated with consumptions of goods. While a consumption-based emissions inventory approach may document GHG emissions associated with the final demand (regardless of where the were generated), a consumption-based emissions inventory excludes emissions associated with products produced within the juridiction but consumed elsewhere. For these reasons, an activity-based emissions inventory was determined to be most applicable for determining significant impacts under CEQA.

Note: Excludes GHG emissions natural gas use from Permitted Sources within the City.

City of Fountain Valley Community Criteria Air Pollutant Emissions Inventory and Forecast

Sources

[1] Source: F&P 2022; EMFAC2021 Version 1.0.3 Emissions Rates. Orange County (South Coast AQMD) Subregion.

[2] Sources: SoCalGas 2022. and CalEEMod User's Guide for natural gas criteria air pollutant emission rates. Excludes criteria air pollutant emissions natural gas use from Permitted Sources within the City.

[3] Source: OFFROAD 2021.

[4] Source: CalEEMod 2022 User's Guide

EXISTING

Phase	Existing (2021) Criteria Air Pollutant Emissions (pounds/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Transportation[1]	91	601	2,779	11	163	71
Energy[2]	15	268	156	2	21	21
Offroad Equipment[3]	21	59	699	0	2	2
Consumer Products[4]	680					
Total	**807**	**927**	**3,634**	**12**	**186**	**95**

Existing in 2045

Phase	Existing Land Uses (2045) Criteria Air Pollutant Emissions (pounds/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Transportation[1]	43	268	1,550	7	156	64
Energy[2]	15	268	156	2	21	21
Offroad Equipment[3]	21	59	699	0	2	2
Consumer Products[4]	680					
Total	**759**	**595**	**2,405**	**9**	**180**	**87**

City of Fountain Valley Community Criteria Air Pollutant Emissions Inventory and Forecast

General Plan Update (2045)

Phase	Project Criteria Air Pollutant Emissions (pounds/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Transportation[1]	49	305	1,762	8	177	73
Energy[2]	19	333	188	2	26	26
Offroad Equipment[3]	24	62	783	0	3	2
Consumer Products[4]	1,003					
Total	**1,094**	**699**	**2,733**	**10**	**206**	**101**

NET CHANGE from Existing Land Uses (2045)

Phase	Net Change Criteria Air Pollutant Emissions (pounds/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Transportation[1]	6	37	212	1	21	9
Energy[2]	4	65	32	0	5	5
Offroad Equipment[3]	2	3	84	0	0	0
Consumer Products[4]	323	0	0	0	0	0
Total	**335**	**104**	**328**	**1**	**27**	**14**
South Coast AQMD Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold	**Yes**	**Yes**	**No**	**No**	**No**	**No**

NET CHANGE from Existing Conditions (2021) - Friant Ranch

Phase	Net Change (2045-2021) Criteria Air Pollutant Emissions (pounds/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Transportation[1]	-42	-296	-1,017	-2	15	2
Energy[2]	4	65	32	0	5	5
Offroad Equipment[3]	2	3	84	0	0	0
Consumer Products[4]	323	0	0	0	0	0
Total	**287**	**-228**	**-901**	**-2**	**20**	**7**
South Coast AQMD Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold	**Yes**	**No**	**No**	**No**	**No**	**No**

Water and Wastewater

Water Demand for Fountain Valley Provided by Fuscoe Engineering (Dec 2021)

Water	Existing	Proposed Project
Million Gallons Per Day	9.0	11.34
Acre Feet Per Year	10,081	12,702
MGY TOTAL	3,285	4,139

Wastewater	Existing	Project
MGD	1.6	3.18
AFY	1,792	3,562
MGY TOTAL	584	1,161

Direct Emissions from Wastewater Treatment

Wastewater Treatment Type	BIOGENIC CO_2 MT/Gallon	CH_4 MT/Gallon	N_2O MT/Gallon	Non-Biogenic CO_2e MT/Gallon
Aerobic	3.90E-07	1.34E-09	8.52E-10	2.63E-07
Anaerobic (Facultative Lagoons)	3.90E-07	4.01E-07	8.52E-10	1.15E-05
Septic	0.00E+00	2.50E-07	8.52E-10	7.23E-06

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Table G-35, Annual Wastewater Treatment Direct Emission Factors (short ton per gallon)

Anaerobic	Existing	Proposed Project
Non-Biogenic CO_2e TOTAL=	6,689	13,294

Water and Wastewater

Energy for Water Conveyance, Treatment, Distribution, and Wastewater Treatment

Location	Supply (Water Conveyance)	Water Treatment	Water Distribution	Total Water	Wastewater Treatment
			kWhr/million gallons		
South Coast	3,044	725	1,537	5,306	1,501
San Francisco Bay	1,182	754	2,998	4,934	1,542
Central Coast	1,577	754	1,537	3,868	1,542
Tulare Lake	1,506	748	166	2,420	1,519
North Coast	620	754	1,537	2,911	1,542
San Joaquin River	827	748	166	1,741	1,519
Colorado River	2,304	748	166	3,218	1,519
Sacramento River	698	748	166	1,612	1,519
South Lahontan	1,953	748	1,537	4,238	1,519
North Lathontan	541	748	166	1,455	1,519

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Table G-32, Water Energy Intensity Factors by Hydrologic Region and Process (kWh per million gallon).

Southern California Edison

	Intensity factor			CO_2e
	CO_2 lbs/MWH[1]	CH_4 lbs/MWH[2]	N_2O lbs/MWH[2]	lbs/MWh
2021	390.704	0.033	0.004	**392.688**
2045	260.788	0.033	0.004	**262.772**
	Intensity factor			**CO_2e**
	CO_2 MTons/MWH[1]	CH_4 MTons/MWH[2]	N_2O MTons/MWH[2]	MTons/MWh
2021	0.177	1.50E-05	1.81E-06	**0.178**
2045	0.118	1.50E-05	1.81E-06	**0.119**

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Table G-3, Electricity Utility Greenhouse Gas Emissions Factors

Water and Wastewater

GHG Emissions from Energy Associated with Water/Wastewater

Energy Associated with Water Use	Existing Mwh	Proposed Project Mwh
TOTAL Water Use	17,430	21,962
TOTAL Wastewater Generation	877	1,742
Total Water/Wastewater	18,307	23,704

GHG Emissions from Energy Associated with Water Use/Wastewater Generation	Existing $MTCO_2e$	Proposed Project $MTCO_2e$
TOTAL Water Use	3,105	2,618
TOTAL Wastewater Generation	156	208
Total Water/Wastewater	3,261	2,825

Total GHGs

GHG Emissions from Water/Wastewater Use	Existing $MTCO_2e$	Proposed Project $MTCO_2e$
TOTAL Water Use	3,105	2,618
TOTAL Wastewater Generation	6,845	13,502
Total Water/Wastewater	**9,950**	**16,120**

Energy Data Requests to SCE and SoCalGas

Southern California Edison (SCE). March 1, 2022. Energy Report for Fountain Valley. Request ID SCE10161132300 (2016 through 2020)

Excludes natural gas use from Industrial (Permitted) Sources within the City.

	Annual Kwh					
Category	2016	2017	2018	2019	2020	**Average**
Agriculture	*	*	*	*	*	
Commercial	148,605,855	148,943,355	152,275,487	146,488,865	131,397,965	**145,542,305**
Industrial	*	*	*	*	*	
Residential	118,663,362	117,871,008	118,718,504	115,556,824	125,476,506	**119,257,241**
Total kwh	267,269,217	266,814,363	270,993,991	262,045,689	256,874,471	**264,799,546**

SoCalGas. January 13, 2022. Natural Gas Use in Fountain Valley (2016-2020). **Request ID 573**

	Annual Therms					
Category	2016	2017	2018	2019	2020	**Average**
Commercial	3,686,459	3,571,502	3,739,238	3,608,492	3,338,204	**3,588,779**
Industrial	43,928	192,658	43,670	188,959	255,935	**145,030**
Single-Family Residential	5,031,775	5,090,239	4,886,693	5,562,038	5,704,719	**5,255,093**
Multi-Family Residential	1,384,663	1,379,305	1,358,067	1,423,627	1,341,338	**1,377,400**
Total Therms	10,146,825	10,233,704	10,027,668	10,783,116	10,640,196	**10,366,302**

City of Fountain Valley

SCE and SoCalGas Emission Factors

	lbs/MMBTU	lbs/MMBTU	lbs/MMBTU	lbs/MMBTU
	CO_2	CH_4	N_2O	**CO_2e**
All Years	117	0.01040	0.00020	**117.321**
	MT/Therm	**MT/Therm**	**MT/Therm**	**MT/Therm**
	CO_2	CH_4	N_2O	**CO_2e**
All Years	0.00531	4.72E-07	9.07E-09	**0.005**

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Table G-4, Natural Gas Emissions Factors (pounds per MMBTU).

Southern California Edison

	Intensity factor			**CO_2e**
	CO_2 lbs/MWH[1]	CH_4 lbs/MWH[2]	N_2O lbs/MWH[2]	lbs/MWh
2021	390.704	0.033	0.004	**392.688**
2045	260.788	0.033	0.004	**262.772**
	Intensity factor			**CO_2e**
	CO_2 MTons/MWH[1]	CH_4 MTons/MWH[2]	N_2O MTons/MWH[2]	MTons/MWh
2021	0.177	1.50E-05	1.81E-06	**0.178**
2045	0.118	1.50E-05	1.81E-06	**0.151**

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Table G-3, Electricity Utility Greenhouse Gas Emissions Factors

Notes

In 2018, SB 100 (de León, 2018) was signed into law, which again increases the RPS to 60% by 2030 and encourages the state's electricity to come from carbon-free resources by 2045.

GHG Emissions from Energy Use

Actual Energy Use	SCE	SoCalGas
	MWH/YR	Therms
	Average	Average
Commercial	145,542	3,588,779
Industrial	0	145,030
Residential	119,257	6,632,493
City Total	264,800	10,366,302
	MTCO2e/Yr	
Commercial	25,924	19,098
Industrial	0	772
Residential	21,242	35,296
City Total	47,167	55,166

Forecast Methodlogy	Existing	Proposed Project
Residential - Dwelling Units	19,395	25,633
Nonresidential - Square footage	11,925,652	13,231,538

MWH per Unit per year	6.1	Therms per Unit per year	342
MWH per SQFT per year	0.01	Therms per SQFT per year	0.3

Electricity	Existing	Proposed Project
	MWH	
Nonresidential	145,542	161,480
Residential	119,257	157,614
Total	264,800	319,093
Electricity	**MTCO2e**	
Nonresidential	25,924	24,431
Residential	21,242	23,846
Total Electricity	**47,167**	**48,276**

Natural Gas	Existing	Proposed Project
	Therms	
Nonresidential	3,733,809	4,142,670
Residential	6,632,493	8,765,697
Total	10,366,302	12,908,366
Natural Gas	**MTCO2e**	
Nonresidential	19,870	22,046
Residential	35,296	46,648
Total Natural Gas	**55,166**	**68,694**

Criteria Air Pollutants from Natural Gas

Rate	lbs/MBTU					
Natural Gas	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Residential	0.0054	0.0922	0.0392	0.0006	0.0075	0.0075
Non-Residential	0.0054	0.0980	0.0824	0.0006	0.0075	0.0075

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Table G-4, Natural Gas Emissions Factors (pounds per MMBTU).

Fountain Valley	Existing	Proposed Project
	Therms	
Residential	6,632,493	8,765,697
Nonresidential	3,733,809	4,142,670
Total	10,366,302	12,908,366

Natural Gas	Existing lbs/day					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Residential	10	168	71	1	14	14
Nonresidential	6	100	84	1	8	8
TOTAL	15	268	156	2	21	21

Natural Gas	Proposed Project lbs/day					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Residential	13	221	94	1	18	18
Nonresidential	6	111	94	1	8	8
TOTAL	19	333	188	2	26	26

Area Sources - Consumer Products

Residential Consumer Product Use		
	Emissions = EF x Building Area	
Statewide (2008)	EF = 2.14E-05	lbs/sqft/day
South Coast AQMD Rule 1143	**EF = 1.98E-05**	**lbs/sqft/day**

Source: California Air Pollution Control Officer's Association (CAPCOA). 2022, April. California Emissions Estimator Model (CalEEMod) User's Guide Version 2022.1. https://www.caleemod.com/user-guide. Appendix D3 - Consumer Products Use.

AVERAGE HOUSING SQFT ASSUMPTIONS

Year Structure was Built	Percent of Housing Stock [a]	Average Square Feet of New Single Family Homes[b]	Average Square Feet (Weighted)
2014 or Later	0.5%	2,617	13
2010 to 2013	1.4%	2,467	35
2000 to 2009	3.2%	2,404	77
1990 to 1999	3.8%	2,116	80
1980 to 1989	10.6%	1,819	193
1970 to 1979	41.9%	1,699	712
1960 to 1969	33.2%	1,715	569
1950 to 1959	4.4%	1,715	75
1940 to 1949	0.2%	1,715	3
1939 or earlier	0.7%	1,715	12
	100%		1,770

Sources/Notes: https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/

a. United States Census Bureau, Selected Housing Characteristics, City of Fountain Valley, 2019. Table DP04. American Community Survey 5-Year Estimates, Year structure built.

b. United States Census Bureau, Characteristics of New Housing, Characteristics of New Single-Family Houses Completed, Median and Average Square Feet by Location. https://www.census.gov/construction/chars/pdf/c25ann2016.pdf

	Existing	Proposed Project
Housing Units	19,395	25,633
Residential SQFT	34,330,233	50,653,000
lbs VOC per day	680	1,003

Notes

[1] New housing units constructed post-2014 assumed to be 2,617 square feet (based on Source b).

Area Sources

Source: OFFROAD2021. https://arb.ca.gov/emfac/emissions-inventory/ Orange County Year 2021

OFFROAD Estimate based on:

Construction Equipment	Based on the percentage of housing permits in Fountain Valley compared to the Orange County (HUD 2021)
Light Commercial and Industrial Equipment	Based on the percentage of employment in Fountain Valley compared to Orange County (US Census 2021)
Lawn & Garden	Based on the percentage of housing units in Fountain Valley compared to Orange County (US Census 2021)

Sources

Construction (Housing Permits)

Source: Housing and Urban Development (HUD). 2021, Accessed October 25. SOCDS Building Permits Database. https://socds.huduser.gov/permits/

Employment

Source. U.S. Census Bureau. Longitudinal Employer-Household Dynamics. 2020 Q3. http://lehd.ces.census.gov/

Existing 2021	**ROG Exhaust**	**NO_x Exhaust**	**CO Exhaust**	**SO_2 Exhaust**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust***	**CO2**
Construction Equipment	4	36	62	0	2	2	1,066
Lawn & Garden	2	0	20	0	0	0	11
Light Commercial / Industrial Equipment	15	22	617	0	1	1	826
TOTAL	21	59	699	0	2	2	1,902

Proposed Project 2045		**ROG Exhaust**	**NO_x Exhaust**	**CO Exhaust**	**SO2 Exhaust**	**PM10 Exhaust**	**PM2.5 Exhaust***	**CO2**
	Forecast Adjusted for:	lbs/day						MT/yr
Construction Equipment	Similar to historic	4	36	62	0	2	2	1,066
Lawn & Garden	Proportional to housing growth	3	0	27	0	0	0	14
Light Commercial / Industrial Equipment	Proportional to employment growth	17	25	694	0	1	1	929
TOTAL		24	62	783	0	3	2	2,009

Orange County OFFROAD2021

Source: OFFROAD 2021 https://arb.ca.gov/emfac/emissions-inventory/

Construction includes: Over 25 horsepower, self-propelled, diesel equipment only subjected to In-Use Regulation; AND Under 25 horsepower equipment not subject to the In-Use Regulation

Model Output: OFFROAD2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2021
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Construction

Region	Calendar Year	Vehicle Category	Model Year	Horsepower Bin	Fuel	Fuel Consumption (g/yr)	ROG_tpd	NOx_tpd	CO_tpd	SOx_tpd	PM10_tpd	PM2.5_tpd	CO2_tpd	CO2e_MTY
Orange (SC)	2021	Construction and Mining - Bore/Drill Rigs	Aggregate	Aggregate	Diesel	1.83E+05	1.55E-03	1.86E-02	1.67E-02	5.20E-05	6.70E-04	6.16E-04	5.63E+00	1.86E+03
Orange (SC)	2021	Construction and Mining - Cranes	Aggregate	Aggregate	Diesel	4.32E+05	9.34E-03	1.03E-01	6.35E-02	1.23E-04	4.70E-03	4.33E-03	1.33E+01	4.41E+03
Orange (SC)	2021	Construction and Mining - Crawler Tractors	Aggregate	Aggregate	Diesel	1.07E+06	2.28E-02	2.45E-01	1.42E-01	3.04E-04	1.21E-02	1.11E-02	3.29E+01	1.09E+04
Orange (SC)	2021	Construction and Mining - Excavators	Aggregate	Aggregate	Diesel	1.92E+06	2.22E-02	2.09E-01	2.10E-01	5.47E-04	8.56E-03	7.87E-03	5.92E+01	1.96E+04
Orange (SC)	2021	Construction and Mining - Graders	Aggregate	Aggregate	Diesel	7.22E+05	1.70E-02	1.87E-01	8.83E-02	2.05E-04	7.95E-03	7.31E-03	2.23E+01	7.37E+03
Orange (SC)	2021	Construction and Mining - Misc - Asphalt Pavers	Aggregate	Aggregate	Gasoline	1.48E+04	8.58E-04	1.17E-03	4.22E-02	3.73E-06	1.79E-04	1.35E-04	3.22E-01	1.07E+02
Orange (SC)	2021	Construction and Mining - Misc - Bore/Drill Rigs	Aggregate	Aggregate	Gasoline	1.16E+04	3.01E-04	8.68E-04	1.22E-02	2.87E-06	6.26E-05	4.73E-05	2.85E-01	9.45E+01
Orange (SC)	2021	Construction and Mining - Misc - Bore/Drill Rigs	Aggregate	Aggregate	Diesel	1.03E+01	3.33E-05	2.10E-04	1.22E-04	3.01E-09	7.11E-06	5.37E-06	4.88E-07	1.62E-04
Orange (SC)	2021	Construction and Mining - Misc - Cement And Mortar Mixers	Aggregate	Aggregate	Gasoline	1.14E+04	6.23E-03	3.57E-03	1.80E-01	2.95E-06	1.55E-03	1.17E-03	6.44E-06	2.13E-03
Orange (SC)	2021	Construction and Mining - Misc - Cement And Mortar Mixers	Aggregate	Aggregate	Diesel	1.51E+01	4.09E-05	2.56E-04	1.98E-04	4.42E-09	9.05E-06	6.84E-06	6.09E-07	2.02E-04
Orange (SC)	2021	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate	Aggregate	Gasoline	4.07E+04	5.21E-03	4.27E-03	1.91E-01	1.07E-05	1.80E-03	1.36E-03	7.61E-01	2.52E+02
Orange (SC)	2021	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate	Aggregate	Diesel	4.53E+03	1.48E-04	1.00E-03	1.09E-03	1.75E-06	4.51E-05	4.13E-05	1.35E-01	4.48E+01
Orange (SC)	2021	Construction and Mining - Misc - Cranes	Aggregate	Aggregate	Gasoline	1.06E+04	3.30E-04	8.51E-04	1.64E-02	2.57E-06	1.77E-05	1.33E-05	2.54E-01	8.40E+01
Orange (SC)	2021	Construction and Mining - Misc - Crushing/Proc. Equipment	Aggregate	Aggregate	Gasoline	7.09E+01	3.23E-05	2.20E-05	1.14E-03	1.80E-08	1.32E-05	9.98E-06	4.08E-08	1.35E-05
Orange (SC)	2021	Construction and Mining - Misc - Dumpers/Tenders	Aggregate	Aggregate	Gasoline	1.54E+04	3.30E-03	2.46E-03	1.22E-01	5.71E-06	1.39E-03	1.05E-03	2.01E-01	6.67E+01
Orange (SC)	2021	Construction and Mining - Misc - Dumpers/Tenders	Aggregate	Aggregate	Diesel	1.21E+00	4.08E-06	2.58E-05	1.39E-05	3.54E-10	8.74E-07	6.61E-07	5.95E-08	1.97E-05
Orange (SC)	2021	Construction and Mining - Misc - Excavators	Aggregate	Aggregate	Diesel	8.70E+00	2.93E-05	1.85E-04	9.99E-05	2.54E-09	6.22E-06	4.70E-06	4.27E-07	1.41E-04
Orange (SC)	2021	Construction and Mining - Misc - Other	Aggregate	Aggregate	Gasoline	1.62E+04	1.43E-04	5.08E-04	1.32E-02	4.04E-06	2.92E-05	2.21E-05	4.07E-01	1.35E+02
Orange (SC)	2021	Construction and Mining - Misc - Other	Aggregate	Aggregate	Diesel	2.08E+04	6.89E-04	5.11E-03	4.00E-03	9.37E-06	1.96E-04	1.77E-04	6.22E-01	2.06E+02
Orange (SC)	2021	Construction and Mining - Misc - Pavers	Aggregate	Aggregate	Diesel	2.29E+00	7.69E-06	4.86E-05	2.62E-05	6.67E-10	1.67E-06	1.26E-06	1.12E-07	3.71E-05
Orange (SC)	2021	Construction and Mining - Misc - Paving Equipment	Aggregate	Aggregate	Gasoline	3.13E+04	1.04E-02	7.27E-03	3.23E-01	8.20E-06	3.06E-03	2.31E-03	2.91E-01	9.62E+01
Orange (SC)	2021	Construction and Mining - Misc - Paving Equipment	Aggregate	Aggregate	Diesel	3.88E+00	1.31E-05	8.26E-05	4.46E-05	1.13E-09	2.77E-06	2.10E-06	1.91E-07	6.31E-05
Orange (SC)	2021	Construction and Mining - Misc - Plate Compactors	Aggregate	Aggregate	Gasoline	1.03E+05	2.41E-02	1.73E-02	8.17E-01	4.28E-05	8.36E-03	6.32E-03	1.34E+00	4.44E+02
Orange (SC)	2021	Construction and Mining - Misc - Plate Compactors	Aggregate	Aggregate	Diesel	6.14E+03	2.05E-04	1.52E-03	1.27E-03	2.87E-06	5.85E-05	5.28E-05	1.84E-01	6.09E+01
Orange (SC)	2021	Construction and Mining - Misc - Rollers	Aggregate	Aggregate	Gasoline	4.37E+04	3.50E-03	4.74E-03	1.45E-01	1.04E-05	7.92E-04	5.98E-04	9.15E-01	3.03E+02
Orange (SC)	2021	Construction and Mining - Misc - Rollers	Aggregate	Aggregate	Diesel	6.67E+01	1.93E-04	1.21E-03	8.42E-04	1.94E-08	4.17E-05	3.15E-05	2.86E-06	9.48E-04
Orange (SC)	2021	Construction and Mining - Misc - Rough Terrain Forklifts	Aggregate	Aggregate	Gasoline	7.50E+04	2.09E-03	6.13E-03	8.86E-02	1.79E-05	1.28E-04	9.68E-05	1.84E+00	6.08E+02
Orange (SC)	2021	Construction and Mining - Misc - Rubber Tired Loaders	Aggregate	Aggregate	Gasoline	3.97E+04	1.19E-03	3.07E-03	5.60E-02	9.41E-06	6.65E-05	5.03E-05	9.55E-01	3.16E+02
Orange (SC)	2021	Construction and Mining - Misc - Rubber Tired Loaders	Aggregate	Aggregate	Diesel	1.46E+00	4.90E-06	3.10E-05	1.67E-05	4.25E-10	1.04E-06	7.87E-07	7.15E-08	2.37E-05
Orange (SC)	2021	Construction and Mining - Misc - Signal Boards	Aggregate	Aggregate	Gasoline	3.14E+03	6.08E-04	5.05E-04	2.61E-02	1.19E-06	3.26E-04	2.46E-04	3.94E-02	1.30E+01
Orange (SC)	2021	Construction and Mining - Misc - Signal Boards	Aggregate	Aggregate	Diesel	9.81E+04	3.26E-03	2.41E-02	2.03E-02	4.56E-05	9.34E-04	8.43E-04	2.94E+00	9.72E+02
Orange (SC)	2021	Construction and Mining - Misc - Skid Steer Loaders	Aggregate	Aggregate	Gasoline	1.13E+05	4.81E-03	5.62E-03	2.26E-01	2.94E-05	1.22E-03	9.22E-04	2.62E+00	8.68E+02
Orange (SC)	2021	Construction and Mining - Misc - Skid Steer Loaders	Aggregate	Aggregate	Diesel	4.56E+02	1.54E-03	9.70E-03	5.22E-03	1.33E-07	3.37E-04	2.55E-04	2.22E-05	7.36E-03
Orange (SC)	2021	Construction and Mining - Misc - Surfacing Equipment	Aggregate	Aggregate	Gasoline	9.22E+03	5.50E-03	3.85E-03	1.45E-01	2.36E-06	1.61E-03	1.21E-03	5.35E-06	1.77E-03
Orange (SC)	2021	Construction and Mining - Misc - Tampers/Rammers	Aggregate	Aggregate	Gasoline	1.92E+04	3.13E-03	2.77E-03	1.53E-01	1.04E-05	2.18E-03	1.65E-03	2.54E-01	8.40E+01
Orange (SC)	2021	Construction and Mining - Misc - Tractors/Loaders/Backhoes	Aggregate	Aggregate	Gasoline	2.55E+04	4.76E-04	1.32E-03	3.48E-02	5.96E-06	4.30E-05	3.25E-05	6.17E-01	2.04E+02

Orange County OFFROAD2021

Source: OFFROAD 2021 https://arb.ca.gov/emfac/emissions-inventory/

Construction includes: Over 25 horsepower, self-propelled, diesel equipment only subjected to In-Use Regulation; AND Under 25 horsepower equipment not subject to the In-Use Regulation

Model Output: OFFROAD2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2021
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Orange (SC)	2021 Construction and Mining - Misc - Tractors/Loaders/Backhoes	Aggregate	Aggregate	Diesel	4.15E+01	1.40E-04	8.82E-04	4.77E-04	1.21E-08	2.97E-05	2.25E-05	2.04E-06	6.74E-04
Orange (SC)	2021 Construction and Mining - Misc - Trenchers	Aggregate	Aggregate	Gasoline	8.16E+04	6.35E-03	7.99E-03	2.88E-01	2.05E-05	1.45E-03	1.09E-03	1.68E+00	5.57E+02
Orange (SC)	2021 Construction and Mining - Misc - Trenchers	Aggregate	Aggregate	Diesel	5.59E+01	1.76E-04	1.11E-03	6.73E-04	1.63E-08	3.76E-05	2.84E-05	2.58E-06	8.55E-04
Orange (SC)	2021 Construction and Mining - Off-Highway Tractors	Aggregate	Aggregate	Diesel	4.07E+05	7.18E-03	5.77E-02	5.52E-02	1.16E-04	3.05E-03	2.80E-03	1.25E+01	4.15E+03
Orange (SC)	2021 Construction and Mining - Off-Highway Trucks	Aggregate	Aggregate	Diesel	2.44E+06	3.50E-02	3.70E-01	2.18E-01	6.94E-04	1.21E-02	1.12E-02	7.52E+01	2.49E+04
Orange (SC)	2021 Construction and Mining - Other	Aggregate	Aggregate	Diesel	5.44E+05	9.70E-03	9.71E-02	6.82E-02	1.55E-04	4.78E-03	4.39E-03	1.68E+01	5.56E+03
Orange (SC)	2021 Construction and Mining - Pavers	Aggregate	Aggregate	Diesel	1.28E+05	2.18E-03	2.22E-02	1.89E-02	3.65E-05	1.17E-03	1.08E-03	3.95E+00	1.31E+03
Orange (SC)	2021 Construction and Mining - Paving Equipment	Aggregate	Aggregate	Diesel	7.46E+04	1.16E-03	1.20E-02	1.05E-02	2.12E-05	5.76E-04	5.30E-04	2.30E+00	7.61E+02
Orange (SC)	2021 Construction and Mining - Rollers	Aggregate	Aggregate	Diesel	3.32E+05	7.20E-03	5.89E-02	6.30E-02	9.46E-05	3.37E-03	3.10E-03	1.02E+01	3.39E+03
Orange (SC)	2021 Construction and Mining - Rough Terrain Forklifts	Aggregate	Aggregate	Diesel	3.61E+05	3.66E-03	4.60E-02	6.65E-02	1.03E-04	1.79E-03	1.65E-03	1.11E+01	3.69E+03
Orange (SC)	2021 Construction and Mining - Rubber Tired Dozers	Aggregate	Aggregate	Diesel	2.13E+05	6.73E-03	6.73E-02	4.74E-02	6.06E-05	3.36E-03	3.09E-03	6.57E+00	2.18E+03
Orange (SC)	2021 Construction and Mining - Rubber Tired Loaders	Aggregate	Aggregate	Diesel	2.94E+06	5.25E-02	5.20E-01	3.46E-01	8.35E-04	2.29E-02	2.10E-02	9.05E+01	3.00E+04
Orange (SC)	2021 Construction and Mining - Scrapers	Aggregate	Aggregate	Diesel	1.91E+06	3.44E-02	3.92E-01	2.48E-01	5.43E-04	1.57E-02	1.45E-02	5.89E+01	1.95E+04
Orange (SC)	2021 Construction and Mining - Skid Steer Loaders	Aggregate	Aggregate	Diesel	3.50E+05	4.23E-03	5.08E-02	6.67E-02	9.95E-05	2.01E-03	1.85E-03	1.08E+01	3.57E+03
Orange (SC)	2021 Construction and Mining - Surfacing Equipment	Aggregate	Aggregate	Diesel	4.01E+04	4.03E-04	5.24E-03	3.44E-03	1.14E-05	2.00E-04	1.84E-04	1.24E+00	4.10E+02
Orange (SC)	2021 Construction and Mining - Tractors/Loaders/Backhoes	Aggregate	Aggregate	Diesel	2.67E+06	4.40E-02	4.33E-01	4.81E-01	7.60E-04	2.33E-02	2.15E-02	8.23E+01	2.73E+04
Orange (SC)	2021 Construction and Mining - Trenchers	Aggregate	Aggregate	Diesel	1.10E+05	3.19E-03	2.47E-02	2.05E-02	3.14E-05	1.54E-03	1.42E-03	3.40E+00	1.13E+03
TOTAL CONSTRUCTION OFFROAD					1.76E+07	3.70E-01	3.04E+00	5.15E+00	5.04E-03	1.56E-01	1.39E-01	5.36E+02	1.77E+05
ESTIMATED FOUNTAIN VALLEY (g/yr; tpd; MTY)					105,954	2.22E-03	1.82E-02	3.09E-02	3.03E-05	9.36E-04	8.37E-04	3.22E+00	1,066
ESTIMATED FOUNTAIN VALLEY (lbs/day)						4	36	62	0	2	2		

TOTAL HOUSING PERMITS: https://socds.huduser.gov/permits/						
	2016	**2017**	**2018**	**2019**	**2020**	**Average**
Orange County	11,523	9,510	7,515	8,989	6,027	8,713
Fountain Valley	8	16	11	130	39	52
Percent in the City	0.1%	0.2%	0.1%	1.4%	0.6%	0.6%

Orange County OFFROAD2021

Source: OFFROAD 2021 https://arb.ca.gov/emfac/emissions-inventory/

Construction includes: Over 25 horsepower, self-propelled, diesel equipment only subjected to In-Use Regulation; AND Under 25 horsepower equipment not subject to the In-Use Regulation

Model Output: OFFROAD2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2021
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Lawn and Garden

Region	Calendar Year	Vehicle Category	Model Year	Horsepower Bin	Fuel	Fuel Consumption (g/yr)	ROG_tpd	NOx_tpd	CO_tpd	SOx_tpd	PM10_tpd	PM2.5_tpd	CO2_tpd	CO2e_MTY
Orange (SC)	2021	Lawn and Garden - Misc - Chainsaws	Aggregate	Aggregate	Gasoline	1.01E+05	1.23E-01	3.75E-03	3.36E-01	2.57E-05	1.43E-03	1.08E-03	1.78E+00	5.88E+02
Orange (SC)	2021	Lawn and Garden - Misc - Chainsaws	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Chainsaws Preempt	Aggregate	Aggregate	Gasoline	5.93E+04	1.10E-01	3.58E-03	1.81E-01	1.52E-05	7.70E-04	5.82E-04	9.57E-01	3.17E+02
Orange (SC)	2021	Lawn and Garden - Misc - Chainsaws Preempt	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	Aggregate	Gasoline	1.10E+03	1.79E-04	5.89E-05	7.75E-03	2.84E-07	4.52E-07	3.42E-07	1.66E-02	5.50E+00
Orange (SC)	2021	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	Aggregate	Diesel	6.27E+01	2.76E-06	1.46E-05	7.88E-06	1.83E-08	4.91E-07	3.71E-07	1.91E-03	6.34E-01
Orange (SC)	2021	Lawn and Garden - Misc - Chippers/Stump Grinders	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Lawn Mowers	Aggregate	Aggregate	Gasoline	2.48E+05	3.80E-02	1.98E-02	1.55E+00	6.64E-05	6.85E-04	5.18E-04	4.08E+00	1.35E+03
Orange (SC)	2021	Lawn and Garden - Misc - Lawn Mowers	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	Aggregate	Gasoline	2.63E+05	2.09E-01	6.82E-03	9.72E-01	6.70E-05	2.81E-03	2.12E-03	4.87E+00	1.61E+03
Orange (SC)	2021	Lawn and Garden - Misc - Leaf Blowers/Vacuums	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Other	Aggregate	Aggregate	Gasoline	5.29E+03	7.00E-04	2.62E-04	3.62E-02	1.37E-06	2.30E-06	1.74E-06	8.26E-02	2.74E+01
Orange (SC)	2021	Lawn and Garden - Misc - Other	Aggregate	Aggregate	Diesel	3.14E+01	1.21E-06	7.01E-06	5.59E-06	9.16E-09	2.45E-07	1.85E-07	9.56E-04	3.17E-01
Orange (SC)	2021	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	Aggregate	Gasoline	4.45E+05	7.10E-02	3.22E-02	3.29E+00	1.14E-04	3.60E-04	2.72E-04	6.52E+00	2.16E+03
Orange (SC)	2021	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	Aggregate	Diesel	2.52E+04	1.07E-03	5.80E-03	3.60E-03	7.36E-06	1.97E-04	1.49E-04	7.70E-01	2.55E+02
Orange (SC)	2021	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Snowblowers	Aggregate	Aggregate	Gasoline	2.20E+03	2.94E-04	1.30E-04	1.73E-02	5.86E-07	1.06E-06	7.98E-07	3.09E-02	1.02E+01
Orange (SC)	2021	Lawn and Garden - Misc - Snowblowers	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Tillers	Aggregate	Aggregate	Gasoline	4.84E+03	1.65E-03	2.49E-04	2.91E-02	1.29E-06	3.72E-06	2.81E-06	7.89E-02	2.61E+01
Orange (SC)	2021	Lawn and Garden - Misc - Tillers	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	Aggregate	Gasoline	1.97E+05	1.33E-01	7.61E-03	7.52E-01	5.04E-05	1.07E-03	8.06E-04	3.68E+00	1.22E+03
Orange (SC)	2021	Lawn and Garden - Misc - Trimmers/Edgers/Brush Cutters	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Lawn and Garden - Misc - Wood Splitters	Aggregate	Aggregate	Gasoline	4.43E+04	7.86E-03	3.16E-03	2.99E-01	1.15E-05	3.81E-05	2.88E-05	6.92E-01	2.29E+02
TOTAL LAWN & GARDEN						1.40E+06	6.96E-01	8.34E-02	7.48E+00	3.61E-04	7.36E-03	5.56E-03	2.36E+01	7.80E+03
ESTIMATED FOUNTAIN VALLEY						1,905	0	0	0	0	0	0	0	11
ESTIMATED FOUNTAIN VALLEY (lbs/day)							2	0	20	0	0	0	64	

HOUSING UNITS		Existing
Housing Units in Orange County (2020)		14,210,945
Housing Units in Fountain Valley		19,395
Percent in the City		0.1%

Orange County OFFROAD2021

Source: OFFROAD 2021 https://arb.ca.gov/emfac/emissions-inventory/

Construction includes: Over 25 horsepower, self-propelled, diesel equipment only subjected to In-Use Regulation; AND Under 25 horsepower equipment not subject to the In-Use Regulation

Model Output: OFFROAD2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2021
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Lawn and Garden

Region	Calendar Year	Vehicle Category	Model Year	Horsepower Bin	Fuel	Fuel Consumption (g/yr)	ROG_tpd	NOx_tpd	CO_tpd	SOx_tpd	PM10_tpd	PM2.5_tpd	CO2_tpd	CO2e_MTY
Orange (SC)	2021	Light Commercial - Misc - Air Compressors	Aggregate	Aggregate	Gasoline	7.24E+05	5.73E-02	5.44E-02	3.28E+00	1.79E-04	7.11E-04	5.95E-04	1.39E+01	4.61E+03
Orange (SC)	2021	Light Commercial - Misc - Air Compressors	Aggregate	Aggregate	Diesel	9.13E+04	3.48E-03	2.01E-02	2.38E-02	3.51E-05	1.00E-03	9.23E-04	2.72E+00	9.02E+02
Orange (SC)	2021	Light Commercial - Misc - Air Compressors	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Light Commercial - Misc - Gas Compressors	Aggregate	Aggregate	Nat Gas	1.22E+06	0.00E+00	6.97E-02	8.17E-01	0.00E+00	0.00E+00	0.00E+00	2.23E+01	7.38E+03
Orange (SC)	2021	Light Commercial - Misc - Generator Sets	Aggregate	Aggregate	Gasoline	1.19E+06	1.58E-01	9.53E-02	4.98E+00	3.15E-04	1.33E-03	1.19E-03	2.34E+01	7.74E+03
Orange (SC)	2021	Light Commercial - Misc - Generator Sets	Aggregate	Aggregate	Diesel	2.76E+05	7.54E-03	5.76E-02	5.53E-02	1.04E-04	2.35E-03	2.24E-03	8.28E+00	2.74E+03
Orange (SC)	2021	Light Commercial - Misc - Generator Sets	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Light Commercial - Misc - Generator Sets	Aggregate	Aggregate	Nat Gas	3.93E+04	0.00E+00	2.53E-03	2.04E-02	0.00E+00	0.00E+00	0.00E+00	7.27E-01	2.41E+02
Orange (SC)	2021	Light Commercial - Misc - Pressure Washers	Aggregate	Aggregate	Gasoline	2.86E+05	3.60E-02	1.58E-02	2.09E+00	7.31E-05	7.71E-05	9.85E-05	4.26E+00	1.41E+03
Orange (SC)	2021	Light Commercial - Misc - Pressure Washers	Aggregate	Aggregate	Diesel	1.34E+03	2.80E-05	2.73E-04	2.36E-04	5.08E-07	9.62E-06	9.32E-06	4.05E-02	1.34E+01
Orange (SC)	2021	Light Commercial - Misc - Pressure Washers	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Light Commercial - Misc - Pumps	Aggregate	Aggregate	Gasoline	3.33E+05	1.45E-02	1.70E-02	6.73E-01	8.40E-05	4.97E-04	3.87E-04	7.71E+00	2.55E+03
Orange (SC)	2021	Light Commercial - Misc - Pumps	Aggregate	Aggregate	Diesel	1.60E+05	4.75E-03	3.36E-02	3.36E-02	6.05E-05	1.43E-03	1.36E-03	4.79E+00	1.59E+03
Orange (SC)	2021	Light Commercial - Misc - Pumps	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Orange (SC)	2021	Light Commercial - Misc - Welders	Aggregate	Aggregate	Gasoline	4.62E+05	3.05E-02	3.03E-02	1.59E+00	1.18E-04	5.99E-04	4.88E-04	9.66E+00	3.20E+03
Orange (SC)	2021	Light Commercial - Misc - Welders	Aggregate	Aggregate	Diesel	4.27E+05	1.52E-02	9.25E-02	1.04E-01	1.64E-04	4.46E-03	4.14E-03	1.28E+01	4.22E+03
Orange (SC)	2021	Light Commercial - Misc - Welders	Aggregate	Aggregate	Electric	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL LIGHT COMMERCIAL + INDUSTRIAL OFFROAD						5.22E+06	3.27E-01	4.89E-01	1.37E+01	1.13E-03	1.25E-02	1.14E-02	1.11E+02	3.66E+04
ESTIMATED FOUNTAIN VALLEY						1.18E+05	7.39E-03	1.10E-02	3.08E-01	2.56E-05	2.81E-04	2.58E-04	2.49E+00	826
ESTIMATED FOUNTAIN VALLEY (lbs/day)							15	22	617	0	1	1	4,988	

EMPLOYMENT: http://lehd.ces.census.gov/		**2021**
Employment in Orange County (Q1)		1,439,359
Employment in Fountain Valley		32,485
Percent in the City		2%

Data Input: Landfill Characteristics

Landfill Name:	Frank Bowerman	**Year Opened:**		Click for lists of k values	
State/Country:	CA	**If Closed, Year:**		**k Value:**	0.020
City/County:	Fountain Valley			**M Value:**	6

Data Input: Waste Deposit History

	Waste			Daily Cover			
	Waste Deposited			Greenwaste & Compost		Sludge	
Year	Tons	% ANDOC		Tons	% ANDOC	Tons	% ANDOC
1952							
1953							
1954							
1955							
1956							
1957							
1958							
1959							
1960	67,995	9.52%					
1961							
1962							
1963							
1964							
1965							
1966							
1967							
1968							
1969							
1970							
1971							
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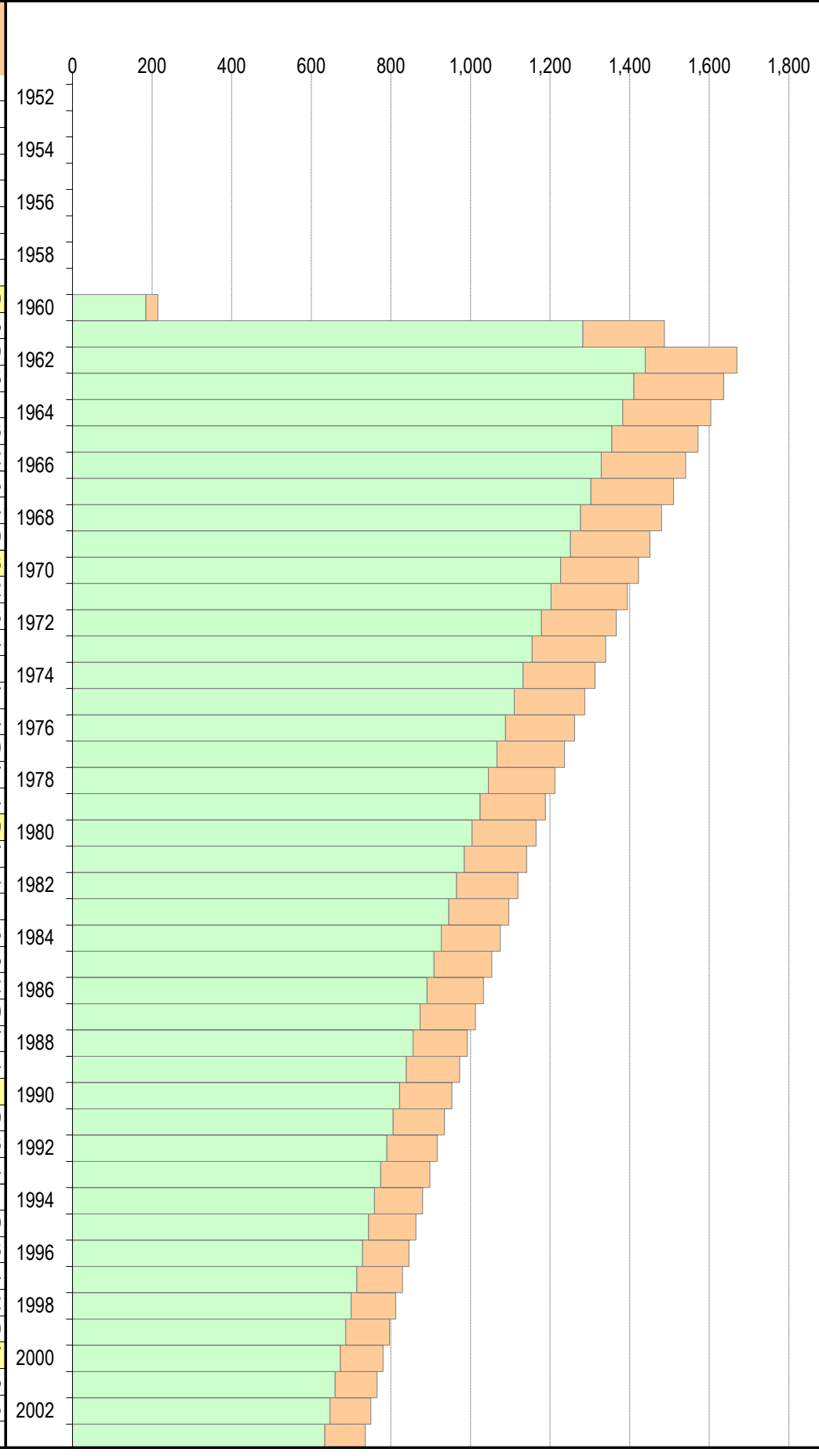
1995							
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							

Model Output: Landfill Characteristics

Landfill Name: Frank Bowerm
State: CA
City/County: Fountain Valley
Year Opened:
If Closed, Year:
k Value: 0.020
M Value: 6

Model Output: Methane and Carbon Dioxide Emissions (metric tonnes of CO_2 equivalent)

Year	CH_4	CO_2
1952		
1953		
1954		
1955		
1956		
1957		
1958		
1959		
1960	185	30
1961	1,282	205
1962	1,439	230
1963	1,411	225
1964	1,383	221
1965	1,355	216
1966	1,329	212
1967	1,302	208
1968	1,276	204
1969	1,251	200
1970	1,226	196
1971	1,202	192
1972	1,178	188
1973	1,155	184
1974	1,132	181
1975	1,110	177
1976	1,088	174
1977	1,066	170
1978	1,045	167
1979	1,024	164
1980	1,004	160
1981	984	157
1982	965	154
1983	946	151
1984	927	148
1985	909	145
1986	891	142
1987	873	139
1988	856	137
1989	839	134
1990	822	131
1991	806	129
1992	790	126
1993	774	124
1994	759	121
1995	744	119
1996	729	116
1997	715	114
1998	701	112
1999	687	110
2000	673	107
2001	660	105
2002	647	103
2003	634	101

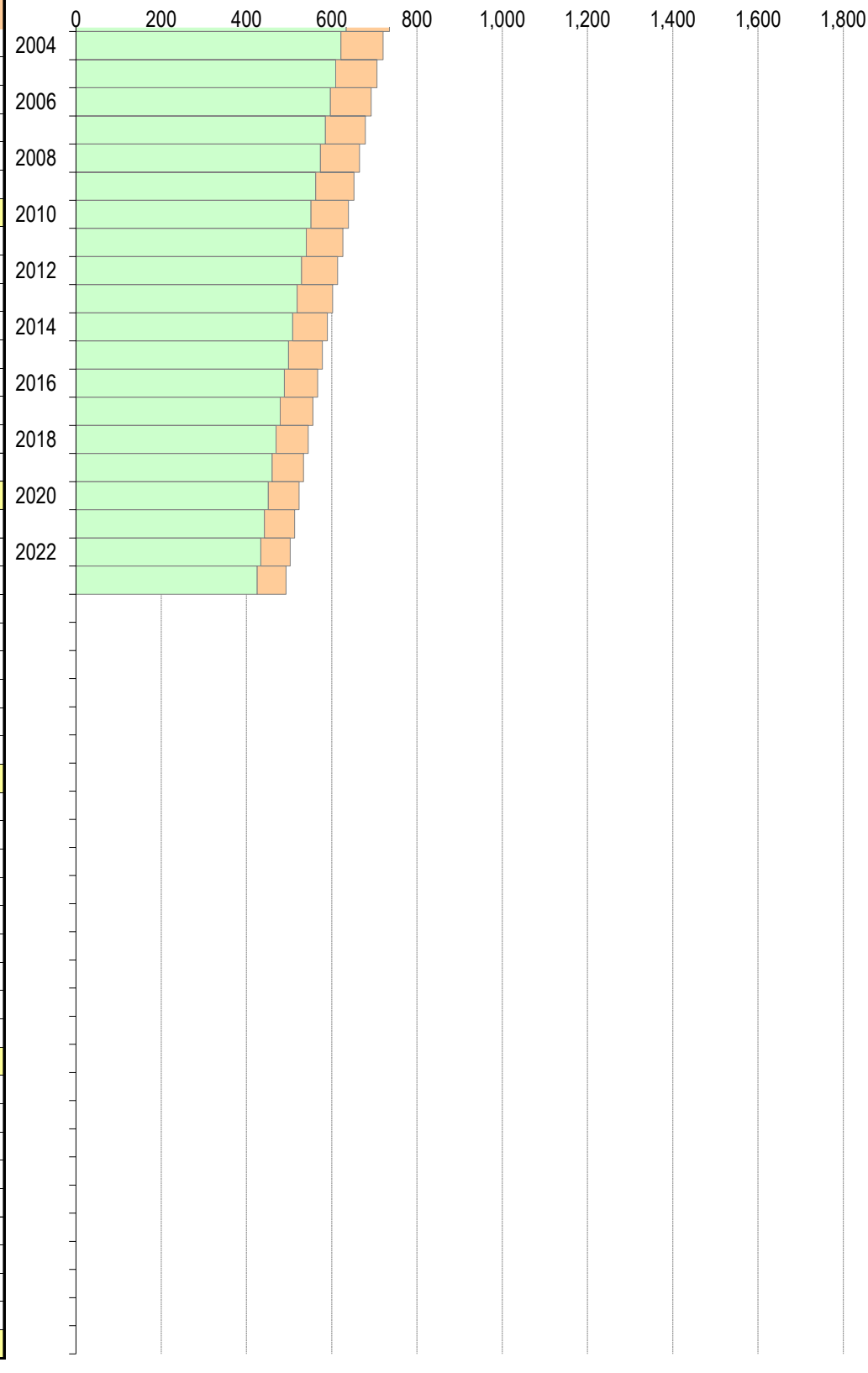


Model Output: Landfill Characteristics

Landfill Name: Frank Bowerm
State: CA
City/County: Fountain Valley
Year Opened:
If Closed, Year:
k Value: 0.020
M Value: 6

Model Output: Methane and Carbon Dioxide Emissions (metric tonnes of CO_2 equivalent)

Year	CH_4	CO_2
2004	621	99
2005	609	97
2006	597	95
2007	585	93
2008	574	92
2009	562	90
2010	551	88
2011	540	86
2012	529	85
2013	519	83
2014	509	81
2015	499	80
2016	489	78
2017	479	77
2018	470	75
2019	460	74
2020	451	72
2021	442	71
2022	433	69
2023	425	68



Solid Waste Disposal

Source: CalRecycle Recycling and Disposal Reporting System Report (Overall Jurisdiction Tons For Disposal and Disposal Related Uses)

Waste Generated Within Fountain Valley

Year	Quarter	Landfill
2021	1	16,460
2021	2	16,268
2021	3	18,497
2021	4	16,769
Total 2021		67,995

Service Population in Fountain Valley

Existing 2021	Proposed GP 2045	% Increase
90,080	110,210	22%

Percent of Disposal	2021	
Frank R. Bowerman Sanitary LF	72%	*primary disposal facility*

Notes:

Source (Post 2019): CalRecycle. 2022, April (accessed). RDRS Report 1: Overall Jurisdiction Tons for Disposal and Disposal Related Uses. https://www2.calrecycle.ca.gov/RecyclingDisposalReporting/Reports/OverallJurisdictionTonsForDisposal

Landfill Emission Tool (version 1.09.24.2021) CH_4 Model Results.

Based on the Frank Bowerman LF (Irvine) Landfill K-Factor

	EXISTING		**Proposed Project**	
	CH_4 Tons	$MTCO_2e$ w/LFG Capture 2021 TOTAL	CH_4 Tons	$MTCO_2e$ w/LFG Capture 2045 TOTAL
Year 1	185	1,173	226	1,435
Year 2	1,282	8,143	1,569	9,962
Year 3 (PEAK)	**1,439**	**9,139**	**1,761**	**11,181**
Year 4	1,411	8,958	1,726	10,960
Year 5	1,383	8,781	1,692	10,743
Year 6	1,355	8,607	1,658	10,530
Year 7	1,329	8,436	1,625	10,322
Year 8	1,302	8,269	1,593	10,117
Year 9	1,276	8,106	1,562	9,917
Year 10	1,251	7,945	1,531	9,721
Year 11	1,226	7,788	1,500	9,528
Year 12	1,202	7,634	1,471	9,340
Year 13	1,178	7,482	1,442	9,155
Year 14	1,155	7,334	1,413	8,973
Year 15	1,132	7,189	1,385	8,796
Year 16	1,110	7,047	1,358	8,621
Year 17	1,088	6,907	1,331	8,451
Year 18	1,066	6,770	1,304	8,283
Year 19	1,045	6,636	1,279	8,119
Year 20	1,024	6,505	1,253	7,959
Year 21	1,004	6,376	1,228	7,801
Year 22	984	6,250	1,204	7,647
Year 23	965	6,126	1,180	7,495
Year 24	946	6,005	1,157	7,347
Year 25	927	5,886	1,134	7,201
Year 26	909	5,769	1,112	7,059
Year 27	891	5,655	1,090	6,919
Year 28	873	5,543	1,068	6,782
Year 29	856	5,433	1,047	6,648
Year 30	839	5,326	1,026	6,516

Year 31	822	5,220	1,006	6,387
Year 32	806	5,117	986	6,260
Year 33	790	5,016	966	6,137
Year 34	774	4,916	947	6,015
Year 35	759	4,819	928	5,896
Year 36	744	4,724	910	5,779
Year 37	729	4,630	892	5,665
Year 38	715	4,538	874	5,553
Year 39	701	4,448	857	5,443
Year 40	687	4,360	840	5,335
Year 41	673	4,274	823	5,229
Year 42	660	4,189	807	5,126
Year 43	647	4,106	791	5,024
Year 44	634	4,025	776	4,925
Year 45	621	3,945	760	4,827
Year 46	609	3,867	745	4,732
Year 47	597	3,791	730	4,638
Year 48	585	3,716	716	4,546
Year 49	574	3,642	702	4,456
Year 50	562	3,570	688	4,368
Year 51	551	3,499	674	4,281
Year 52	540	3,430	661	4,197
Year 53	529	3,362	648	4,113
Year 54	519	3,296	635	4,032
Year 55	509	3,230	622	3,952
Year 56	499	3,166	610	3,874
Year 57	489	3,104	598	3,797
Year 58	479	3,042	586	3,722
Year 59	470	2,982	575	3,648
Year 60	460	2,923	563	3,576
60 YR Avg (Average Annual)	**856**	**5,436**	**1,047**	**6,651**

Waste. Landfill Emissions Tool Version 1.09.24.2021. and data from CalRecycle. Biogenic CO_2 emissions are not included.

Notes

LFG capture Efficiency	0.75	AR5 CH_4 GWP	28	Tons to metric Tons	0.9071847

Waste generation based on three year average waste commitment for Fountain Valley obtained from CalRecycle.

Significant CH_4 production typically begins one or two years after waste disposal in a landfill and continues for 10 to 60 years or longer. Consequently, the highest CH_4 emissions from waste disposal in a given year are reported.

Decomposition based on an average annual rainfall of 13.69 inches per year average (anaerobic decomposition factor (k) of 0.02) for the Frank Bowerman LF.

The Landfill Gas Estimator only includes the landfill gas (LFG) capture in the landfill gas heat output and therefore the reduction and emissions from landfill gas capture are calculated separately. Assumes 75 percent of fugitive GHG emissions are captured within the landfill's Landfill Gas Capture System with a landfill gas capture efficiency of 75 percent. The Landfill gas capture efficiency is based on the California Air Resources Board's (CARB) Local Government Operations Protocol (LGOP), Version 1.3.

Biogenic CO_2 emissions are not included.

Refrigerants

	Refrigerants	$MTCO_2e$	
	2019 Statewide Refrigerant Use (AR4)	$MTCO_2e$	18,618,116
	US Census April 2020 California Population	People	39,538,223
		MT/person	0.47

	Existing	Proposed Project
Population	57,595	73,668
MTCO2e	27,121	34,689

Source: CARB. Greenhouse Gas Emissions Inventory Query Tool for years 2000 to 2019 (14th Edition) - Query Results. Main Activity: Use of substitutes for ozone depleting substances Activity Subset: Refrigeration and Air Conditioning. AR 4. https://ww2.arb.ca.gov/applications/greenhouse-gas-emission-inventory-0

City of Fountain Valley VMT

Source: F&P 2022. Based on the Orange County Transportation Analysis Model (OCTAM)

	Daily VMT			Total Daily VMT	Total with RTAC	Service Population	VMT/SP	VMT/SP w RTAC
	IX	XI	II					
Existing (Year 2021)	1,298,304	1,293,734	77,997	2,670,035	1,374,016	90,080	29.6	15.3
Current GP (in 2045)	1,451,747	1,457,627	87,706	2,997,080	1,542,393	98,130	30.5	15.7
GP Update (2045)	1,465,520	1,473,792	92,540	3,031,852	1,562,196	110,210	27.5	14.2

Notes: Total may not add to 100% due to rounding.

IX = Internal-External

XI = External- Internal

II = Internal-Internal

Modeling of vehicle miles traveled (VMT) provided by Fehr and Peers is based on OCTA's OCTAM. VMT from passenger vehicles and trucks that have an origin or destination in the City using a transportation origin-destination methodology. Accounting of VMT is based on the recommendations of CARB's Regional Targets Advisory Committee (RTAC) created under Senate Bill 375 (SB 375). For accounting purposes, there are three types of trips:

» Vehicle trips that originated and terminated within the City (Internal-Internal, I-I). Using the accounting rules established by RTAC, 100 percent of the length of these trips, and their emissions, are attributed to the City.

» Vehicle trips that either originated or terminated (but not both) within the City (Internal-External or External-Internal, I-X and X-I). Using the accounting rules established by RTAC, 50 percent of the trip length for these trips is attributed to the City.

» Vehicle trips that neither originated nor terminated within the City. These trips are commonly called pass-through trips (External-External, X-X). Using the accounting rules established by RTAC, these trips are not counted towards the City's VMT or emissions.

FOUNTAIN VALLEY — TRANSPORTATION SECTOR

Source: EMFAC2021 V 1.0.3, Web Database - Emissions Rates. Orange County (South Coast AQMD) Sub Area. Based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) Global Warming Potentials (GWPs)

Note: MTons = metric tons; CO_2e = carbon dioxide-equivalent.

Criteria Air Pollutant Emissions

	lbs/day					
	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Existing (2021)	91	601	2,779	11	163	71
Existing (2045)	43	268	1,550	7	156	64
Proposed General Plan (2045)	49	305	1,762	8	177	73
Change from Existing Land Uses (2045)	**6**	**37**	**212**	**1**	**21**	**9**
Change from Existing Conditions (2021)	-42	-296	-1,017	-2	15	2
Current General Plan (2045)	48	301	1,740	8	175	72
Change from Current General Plan	1	4	22	0	2	1

GHG EMISSIONS

	MTons/year			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Existing (2021)	169,900	7	7	171,891
Proposed General Plan (2045)	132,571	6	6	134,279
Change from Existing	**-37,329**	**-1**	**-1**	**-37,612**
Current General Plan (2045)	130,890	6	6	132,577
Change from Current General Plan	1,681	0	0	1,702

Note: MTons = metric tons; CO_2e = carbon dioxide-equivalent.

Year 2021 Existing: Criteria Air Pollutants

Source: EMFAC2021 Version 1.0.3 web database. Emission Rates. Orange County (South Coast Air Basin) Subregion

Daily VMT	1,374,016								lbs/day
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
All Other Buses	Diesel	0.03%	0.03%	0.1195	2.6584	0.4163	0.0089	0.1977	0.1156
LDA	Gasoline	53.70%	53.70%	16.9595	63.1015	1,129.587	4.3669	75.4734	31.3357
LDA	Diesel	0.52%	0.52%	0.2704	1.1046	3.9321	0.0312	0.8261	0.3956
LDA	Electricity	1.05%	1.05%	0.0000	0.0000	0.0000	0.0000	1.4286	0.5667
LDT1	Gasoline	5.60%	5.60%	4.6247	17.1643	214.9577	0.5289	7.9838	3.3694
LDT1	Diesel	0.00%	0.00%	0.0074	0.0362	0.0403	0.0001	0.0074	0.0062
LDT1	Electricity	0.03%	0.03%	0.0000	0.0000	0.0000	0.0000	0.0440	0.0174
LDT2	Gasoline	18.47%	18.47%	9.1508	41.5457	516.0676	1.9026	25.9452	10.7653
LDT2	Diesel	0.13%	0.13%	0.0701	0.1610	0.5937	0.0106	0.1937	0.0883
LDT2	Electricity	0.12%	0.12%	0.0000	0.0000	0.0000	0.0000	0.1661	0.0659
LHD1	Gasoline	1.47%	1.47%	1.2791	8.4525	30.9335	0.3531	3.8046	1.5928
LHD1	Diesel	1.03%	1.03%	2.2526	52.8441	12.3016	0.1394	3.2413	1.5826
LHD2	Gasoline	0.25%	0.25%	0.1485	1.4690	3.7765	0.0687	0.7384	0.3095
LHD2	Diesel	0.39%	0.39%	0.7811	16.6498	4.1545	0.0588	1.3881	0.6689
MCY	Gasoline	0.45%	0.45%	32.8355	15.3136	258.2664	0.0290	0.2443	0.1096
MDV	Gasoline	12.26%	12.26%	9.2796	38.7274	424.0901	1.5568	17.2584	7.1774
MDV	Diesel	0.29%	0.29%	0.1275	0.4828	2.1848	0.0318	0.4424	0.2017
MDV	Electricity	0.05%	0.05%	0.0000	0.0000	0.0000	0.0000	0.0713	0.0283
MH	Gasoline	0.07%	0.07%	0.1160	0.7925	3.3159	0.0358	0.3106	0.1299
MH	Diesel	0.03%	0.03%	0.0680	3.6742	0.2931	0.0087	0.2294	0.1441
Motor Coach	Diesel	0.02%	0.02%	0.0941	2.2198	0.3706	0.0082	0.1275	0.0768
OBUS	Gasoline	0.05%	0.05%	0.0873	0.6725	2.2399	0.0243	0.2102	0.0875
PTO	Diesel	0.03%	0.03%	0.3244	6.7600	1.1423	0.0206	0.0860	0.0823
SBUS	Gasoline	0.02%	0.02%	0.0680	0.4543	1.5504	0.0061	0.5269	0.2253
SBUS	Diesel	0.04%	0.04%	0.2109	12.4909	0.5648	0.0160	1.1063	0.5176
T6 Ag	Diesel	0.00%	0.00%	0.0005	0.0038	0.0014	0.0000	0.0004	0.0004
T6 CAIRP heavy	Diesel	0.02%	0.02%	0.0176	0.7696	0.0816	0.0050	0.0960	0.0458
T6 CAIRP small	Diesel	0.00%	0.00%	0.0041	0.1223	0.0164	0.0007	0.0139	0.0071
T6 instate construction heavy	Diesel	0.03%	0.03%	0.1395	3.1121	0.4767	0.0086	0.2085	0.1298
T6 instate construction small	Diesel	0.16%	0.16%	0.6796	12.9433	2.4001	0.0445	1.0919	0.6751
T6 instate heavy	Diesel	0.67%	0.67%	1.8062	43.9965	6.6216	0.1773	3.9847	2.2335
T6 instate small	Diesel	1.06%	1.06%	3.6775	75.3783	13.2849	0.2957	6.8445	4.0618
T6 OOS heavy	Diesel	0.01%	0.01%	0.0081	0.4089	0.0407	0.0028	0.0538	0.0252
T6 OOS small	Diesel	0.00%	0.00%	0.0024	0.0727	0.0098	0.0004	0.0083	0.0042
T6 Public	Diesel	0.01%	0.01%	0.0238	2.6434	0.0759	0.0044	0.0786	0.0410
T6 utility	Diesel	0.01%	0.01%	0.0010	0.1442	0.0106	0.0016	0.0272	0.0116
T6TS	Gasoline	0.44%	0.44%	0.5421	4.1018	14.2427	0.2208	1.9079	0.7948
T7 Ag	Diesel	0.00%	0.00%	0.0002	0.0027	0.0007	0.0000	0.0002	0.0001
T7 CAIRP	Diesel	0.19%	0.19%	0.3097	16.2479	1.6773	0.0713	0.7398	0.3774
T7 CAIRP construction	Diesel	0.02%	0.02%	0.0342	1.8044	0.1865	0.0084	0.0836	0.0424
T7 NNOOS	Diesel	0.23%	0.23%	0.3124	16.1057	1.8324	0.0826	0.8935	0.4521
T7 NOOS	Diesel	0.07%	0.07%	0.1010	6.1358	0.5896	0.0280	0.2827	0.1407
T7 POLA	Diesel	0.18%	0.18%	0.7889	27.5637	2.5792	0.0817	0.7446	0.3959
T7 Public	Diesel	0.02%	0.02%	0.0580	6.9192	0.2473	0.0105	0.1067	0.0620
T7 Single	Diesel	0.18%	0.18%	0.7516	20.1665	2.9885	0.0730	0.9324	0.5833
T7 single construction	Diesel	0.05%	0.05%	0.2559	7.3714	0.9953	0.0225	0.2951	0.1891
T7 SWCV	Diesel	0.01%	0.01%	0.0033	7.6027	0.0133	0.0209	0.0513	0.0227
T7 SWCV	Natural Gas	0.04%	0.04%	0.3791	3.4425	15.5586	0.0000	0.1195	0.0471
T7 tractor	Diesel	0.29%	0.29%	1.2500	36.2949	5.0025	0.1177	1.4538	0.8781
T7 tractor construction	Diesel	0.04%	0.04%	0.2239	6.2171	0.8568	0.0187	0.2326	0.1456
T7 utility	Diesel	0.00%	0.00%	0.0005	0.0630	0.0057	0.0006	0.0046	0.0019
T7IS	Gasoline	0.00%	0.00%	0.0205	0.1545	0.9692	0.0007	0.0027	0.0011
UBUS	Gasoline	0.02%	0.02%	0.0149	0.2749	0.3175	0.0151	0.0938	0.0389
UBUS	Diesel	0.00%	0.00%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UBUS	Natural Gas	0.09%	0.09%	0.3631	13.8281	97.0126	0.0000	0.3024	0.1217
		100.00%	100.00%	91	601	2,779	11	163	71

Year 2021 Existing: Greenhouse Gas Emissions

Source: EMFAC2021 Version 1.0.3 web database. Orange County (South Coast Air Basin) Subregion

Adjusted Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the 2008 Climate Change Scoping Plan Measure Documentation Supplement.

				CO_2	CH_4	N_2O	
				AR5 GWP	AR5 GWP	AR5 GWP	
Annual VMT 476,783,552				1	28	265	
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
All Other Buses	Diesel	0.03%	0.03%	148	0.001	0.023	154
LDA	Gasoline	53.70%	53.70%	69,458	0.700	1.157	69,785
LDA	Diesel	0.52%	0.52%	519	0.002	0.082	541
LDA	Electricity	1.05%	1.05%	0	0.000	0.000	0
LDT1	Gasoline	5.60%	5.60%	8,412	0.167	0.211	8,472
LDT1	Diesel	0.00%	0.00%	2	0.000	0.000	2
LDT1	Electricity	0.03%	0.03%	0	0.000	0.000	0
LDT2	Gasoline	18.47%	18.47%	30,263	0.362	0.571	30,424
LDT2	Diesel	0.13%	0.13%	176	0.001	0.028	183
LDT2	Electricity	0.12%	0.12%	0	0.000	0.000	0
LHD1	Gasoline	1.47%	1.47%	5,616	0.043	0.084	5,639
LHD1	Diesel	1.03%	1.03%	2,321	0.016	0.365	2,418
LHD2	Gasoline	0.25%	0.25%	1,093	0.005	0.016	1,097
LHD2	Diesel	0.39%	0.39%	978	0.006	0.154	1,019
MCY	Gasoline	0.45%	0.45%	461	0.757	0.140	520
MDV	Gasoline	12.26%	12.26%	24,762	0.336	0.490	24,901
MDV	Diesel	0.29%	0.29%	530	0.001	0.083	552
MDV	Electricity	0.05%	0.05%	0	0.000	0.000	0
MH	Gasoline	0.07%	0.07%	569	0.004	0.008	571
MH	Diesel	0.03%	0.03%	145	0.000	0.023	151
Motor Coach	Diesel	0.02%	0.02%	137	0.001	0.022	143
OBUS	Gasoline	0.05%	0.05%	387	0.003	0.005	388
PTO	Diesel	0.03%	0.03%	343	0.002	0.054	358
SBUS	Gasoline	0.02%	0.02%	97	0.002	0.004	98
SBUS	Diesel	0.04%	0.04%	267	0.002	0.042	278
T6 Ag	Diesel	0.00%	0.00%	0	0.000	0.000	0
T6 CAIRP heavy	Diesel	0.02%	0.02%	83	0.000	0.013	86
T6 CAIRP small	Diesel	0.00%	0.00%	12	0.000	0.002	12
T6 instate construction heavy	Diesel	0.03%	0.03%	143	0.001	0.022	149
T6 instate construction small	Diesel	0.16%	0.16%	742	0.005	0.117	773
T6 instate heavy	Diesel	0.67%	0.67%	2,954	0.013	0.464	3,078
T6 instate small	Diesel	1.06%	1.06%	4,927	0.027	0.774	5,133
T6 OOS heavy	Diesel	0.01%	0.01%	47	0.000	0.007	49
T6 OOS small	Diesel	0.00%	0.00%	7	0.000	0.001	7
T6 Public	Diesel	0.01%	0.01%	74	0.000	0.012	77
T6 utility	Diesel	0.01%	0.01%	27	0.000	0.004	29
T6TS	Gasoline	0.44%	0.44%	3,512	0.018	0.036	3,522
T7 Ag	Diesel	0.00%	0.00%	0	0.000	0.000	0
T7 CAIRP	Diesel	0.19%	0.19%	1,188	0.002	0.187	1,238
T7 CAIRP construction	Diesel	0.02%	0.02%	139	0.000	0.022	145
T7 NNOOS	Diesel	0.23%	0.23%	1,376	0.002	0.216	1,433
T7 NOOS	Diesel	0.07%	0.07%	466	0.001	0.073	486
T7 POLA	Diesel	0.18%	0.18%	1,361	0.006	0.214	1,418
T7 Public	Diesel	0.02%	0.02%	176	0.000	0.028	183
T7 Single	Diesel	0.18%	0.18%	1,216	0.005	0.191	1,267
T7 single construction	Diesel	0.05%	0.05%	375	0.002	0.059	391
T7 SWCV	Diesel	0.01%	0.01%	348	0.000	0.055	363
T7 SWCV	Natural Gas	0.04%	0.04%	626	0.904	0.128	685
T7 tractor	Diesel	0.29%	0.29%	1,960	0.009	0.308	2,042
T7 tractor construction	Diesel	0.04%	0.04%	311	0.002	0.049	324
T7 utility	Diesel	0.00%	0.00%	10	0.000	0.002	11
T7IS	Gasoline	0.00%	0.00%	10	0.001	0.001	11
UBUS	Gasoline	0.02%	0.02%	241	0.001	0.003	242
UBUS	Diesel	0.00%	0.00%	0	0.000	0.000	0
UBUS	Natural Gas	0.09%	0.09%	882	4.000	0.180	1,042
		100.00%	**100.00%**	**169,900**	***7***	***7***	**171,891**

Source: EMFAC2021 (v1.0.3) Emission Rates

Region Type: Sub-Area
Region: Orange
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN

g/mile 2.205E-03

Vehicle Category	Fuel	VMT Total	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUNEX	PM10_PMTW	PM10_PMBW	PM10_TOTAL	PM2.5_RUNEX	PM2.5_PMTW	PM2.5_PMBW	PM 2.5 Total	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX	% of VMT
All Other Buses	Diesel	28,864	1.26E-01	2.80E+00	4.38E-01	9.36E-03	6.56E-02	1.20E-02	1.30E-01	2.08E-01	6.28E-02	3.00E-03	5.59E-02	1.22E-01	9.91E+02	5.84E-03	1.56E-01	0.0314%
LDA	Gasoline	49,395,345	1.04E-02	3.88E-02	6.94E-01	2.68E-03	1.65E-03	8.00E-03	3.68E-02	4.64E-02	1.51E-03	2.00E-03	1.58E-02	1.93E-02	2.71E+02	2.73E-03	4.52E-03	53.7031%
LDA	Diesel	478,207	1.72E-02	7.01E-02	2.50E-01	1.98E-03	7.71E-03	8.00E-03	3.68E-02	5.25E-02	7.37E-03	2.00E-03	1.58E-02	2.51E-02	2.10E+02	7.97E-04	3.29E-02	0.5199%
LDA	Electricity	969,374	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	1.0539%
LDT1	Gasoline	5,154,285	2.72E-02	1.01E-01	1.27E+00	3.12E-03	2.28E-03	8.00E-03	3.68E-02	4.70E-02	2.10E-03	2.00E-03	1.58E-02	1.98E-02	3.15E+02	6.24E-03	7.90E-03	5.6038%
LDT1	Diesel	1,053	2.14E-01	1.04E+00	1.16E+00	3.90E-03	1.69E-01	8.00E-03	3.68E-02	2.14E-01	1.62E-01	2.00E-03	1.58E-02	1.80E-01	4.13E+02	9.95E-03	6.49E-02	0.0011%
LDT1	Electricity	29,846	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.0324%
LDT2	Gasoline	16,989,289	1.64E-02	7.43E-02	9.22E-01	3.40E-03	1.62E-03	8.00E-03	3.68E-02	4.64E-02	1.49E-03	2.00E-03	1.58E-02	1.92E-02	3.44E+02	4.11E-03	6.48E-03	18.4709%
LDT2	Diesel	117,529	1.81E-02	4.16E-02	1.53E-01	2.73E-03	5.29E-03	8.00E-03	3.68E-02	5.00E-02	5.06E-03	2.00E-03	1.58E-02	2.28E-02	2.89E+02	8.42E-04	4.54E-02	0.1278%
LDT2	Electricity	112,688	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.1225%
LHD1	Gasoline	1,349,255	2.88E-02	1.90E-01	6.96E-01	7.95E-03	1.18E-03	8.00E-03	7.64E-02	8.56E-02	1.09E-03	2.00E-03	3.28E-02	3.58E-02	8.03E+02	6.16E-03	1.20E-02	1.4669%
LHD1	Diesel	943,814	7.25E-02	1.70E+00	3.96E-01	4.49E-03	1.58E-02	1.20E-02	7.64E-02	1.04E-01	1.52E-02	3.00E-03	3.28E-02	5.09E-02	4.74E+02	3.37E-03	7.46E-02	1.0261%
LHD2	Gasoline	228,273	1.98E-02	1.95E-01	5.02E-01	9.14E-03	1.04E-03	8.00E-03	8.92E-02	9.82E-02	9.55E-04	2.00E-03	3.82E-02	4.12E-02	9.23E+02	4.62E-03	1.32E-02	0.2482%
LHD2	Diesel	360,088	6.59E-02	1.40E+00	3.50E-01	4.96E-03	1.59E-02	1.20E-02	8.92E-02	1.17E-01	1.52E-02	3.00E-03	3.82E-02	5.64E-02	5.24E+02	3.06E-03	8.24E-02	0.3915%
MCY	Gasoline	414,998	2.40E+00	1.12E+00	1.89E+01	2.12E-03	2.12E-03	4.00E-03	1.18E-02	1.79E-02	1.98E-03	1.00E-03	5.04E-03	8.02E-03	2.14E+02	3.52E-01	6.50E-02	0.4512%
MDV	Gasoline	11,280,044	2.50E-02	1.04E-01	1.14E+00	4.19E-03	1.71E-03	8.00E-03	3.68E-02	4.65E-02	1.57E-03	2.00E-03	1.58E-02	1.93E-02	4.23E+02	5.74E-03	8.37E-03	12.2638%
MDV	Diesel	268,375	1.44E-02	5.46E-02	2.47E-01	3.60E-03	5.30E-03	8.00E-03	3.68E-02	5.01E-02	5.07E-03	2.00E-03	1.58E-02	2.28E-02	3.81E+02	6.70E-04	5.99E-02	0.2918%
MDV	Electricity	48,350	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.0526%
MH	Gasoline	65,647	5.37E-02	3.67E-01	1.53E+00	1.65E-02	1.33E-03	1.20E-02	1.30E-01	1.44E-01	1.22E-03	3.00E-03	5.59E-02	6.01E-02	1.67E+03	1.24E-02	2.34E-02	0.0714%
MH	Diesel	28,541	7.23E-02	3.91E+00	3.12E-01	9.28E-03	9.77E-02	1.60E-02	1.30E-01	2.44E-01	9.35E-02	4.00E-03	5.59E-02	1.53E-01	9.82E+02	3.36E-03	1.54E-01	0.0310%
Motor Coach	Diesel	17,770	1.61E-01	3.79E+00	6.33E-01	1.41E-02	7.56E-02	1.20E-02	1.30E-01	2.18E-01	7.23E-02	3.00E-03	5.59E-02	1.31E-01	1.49E+03	7.47E-03	2.34E-01	0.0193%
OBUS	Gasoline	44,567	5.94E-02	4.58E-01	1.53E+00	1.66E-02	8.42E-04	1.20E-02	1.30E-01	1.43E-01	7.74E-04	3.00E-03	5.59E-02	5.96E-02	1.67E+03	1.24E-02	2.29E-02	0.0485%
PTO	Diesel	32,064	3.07E-01	6.40E+00	1.08E+00	1.95E-02	8.15E-02	0.00E+00	0.00E+00	8.15E-02	7.79E-02	0.00E+00	0.00E+00	7.79E-02	2.06E+03	1.43E-02	3.25E-01	0.0349%
SBUS	Gasoline	21,212	9.74E-02	6.50E-01	2.22E+00	8.69E-03	1.38E-03	8.00E-03	7.45E-01	7.54E-01	1.27E-03	2.00E-03	3.19E-01	3.22E-01	8.78E+02	1.94E-02	3.28E-02	0.0231%
SBUS	Diesel	40,865	1.57E-01	9.28E+00	4.20E-01	1.19E-02	6.52E-02	1.20E-02	7.45E-01	8.22E-01	6.24E-02	3.00E-03	3.19E-01	3.85E-01	1.26E+03	7.28E-03	1.98E-01	0.0444%
T6 Ag	Diesel	8	1.96E+00	1.38E+01	5.28E+00	1.17E-02	1.32E+00	1.20E-02	1.30E-01	1.46E+00	1.26E+00	3.00E-03	5.59E-02	1.32E+00	1.24E+03	9.10E-02	1.95E-01	0.0000%
T6 CAIRP heavy	Diesel	18,085	2.96E-02	1.29E+00	1.37E-01	8.34E-03	1.89E-02	1.20E-02	1.30E-01	1.61E-01	1.81E-02	3.00E-03	5.59E-02	7.70E-02	8.83E+02	1.38E-03	1.39E-01	0.0197%
T6 CAIRP small	Diesel	2,433	5.08E-02	1.53E+00	2.04E-01	8.81E-03	3.16E-02	1.20E-02	1.30E-01	1.74E-01	3.02E-02	3.00E-03	5.59E-02	8.91E-02	9.33E+02	2.36E-03	1.47E-01	0.0026%
T6 instate construction heavy	Diesel	27,372	1.55E-01	3.45E+00	5.29E-01	9.53E-03	8.90E-02	1.20E-02	1.30E-01	2.31E-01	8.52E-02	3.00E-03	5.59E-02	1.44E-01	1.01E+03	7.19E-03	1.58E-01	0.0298%
T6 instate construction small	Diesel	145,117	1.42E-01	2.71E+00	5.02E-01	9.32E-03	8.61E-02	1.20E-02	1.30E-01	2.28E-01	8.24E-02	3.00E-03	5.59E-02	1.41E-01	9.87E+02	6.60E-03	1.55E-01	0.1578%
T6 instate heavy	Diesel	619,996	8.85E-02	2.15E+00	3.24E-01	8.69E-03	5.28E-02	1.20E-02	1.30E-01	1.95E-01	5.05E-02	3.00E-03	5.59E-02	1.09E-01	9.19E+02	4.11E-03	1.44E-01	0.6741%
T6 instate small	Diesel	976,479	1.14E-01	2.34E+00	4.13E-01	9.20E-03	7.05E-02	1.20E-02	1.30E-01	2.13E-01	6.74E-02	3.00E-03	5.59E-02	1.26E-01	9.73E+02	5.31E-03	1.53E-01	1.0616%
T6 OOS heavy	Diesel	10,297	2.40E-02	1.21E+00	1.20E-01	8.33E-03	1.63E-02	1.20E-02	1.30E-01	1.59E-01	1.56E-02	3.00E-03	5.59E-02	7.44E-02	8.82E+02	1.11E-03	1.39E-01	0.0112%
T6 OOS small	Diesel	1,439	5.17E-02	1.53E+00	2.07E-01	8.81E-03	3.21E-02	1.20E-02	1.30E-01	1.74E-01	3.07E-02	3.00E-03	5.59E-02	8.96E-02	9.32E+02	2.40E-03	1.47E-01	0.0016%
T6 Public	Diesel	13,409	5.38E-02	5.99E+00	1.72E-01	1.00E-02	3.55E-02	1.20E-02	1.30E-01	1.78E-01	3.40E-02	3.00E-03	5.59E-02	9.29E-02	1.06E+03	2.50E-03	1.66E-01	0.0146%
T6 utility	Diesel	5,650	5.61E-03	7.75E-01	5.67E-02	8.86E-03	3.77E-03	1.20E-02	1.30E-01	1.46E-01	3.61E-03	3.00E-03	5.59E-02	6.25E-02	9.38E+02	2.60E-04	1.47E-01	0.0061%
T6TS	Gasoline	404,523	4.07E-02	3.08E-01	1.07E+00	1.66E-02	8.73E-04	1.20E-02	1.30E-01	1.43E-01	8.03E-04	3.00E-03	5.59E-02	5.97E-02	1.67E+03	8.69E-03	1.70E-02	0.4398%
T7 Ag	Diesel	8	7.56E-01	1.06E+01	2.62E+00	1.65E-02	5.12E-01	3.60E-02	6.17E-02	6.10E-01	4.90E-01	9.00E-03	2.65E-02	5.25E-01	1.75E+03	3.51E-02	2.74E-01	0.0000%
T7 CAIRP	Diesel	172,790	5.44E-02	2.86E+00	2.95E-01	1.25E-02	3.23E-02	3.60E-02	6.17E-02	1.30E-01	3.09E-02	9.00E-03	2.65E-02	6.63E-02	1.33E+03	2.53E-03	2.09E-01	0.1879%
T7 CAIRP construction	Diesel	19,661	5.28E-02	2.79E+00	2.88E-01	1.29E-02	3.13E-02	3.60E-02	6.17E-02	1.29E-01	3.00E-02	9.00E-03	2.65E-02	6.54E-02	1.37E+03	2.45E-03	2.15E-01	0.0214%
T7 NNOOS	Diesel	210,653	4.50E-02	2.32E+00	2.64E-01	1.19E-02	3.11E-02	3.60E-02	6.17E-02	1.29E-01	2.97E-02	9.00E-03	2.65E-02	6.52E-02	1.26E+03	2.09E-03	1.98E-01	0.2290%
T7 NOOS	Diesel	67,887	4.52E-02	2.74E+00	2.64E-01	1.25E-02	2.87E-02	3.60E-02	6.17E-02	1.26E-01	2.75E-02	9.00E-03	2.65E-02	6.29E-02	1.33E+03	2.10E-03	2.08E-01	0.0738%
T7 POLA	Diesel	165,521	1.45E-01	5.06E+00	4.73E-01	1.50E-02	3.89E-02	3.60E-02	6.17E-02	1.37E-01	3.72E-02	9.00E-03	2.65E-02	7.26E-02	1.59E+03	6.72E-03	2.49E-01	0.1800%
T7 Public	Diesel	20,965	8.40E-02	1.00E+01	3.58E-01	1.53E-02	5.68E-02	3.60E-02	6.17E-02	1.55E-01	5.44E-02	9.00E-03	2.65E-02	8.98E-02	1.62E+03	3.90E-03	2.54E-01	0.0228%
T7 Single	Diesel	161,482	1.41E-01	3.79E+00	5.62E-01	1.37E-02	7.76E-02	3.60E-02	6.17E-02	1.75E-01	7.42E-02	9.00E-03	2.65E-02	1.10E-01	1.45E+03	6.56E-03	2.28E-01	0.1756%
T7 single construction	Diesel	48,776	1.59E-01	4.59E+00	6.20E-01	1.40E-02	8.60E-02	3.60E-02	6.17E-02	1.84E-01	8.22E-02	9.00E-03	2.65E-02	1.18E-01	1.48E+03	7.40E-03	2.33E-01	0.0530%
T7 SWCV	Diesel	13,792	7.16E-03	1.67E+01	2.93E-02	4.60E-02	1.52E-02	3.60E-02	6.17E-02	1.13E-01	1.45E-02	9.00E-03	2.65E-02	5.00E-02	4.87E+03	3.33E-04	7.66E-01	0.0150%
T7 SWCV	Natural Gas	35,200	3.27E-01	2.97E+00	1.34E+01	0.00E+00	5.37E-03	3.60E-02	6.17E-02	1.03E-01	5.14E-03	9.00E-03	2.65E-02	4.06E-02	3.43E+03	4.95E+00	6.99E-01	0.0383%
T7 tractor	Diesel	268,236	1.42E-01	4.11E+00	5.66E-01	1.33E-02	6.68E-02	3.60E-02	6.17E-02	1.65E-01	6.39E-02	9.00E-03	2.65E-02	9.94E-02	1.41E+03	6.57E-03	2.22E-01	0.2916%
T7 tractor construction	Diesel	40,236	1.69E-01	4.69E+00	6.47E-01	1.41E-02	7.78E-02	3.60E-02	6.17E-02	1.76E-01	7.44E-02	9.00E-03	2.65E-02	1.10E-01	1.49E+03	7.85E-03	2.34E-01	0.0437%
T7 utility	Diesel	1,343	1.17E-02	1.43E+00	1.28E-01	1.42E-02	7.29E-03	3.60E-02	6.17E-02	1.05E-01	6.98E-03	9.00E-03	2.65E-02	4.24E-02	1.50E+03	5.46E-04	2.36E-01	0.0015%
T7IS	Gasoline	1,000	6.22E-01	4.69E+00	2.94E+01	1.98E-02	1.34E-03	2.00E-02	6.17E-02	8.31E-02	1.23E-03	5.00E-03	2.65E-02	3.27E-02	2.00E+03	1.19E-01	1.60E-01	0.0011%
UBUS	Gasoline	19,936	2.27E-02	4.19E-01	4.84E-01	2.31E-02	4.77E-04	1.20E-02	1.30E-01	1.43E-01	4.38E-04	3.00E-03	5.59E-02	5.93E-02	2.33E+03	6.72E-03	3.22E-02	0.0217%
UBUS	Diesel	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000%
UBUS	Natural Gas	86,004	1.28E-01	4.88E+00	3.43E+01	0.00E+00	6.41E-03	3.46E-02	6.58E-02	1.07E-01	6.13E-03	8.65E-03	2.82E-02	4.30E-02	1.98E+03	8.97E+00	4.03E-01	0.0935%
		91,978,638																100.0000%

Source: EMFAC2021 (v1.0.3) Ei

Region Type: Sub-Area
Region: Orange
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trip

1.000E-06

		lbs/Mile														
Vehicle Category	Fuel	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX
All Other Buses	Diesel	2.771E-04	6.165E-03	9.655E-04	2.063E-05	1.446E-04	2.646E-05	2.873E-04	4.584E-04	1.384E-04	6.614E-06	1.231E-04	2.681E-04	2.184E+00	1.287E-05	3.433E-04
LDA	Gasoline	2.298E-05	8.552E-05	1.531E-03	5.918E-06	3.627E-06	1.764E-05	8.102E-05	1.023E-04	3.335E-06	4.409E-06	3.472E-05	4.247E-05	5.980E-01	6.024E-06	9.963E-06
LDA	Diesel	3.785E-05	1.546E-04	5.504E-04	4.367E-06	1.699E-05	1.764E-05	8.102E-05	1.156E-04	1.625E-05	4.409E-06	3.472E-05	5.538E-05	4.620E-01	1.758E-06	7.262E-05
LDA	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
LDT1	Gasoline	6.006E-05	2.229E-04	2.792E-03	6.869E-06	5.034E-06	1.764E-05	8.102E-05	1.037E-04	4.629E-06	4.409E-06	3.472E-05	4.376E-05	6.941E-01	1.376E-05	1.743E-05
LDT1	Diesel	4.723E-04	2.302E-03	2.563E-03	8.602E-06	3.730E-04	1.764E-05	8.102E-05	4.717E-04	3.569E-04	4.409E-06	3.472E-05	3.960E-04	9.099E-01	2.194E-05	1.430E-04
LDT1	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
LDT2	Gasoline	3.606E-05	1.637E-04	2.033E-03	7.497E-06	3.574E-06	1.764E-05	8.102E-05	1.022E-04	3.286E-06	4.409E-06	3.472E-05	4.242E-05	7.576E-01	9.051E-06	1.429E-05
LDT2	Diesel	3.995E-05	9.171E-05	3.381E-04	6.018E-06	1.167E-05	1.764E-05	8.102E-05	1.103E-04	1.117E-05	4.409E-06	3.472E-05	5.030E-05	6.366E-01	1.855E-06	1.001E-04
LDT2	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
LHD1	Gasoline	6.346E-05	4.194E-04	1.535E-03	1.752E-05	2.604E-06	1.764E-05	1.685E-04	1.888E-04	2.394E-06	4.409E-06	7.222E-05	7.903E-05	1.770E+00	1.358E-05	2.652E-05
LHD1	Diesel	1.598E-04	3.748E-03	8.725E-04	9.889E-06	3.492E-05	2.646E-05	1.685E-04	2.299E-04	3.341E-05	6.614E-06	7.222E-05	1.122E-04	1.046E+00	7.421E-06	1.644E-04
LHD2	Gasoline	4.354E-05	4.308E-04	1.107E-03	2.015E-05	2.290E-06	1.764E-05	1.966E-04	2.165E-04	2.105E-06	4.409E-06	8.426E-05	9.077E-05	2.036E+00	1.018E-05	2.908E-05
LHD2	Diesel	1.452E-04	3.095E-03	7.723E-04	1.093E-05	3.499E-05	2.646E-05	1.966E-04	2.581E-04	3.348E-05	6.614E-06	8.426E-05	1.244E-04	1.156E+00	6.745E-06	1.817E-04
MCY	Gasoline	5.297E-03	2.470E-03	4.166E-02	4.679E-06	4.665E-06	8.818E-06	2.593E-05	3.941E-05	4.364E-06	2.205E-06	1.111E-05	1.768E-05	4.729E-01	7.763E-04	1.433E-04
MDV	Gasoline	5.507E-05	2.298E-04	2.517E-03	9.239E-06	3.764E-06	1.764E-05	8.102E-05	1.024E-04	3.463E-06	4.409E-06	3.472E-05	4.259E-05	9.336E-01	1.266E-05	1.846E-05
MDV	Diesel	3.179E-05	1.204E-04	5.450E-04	7.937E-06	1.169E-05	1.764E-05	8.102E-05	1.103E-04	1.119E-05	4.409E-06	3.472E-05	5.032E-05	8.395E-01	1.477E-06	1.320E-04
MDV	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
MH	Gasoline	1.183E-04	8.081E-04	3.381E-03	3.648E-05	2.935E-06	2.646E-05	2.873E-04	3.167E-04	2.699E-06	6.614E-06	1.231E-04	1.325E-04	3.687E+00	2.744E-05	5.161E-05
MH	Diesel	1.595E-04	8.618E-03	6.875E-04	2.046E-05	2.154E-04	3.527E-05	2.873E-04	5.380E-04	2.061E-04	8.818E-06	1.231E-04	3.381E-04	2.164E+00	7.408E-06	3.401E-04
Motor Coach	Diesel	3.546E-04	8.362E-03	1.396E-03	3.101E-05	1.666E-04	2.646E-05	2.873E-04	4.804E-04	1.594E-04	6.614E-06	1.231E-04	2.892E-04	3.282E+00	1.647E-05	5.159E-04
OBUS	Gasoline	1.311E-04	1.010E-03	3.364E-03	3.654E-05	1.855E-06	2.646E-05	2.873E-04	3.157E-04	1.706E-06	6.614E-06	1.231E-04	1.315E-04	3.693E+00	2.732E-05	5.054E-05
PTO	Diesel	6.772E-04	1.411E-02	2.385E-03	4.301E-05	1.796E-04	0.000E+00	0.000E+00	1.796E-04	1.718E-04	0.000E+00	0.000E+00	1.718E-04	4.552E+00	3.145E-05	7.156E-04
SBUS	Gasoline	2.147E-04	1.434E-03	4.893E-03	1.916E-05	3.041E-06	1.764E-05	1.642E-03	1.663E-03	2.796E-06	4.409E-06	7.037E-04	7.109E-04	1.936E+00	4.282E-05	7.235E-05
SBUS	Diesel	3.454E-04	2.046E-02	9.252E-04	2.622E-05	1.438E-04	2.646E-05	1.642E-03	1.812E-03	1.376E-04	6.614E-06	7.037E-04	8.479E-04	2.775E+00	1.604E-05	4.362E-04
T6 Ag	Diesel	4.318E-03	3.053E-02	1.163E-02	2.590E-05	2.908E-03	2.646E-05	2.873E-04	3.222E-03	2.782E-03	6.614E-06	1.231E-04	2.912E-03	2.741E+00	2.006E-04	4.309E-04
T6 CAIRP heavy	Diesel	6.527E-05	2.849E-03	3.021E-04	1.840E-05	4.169E-05	2.646E-05	2.873E-04	3.555E-04	3.989E-05	6.614E-06	1.231E-04	1.697E-04	1.947E+00	3.032E-06	3.061E-04
T6 CAIRP small	Diesel	1.120E-04	3.365E-03	4.505E-04	1.943E-05	6.965E-05	2.646E-05	2.873E-04	3.834E-04	6.663E-05	6.614E-06	1.231E-04	1.964E-04	2.056E+00	5.201E-06	3.232E-04
T6 instate construction heavy	Diesel	3.411E-04	7.611E-03	1.166E-03	2.100E-05	1.962E-04	2.646E-05	2.873E-04	5.100E-04	1.877E-04	6.614E-06	1.231E-04	3.175E-04	2.223E+00	1.584E-05	3.494E-04
T6 instate construction small	Diesel	3.135E-04	5.971E-03	1.107E-03	2.055E-05	1.899E-04	2.646E-05	2.873E-04	5.037E-04	1.817E-04	6.614E-06	1.231E-04	3.114E-04	2.175E+00	1.456E-05	3.419E-04
T6 instate heavy	Diesel	1.950E-04	4.750E-03	7.149E-04	1.915E-05	1.164E-04	2.646E-05	2.873E-04	4.302E-04	1.114E-04	6.614E-06	1.231E-04	2.412E-04	2.027E+00	9.058E-06	3.186E-04
T6 instate small	Diesel	2.521E-04	5.167E-03	9.107E-04	2.027E-05	1.554E-04	2.646E-05	2.873E-04	4.692E-04	1.487E-04	6.614E-06	1.231E-04	2.785E-04	2.146E+00	1.171E-05	3.373E-04
T6 OOS heavy	Diesel	5.290E-05	2.658E-03	2.644E-04	1.837E-05	3.590E-05	2.646E-05	2.873E-04	3.497E-04	3.434E-05	6.614E-06	1.231E-04	1.641E-04	1.945E+00	2.457E-06	3.057E-04
T6 OOS small	Diesel	1.140E-04	3.383E-03	4.569E-04	1.942E-05	7.085E-05	2.646E-05	2.873E-04	3.847E-04	6.778E-05	6.614E-06	1.231E-04	1.975E-04	2.055E+00	5.294E-06	3.231E-04
T6 Public	Diesel	1.187E-04	1.320E-02	3.790E-04	2.206E-05	7.834E-05	2.646E-05	2.873E-04	3.921E-04	7.495E-05	6.614E-06	1.231E-04	2.047E-04	2.335E+00	5.512E-06	3.670E-04
T6 utility	Diesel	1.236E-05	1.709E-03	1.250E-04	1.954E-05	8.320E-06	2.646E-05	2.873E-04	3.221E-04	7.960E-06	6.614E-06	1.231E-04	1.377E-04	2.068E+00	5.741E-07	3.251E-04
T6TS	Gasoline	8.971E-05	6.788E-04	2.357E-03	3.654E-05	1.924E-06	2.646E-05	2.873E-04	3.157E-04	1.769E-06	6.614E-06	1.231E-04	1.315E-04	3.692E+00	1.915E-05	3.742E-05
T7 Ag	Diesel	1.666E-03	2.330E-02	5.766E-03	3.637E-05	1.128E-03	7.937E-05	1.361E-04	1.344E-03	1.080E-03	1.984E-05	5.833E-05	1.158E-03	3.849E+00	7.739E-05	6.051E-04
T7 CAIRP	Diesel	1.200E-04	6.295E-03	6.498E-04	2.763E-05	7.113E-05	7.937E-05	1.361E-04	2.866E-04	6.805E-05	1.984E-05	5.833E-05	1.462E-04	2.925E+00	5.573E-06	4.598E-04
T7 CAIRP construction	Diesel	1.164E-04	6.144E-03	6.349E-04	2.844E-05	6.906E-05	7.937E-05	1.361E-04	2.845E-04	6.607E-05	1.984E-05	5.833E-05	1.442E-04	3.010E+00	5.406E-06	4.732E-04
T7 NNOOS	Diesel	9.926E-05	5.118E-03	5.823E-04	2.625E-05	6.845E-05	7.937E-05	1.361E-04	2.839E-04	6.549E-05	1.984E-05	5.833E-05	1.437E-04	2.778E+00	4.610E-06	4.367E-04
T7 NOOS	Diesel	9.955E-05	6.050E-03	5.814E-04	2.760E-05	6.328E-05	7.937E-05	1.361E-04	2.788E-04	6.054E-05	1.984E-05	5.833E-05	1.387E-04	2.921E+00	4.624E-06	4.592E-04
T7 POLA	Diesel	3.191E-04	1.115E-02	1.043E-03	3.305E-05	8.566E-05	7.937E-05	1.361E-04	3.011E-04	8.195E-05	1.984E-05	5.833E-05	1.601E-04	3.498E+00	1.482E-05	5.499E-04
T7 Public	Diesel	1.851E-04	2.209E-02	7.895E-04	3.367E-05	1.253E-04	7.937E-05	1.361E-04	3.408E-04	1.199E-04	1.984E-05	5.833E-05	1.980E-04	3.564E+00	8.599E-06	5.602E-04
T7 Single	Diesel	3.116E-04	8.360E-03	1.239E-03	3.026E-05	1.710E-04	7.937E-05	1.361E-04	3.865E-04	1.636E-04	1.984E-05	5.833E-05	2.418E-04	3.203E+00	1.447E-05	5.034E-04
T7 single construction	Diesel	3.512E-04	1.012E-02	1.366E-03	3.092E-05	1.895E-04	7.937E-05	1.361E-04	4.050E-04	1.813E-04	1.984E-05	5.833E-05	2.595E-04	3.273E+00	1.631E-05	5.145E-04
T7 SWCV	Diesel	1.579E-05	3.690E-02	6.457E-05	1.015E-04	3.342E-05	7.937E-05	1.361E-04	2.489E-04	3.198E-05	1.984E-05	5.833E-05	1.102E-04	1.074E+01	7.336E-07	1.688E-03
T7 SWCV	Natural Gas	7.210E-04	6.547E-03	2.959E-02	0.000E+00	1.184E-05	7.937E-05	1.361E-04	2.273E-04	1.132E-05	1.984E-05	5.833E-05	8.950E-05	7.558E+00	1.092E-02	1.541E-03
T7 tractor	Diesel	3.120E-04	9.058E-03	1.248E-03	2.937E-05	1.473E-04	7.937E-05	1.361E-04	3.628E-04	1.410E-04	1.984E-05	5.833E-05	2.191E-04	3.108E+00	1.449E-05	4.886E-04
T7 tractor construction	Diesel	3.725E-04	1.034E-02	1.425E-03	3.107E-05	1.715E-04	7.937E-05	1.361E-04	3.870E-04	1.641E-04	1.984E-05	5.833E-05	2.422E-04	3.288E+00	1.730E-05	5.169E-04
T7 utility	Diesel	2.590E-05	3.142E-03	2.820E-04	3.128E-05	1.608E-05	7.937E-05	1.361E-04	2.316E-04	1.538E-05	1.984E-05	5.833E-05	9.356E-05	3.310E+00	1.203E-06	5.204E-04
T7IS	Gasoline	1.371E-03	1.034E-02	6.485E-02	4.374E-05	2.960E-06	4.409E-05	1.361E-04	1.832E-04	2.721E-06	1.102E-05	5.833E-05	7.208E-05	4.420E+00	2.626E-04	3.537E-04
UBUS	Gasoline	5.001E-05	9.232E-04	1.066E-03	5.086E-05	1.051E-06	2.646E-05	2.873E-04	3.149E-04	9.664E-07	6.614E-06	1.231E-04	1.307E-04	5.140E+00	1.481E-05	7.100E-05
UBUS	Diesel	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
UBUS	Natural Gas	2.826E-04	1.076E-02	7.551E-02	0.000E+00	1.413E-05	7.626E-05	1.450E-04	2.354E-04	1.352E-05	1.907E-05	6.214E-05	9.472E-05	4.361E+00	1.978E-02	8.890E-04

Source: EMFAC2021 (v1.0.3) Em

Region Type: Sub-Area
Region: Orange
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trip

		MTons/Mile														
Vehicle Category	Fuel	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX
All Other Buses	Diesel	1.257E-07	2.797E-06	4.380E-07	9.359E-09	6.560E-08	1.200E-08	1.303E-07	2.079E-07	6.276E-08	3.000E-09	5.586E-08	1.216E-07	9.906E-04	5.839E-09	1.557E-07
LDA	Gasoline	1.043E-08	3.879E-08	6.944E-07	2.684E-09	1.645E-09	8.000E-09	3.675E-08	4.640E-08	1.513E-09	2.000E-09	1.575E-08	1.926E-08	2.713E-04	2.733E-09	4.519E-09
LDA	Diesel	1.717E-08	7.014E-08	2.497E-07	1.981E-09	7.706E-09	8.000E-09	3.675E-08	5.246E-08	7.372E-09	2.000E-09	1.575E-08	2.512E-08	2.096E-04	7.975E-10	3.294E-08
LDA	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
LDT1	Gasoline	2.724E-08	1.011E-07	1.266E-06	3.116E-09	2.283E-09	8.000E-09	3.675E-08	4.703E-08	2.099E-09	2.000E-09	1.575E-08	1.985E-08	3.148E-04	6.243E-09	7.905E-09
LDT1	Diesel	2.142E-07	1.044E-06	1.163E-06	3.902E-09	1.692E-07	8.000E-09	3.675E-08	2.140E-07	1.619E-07	2.000E-09	1.575E-08	1.796E-07	4.127E-04	9.950E-09	6.488E-08
LDT1	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
LDT2	Gasoline	1.636E-08	7.425E-08	9.224E-07	3.401E-09	1.621E-09	8.000E-09	3.675E-08	4.637E-08	1.490E-09	2.000E-09	1.575E-08	1.924E-08	3.436E-04	4.106E-09	6.483E-09
LDT2	Diesel	1.812E-08	4.160E-08	1.534E-07	2.730E-09	5.294E-09	8.000E-09	3.675E-08	5.004E-08	5.065E-09	2.000E-09	1.575E-08	2.281E-08	2.888E-04	8.416E-10	4.539E-08
LDT2	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
LHD1	Gasoline	2.878E-08	1.902E-07	6.961E-07	7.945E-09	1.181E-09	8.000E-09	7.644E-08	8.562E-08	1.086E-09	2.000E-09	3.276E-08	3.585E-08	8.029E-04	6.159E-09	1.203E-08
LHD1	Diesel	7.247E-08	1.700E-06	3.958E-07	4.485E-09	1.584E-08	1.200E-08	7.644E-08	1.043E-07	1.516E-08	3.000E-09	3.276E-08	5.092E-08	4.745E-04	3.366E-09	7.458E-08
LHD2	Gasoline	1.975E-08	1.954E-07	5.023E-07	9.138E-09	1.039E-09	8.000E-09	8.918E-08	9.822E-08	9.550E-10	2.000E-09	3.822E-08	4.117E-08	9.234E-04	4.616E-09	1.319E-08
LHD2	Diesel	6.587E-08	1.404E-06	3.503E-07	4.956E-09	1.587E-08	1.200E-08	8.918E-08	1.171E-07	1.519E-08	3.000E-09	3.822E-08	5.641E-08	5.242E-04	3.059E-09	8.240E-08
MCY	Gasoline	2.402E-06	1.120E-06	1.890E-05	2.123E-09	2.116E-09	4.000E-09	1.176E-08	1.788E-08	1.980E-09	1.000E-09	5.040E-09	8.020E-09	2.145E-04	3.521E-07	6.501E-08
MDV	Gasoline	2.498E-08	1.042E-07	1.142E-06	4.191E-09	1.707E-09	8.000E-09	3.675E-08	4.646E-08	1.571E-09	2.000E-09	1.575E-08	1.932E-08	4.235E-04	5.742E-09	8.374E-09
MDV	Diesel	1.442E-08	5.462E-08	2.472E-07	3.600E-09	5.304E-09	8.000E-09	3.675E-08	5.005E-08	5.075E-09	2.000E-09	1.575E-08	2.282E-08	3.808E-04	6.699E-10	5.986E-08
MDV	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
MH	Gasoline	5.365E-08	3.666E-07	1.534E-06	1.655E-08	1.331E-09	1.200E-08	1.303E-07	1.437E-07	1.224E-09	3.000E-09	5.586E-08	6.008E-08	1.672E-03	1.245E-08	2.341E-08
MH	Diesel	7.235E-08	3.909E-06	3.119E-07	9.279E-09	9.772E-08	1.600E-08	1.303E-07	2.441E-07	9.349E-08	4.000E-09	5.586E-08	1.533E-07	9.815E-04	3.360E-09	1.543E-07
Motor Coach	Diesel	1.609E-07	3.793E-06	6.333E-07	1.407E-08	7.558E-08	1.200E-08	1.303E-07	2.179E-07	7.231E-08	3.000E-09	5.586E-08	1.312E-07	1.489E-03	7.471E-09	2.340E-07
OBUS	Gasoline	5.945E-08	4.582E-07	1.526E-06	1.658E-08	8.415E-10	1.200E-08	1.303E-07	1.432E-07	7.738E-10	3.000E-09	5.586E-08	5.963E-08	1.675E-03	1.239E-08	2.293E-08
PTO	Diesel	3.072E-07	6.402E-06	1.082E-06	1.951E-08	8.146E-08	0.000E+00	0.000E+00	8.146E-08	7.794E-08	0.000E+00	0.000E+00	7.794E-08	2.065E-03	1.427E-08	3.246E-07
SBUS	Gasoline	9.738E-08	6.503E-07	2.219E-06	8.692E-09	1.379E-09	8.000E-09	7.448E-07	7.542E-07	1.268E-09	2.000E-09	3.192E-07	3.225E-07	8.783E-04	1.942E-08	3.282E-08
SBUS	Diesel	1.567E-07	9.281E-06	4.196E-07	1.189E-08	6.524E-08	1.200E-08	7.448E-07	8.220E-07	6.241E-08	3.000E-09	3.192E-07	3.846E-07	1.259E-03	7.277E-09	1.979E-07
T6 Ag	Diesel	1.959E-06	1.385E-05	5.277E-06	1.175E-08	1.319E-06	1.200E-08	1.303E-07	1.461E-06	1.262E-06	3.000E-09	5.586E-08	1.321E-06	1.243E-03	9.098E-08	1.954E-07
T6 CAIRP heavy	Diesel	2.961E-08	1.292E-06	1.370E-07	8.345E-09	1.891E-08	1.200E-08	1.303E-07	1.613E-07	1.809E-08	3.000E-09	5.586E-08	7.695E-08	8.833E-04	1.375E-09	1.388E-07
T6 CAIRP small	Diesel	5.079E-08	1.526E-06	2.044E-07	8.811E-09	3.159E-08	1.200E-08	1.303E-07	1.739E-07	3.022E-08	3.000E-09	5.586E-08	8.908E-08	9.327E-04	2.359E-09	1.466E-07
T6 instate construction heavy	Diesel	1.547E-07	3.452E-06	5.289E-07	9.526E-09	8.900E-08	1.200E-08	1.303E-07	2.313E-07	8.515E-08	3.000E-09	5.586E-08	1.440E-07	1.008E-03	7.187E-09	1.585E-07
T6 instate construction small	Diesel	1.422E-07	2.708E-06	5.022E-07	9.321E-09	8.613E-08	1.200E-08	1.303E-07	2.285E-07	8.240E-08	3.000E-09	5.586E-08	1.413E-07	9.867E-04	6.605E-09	1.551E-07
T6 instate heavy	Diesel	8.846E-08	2.155E-06	3.243E-07	8.685E-09	5.281E-08	1.200E-08	1.303E-07	1.952E-07	5.053E-08	3.000E-09	5.586E-08	1.094E-07	9.193E-04	4.109E-09	1.445E-07
T6 instate small	Diesel	1.144E-07	2.344E-06	4.131E-07	9.196E-09	7.050E-08	1.200E-08	1.303E-07	2.128E-07	6.745E-08	3.000E-09	5.586E-08	1.263E-07	9.734E-04	5.312E-09	1.530E-07
T6 OOS heavy	Diesel	2.399E-08	1.206E-06	1.199E-07	8.334E-09	1.628E-08	1.200E-08	1.303E-07	1.586E-07	1.558E-08	3.000E-09	5.586E-08	7.444E-08	8.822E-04	1.115E-09	1.387E-07
T6 OOS small	Diesel	5.170E-08	1.534E-06	2.072E-07	8.809E-09	3.214E-08	1.200E-08	1.303E-07	1.745E-07	3.075E-08	3.000E-09	5.586E-08	8.961E-08	9.324E-04	2.401E-09	1.466E-07
T6 Public	Diesel	5.383E-08	5.986E-06	1.719E-07	1.001E-08	3.553E-08	1.200E-08	1.303E-07	1.779E-07	3.400E-08	3.000E-09	5.586E-08	9.286E-08	1.059E-03	2.500E-09	1.665E-07
T6 utility	Diesel	5.607E-09	7.751E-07	5.672E-08	8.863E-09	3.774E-09	1.200E-08	1.303E-07	1.461E-07	3.611E-09	3.000E-09	5.586E-08	6.247E-08	9.382E-04	2.604E-10	1.475E-07
T6TS	Gasoline	4.069E-08	3.079E-07	1.069E-06	1.657E-08	8.728E-10	1.200E-08	1.303E-07	1.432E-07	8.025E-10	3.000E-09	5.586E-08	5.966E-08	1.675E-03	8.686E-09	1.697E-08
T7 Ag	Diesel	7.558E-07	1.057E-05	2.616E-06	1.650E-08	5.118E-07	3.600E-08	6.174E-08	6.096E-07	4.897E-07	9.000E-09	2.646E-08	5.252E-07	1.746E-03	3.510E-08	2.745E-07
T7 CAIRP	Diesel	5.442E-08	2.855E-06	2.948E-07	1.253E-08	3.226E-08	3.600E-08	6.174E-08	1.300E-07	3.087E-08	9.000E-09	2.646E-08	6.633E-08	1.327E-03	2.528E-09	2.085E-07
T7 CAIRP construction	Diesel	5.279E-08	2.787E-06	2.880E-07	1.290E-08	3.133E-08	3.600E-08	6.174E-08	1.291E-07	2.997E-08	9.000E-09	2.646E-08	6.543E-08	1.365E-03	2.452E-09	2.146E-07
T7 NNOOS	Diesel	4.502E-08	2.322E-06	2.641E-07	1.190E-08	3.105E-08	3.600E-08	6.174E-08	1.288E-07	2.971E-08	9.000E-09	2.646E-08	6.517E-08	1.260E-03	2.091E-09	1.981E-07
T7 NOOS	Diesel	4.516E-08	2.744E-06	2.637E-07	1.252E-08	2.870E-08	3.600E-08	6.174E-08	1.264E-07	2.746E-08	9.000E-09	2.646E-08	6.292E-08	1.325E-03	2.097E-09	2.083E-07
T7 POLA	Diesel	1.447E-07	5.056E-06	4.732E-07	1.499E-08	3.885E-08	3.600E-08	6.174E-08	1.366E-07	3.717E-08	9.000E-09	2.646E-08	7.263E-08	1.587E-03	6.722E-09	2.494E-07
T7 Public	Diesel	8.398E-08	1.002E-05	3.581E-07	1.527E-08	5.683E-08	3.600E-08	6.174E-08	1.546E-07	5.437E-08	9.000E-09	2.646E-08	8.983E-08	1.617E-03	3.901E-09	2.541E-07
T7 Single	Diesel	1.413E-07	3.792E-06	5.620E-07	1.373E-08	7.758E-08	3.600E-08	6.174E-08	1.753E-07	7.422E-08	9.000E-09	2.646E-08	1.097E-07	1.453E-03	6.564E-09	2.284E-07
T7 single construction	Diesel	1.593E-07	4.589E-06	6.196E-07	1.403E-08	8.597E-08	3.600E-08	6.174E-08	1.837E-07	8.225E-08	9.000E-09	2.646E-08	1.177E-07	1.485E-03	7.399E-09	2.334E-07
T7 SWCV	Diesel	7.164E-09	1.674E-05	2.929E-08	4.603E-08	1.516E-08	3.600E-08	6.174E-08	1.129E-07	1.450E-08	9.000E-09	2.646E-08	4.996E-08	4.872E-03	3.328E-10	7.658E-07
T7 SWCV	Natural Gas	3.271E-07	2.970E-06	1.342E-05	0.000E+00	5.368E-09	3.600E-08	6.174E-08	1.031E-07	5.136E-09	9.000E-09	2.646E-08	4.060E-08	3.428E-03	4.954E-06	6.989E-07
T7 tractor	Diesel	1.415E-07	4.109E-06	5.663E-07	1.332E-08	6.684E-08	3.600E-08	6.174E-08	1.646E-07	6.394E-08	9.000E-09	2.646E-08	9.940E-08	1.410E-03	6.572E-09	2.216E-07
T7 tractor construction	Diesel	1.690E-07	4.692E-06	6.466E-07	1.409E-08	7.779E-08	3.600E-08	6.174E-08	1.755E-07	7.442E-08	9.000E-09	2.646E-08	1.099E-07	1.492E-03	7.848E-09	2.344E-07
T7 utility	Diesel	1.175E-08	1.425E-06	1.279E-07	1.419E-08	7.292E-09	3.600E-08	6.174E-08	1.050E-07	6.976E-09	9.000E-09	2.646E-08	4.244E-08	1.502E-03	5.456E-10	2.360E-07
T7IS	Gasoline	6.217E-07	4.689E-06	2.941E-05	1.984E-08	1.342E-09	2.000E-08	6.174E-08	8.308E-08	1.234E-09	5.000E-09	2.646E-08	3.269E-08	2.005E-03	1.191E-07	1.604E-07
UBUS	Gasoline	2.269E-08	4.188E-07	4.835E-07	2.307E-08	4.768E-10	1.200E-08	1.303E-07	1.428E-07	4.384E-10	3.000E-09	5.586E-08	5.930E-08	2.331E-03	6.718E-09	3.221E-08
UBUS	Diesel	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
UBUS	Natural Gas	1.282E-07	4.882E-06	3.425E-05	0.000E+00	6.408E-09	3.459E-08	6.576E-08	1.068E-07	6.130E-09	8.648E-09	2.818E-08	4.296E-08	1.978E-03	8.972E-06	4.033E-07

Year 2045 Current General Plan: Criteria Air Pollutants

Source: EMFAC2021 Version 1.0.3 web database. Emission Rates. Orange County (South Coast Air Basin) Subregion

Daily VMT	1,542,393								lbs/day
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
All Other Buses	Diesel	0.04%	0.04%	0.0110	1.8518	0.1101	0.0103	0.2139	0.0952
LDA	Gasoline	52.02%	52.02%	3.1638	29.2182	702.6733	3.4083	80.1328	32.2983
LDA	Diesel	0.65%	0.65%	0.1111	0.1928	3.6838	0.0324	1.0032	0.4072
LDA	Electricity	3.54%	3.54%	0.0000	0.0000	0.0000	0.0000	5.3900	2.1379
LDT1	Gasoline	6.08%	6.08%	0.4144	3.7773	83.7202	0.4616	9.3700	3.7824
LDT1	Diesel	0.00%	0.00%	0.0005	0.0010	0.0052	0.0001	0.0014	0.0006
LDT1	Electricity	0.25%	0.25%	0.0000	0.0000	0.0000	0.0000	0.3752	0.1488
LDT2	Gasoline	16.89%	16.89%	1.5099	9.7923	265.1230	1.2687	26.0252	10.4955
LDT2	Diesel	0.17%	0.17%	0.1012	0.1886	1.0375	0.0116	0.2921	0.1306
LDT2	Electricity	0.56%	0.56%	0.0000	0.0000	0.0000	0.0000	0.8485	0.3365
LHD1	Gasoline	1.15%	1.15%	0.1272	3.5842	4.6500	0.2476	3.3357	1.3963
LHD1	Diesel	1.33%	1.33%	1.7300	3.1303	8.1722	0.1605	4.2487	1.8539
LHD2	Gasoline	0.20%	0.20%	0.0223	0.7061	0.8242	0.0505	0.6801	0.2855
LHD2	Diesel	0.52%	0.52%	0.7010	2.0565	3.3863	0.0699	2.0242	0.9480
MCY	Gasoline	0.48%	0.48%	36.7402	17.9468	272.6537	0.0343	0.2952	0.1351
MDV	Gasoline	10.52%	10.52%	1.0684	6.8646	169.2435	0.9623	16.2251	6.5470
MDV	Diesel	0.38%	0.38%	0.0747	0.1317	2.4451	0.0328	0.5914	0.2412
MDV	Electricity	0.41%	0.41%	0.0000	0.0000	0.0000	0.0000	0.6201	0.2460
MH	Gasoline	0.06%	0.06%	0.0192	0.3932	0.3490	0.0277	0.3067	0.1281
MH	Diesel	0.03%	0.03%	0.0421	2.0193	0.1278	0.0072	0.1642	0.0794
Motor Coach	Diesel	0.02%	0.02%	0.0119	1.3880	0.1288	0.0084	0.1250	0.0580
OBUS	Gasoline	0.04%	0.04%	0.0165	0.5496	0.3435	0.0193	0.2144	0.0895
PTO	Diesel	0.05%	0.05%	0.0420	7.5917	0.6722	0.0234	0.0081	0.0078
SBUS	Gasoline	0.04%	0.04%	0.0146	0.1785	0.2625	0.0087	0.9308	0.3981
SBUS	Diesel	0.04%	0.04%	0.0137	2.5582	0.1749	0.0116	1.0569	0.4530
T6 CAIRP heavy	Diesel	0.02%	0.02%	0.0053	0.7748	0.0534	0.0050	0.1221	0.0531
T6 CAIRP small	Diesel	0.00%	0.00%	0.0007	0.1053	0.0071	0.0007	0.0161	0.0070
T6 instate construction heavy	Diesel	0.02%	0.02%	0.0065	1.0889	0.0650	0.0061	0.1262	0.0562
T6 instate construction small	Diesel	0.13%	0.13%	0.0305	4.7197	0.3069	0.0302	0.6603	0.2895
T6 instate heavy	Diesel	0.95%	0.95%	0.2324	37.0428	2.3355	0.2070	4.8570	2.1399
T6 instate small	Diesel	1.26%	1.26%	0.2955	45.6197	2.9695	0.2926	6.3969	2.8041
T6 OOS heavy	Diesel	0.01%	0.01%	0.0030	0.4380	0.0302	0.0028	0.0691	0.0301
T6 OOS small	Diesel	0.00%	0.00%	0.0004	0.0642	0.0043	0.0004	0.0097	0.0042
T6 Public	Diesel	0.01%	0.01%	0.0030	0.3627	0.0259	0.0029	0.0616	0.0266
T6 utility	Diesel	0.01%	0.01%	0.0012	0.1543	0.0125	0.0015	0.0326	0.0139
T6TS	Gasoline	0.24%	0.24%	0.0724	0.6704	1.4838	0.1042	1.1582	0.4836
T7 Ag	Diesel	0.00%	0.00%	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000
T7 CAIRP	Diesel	0.23%	0.23%	0.1278	15.6056	1.3795	0.0651	0.8944	0.4063
T7 CAIRP construction	Diesel	0.02%	0.02%	0.0100	1.2210	0.1076	0.0056	0.0694	0.0316
T7 NNOOS	Diesel	0.28%	0.28%	0.1464	17.3431	1.5798	0.0794	1.0700	0.4757
T7 NOOS	Diesel	0.09%	0.09%	0.0503	6.1428	0.5427	0.0256	0.3516	0.1597
T7 POLA	Diesel	0.39%	0.39%	0.2292	28.7464	2.4735	0.1203	1.5432	0.7145
T7 Public	Diesel	0.02%	0.02%	0.0141	1.3452	0.1136	0.0080	0.0861	0.0361
T7 Single	Diesel	0.24%	0.24%	0.1191	13.7102	1.2856	0.0806	0.9146	0.3971
T7 single construction	Diesel	0.04%	0.04%	0.0216	2.4858	0.2326	0.0146	0.1653	0.0718
T7 SWCV	Diesel	0.00%	0.00%	0.0005	0.5396	0.0015	0.0017	0.0043	0.0019
T7 SWCV	Natural Gas	0.07%	0.07%	0.1743	1.3009	34.6404	0.0000	0.2393	0.0913
T7 tractor	Diesel	0.33%	0.33%	0.1862	22.7999	2.0100	0.0967	1.3014	0.5915
T7 tractor construction	Diesel	0.04%	0.04%	0.0211	2.6199	0.2270	0.0118	0.1434	0.0660
T7 utility	Diesel	0.00%	0.00%	0.0006	0.0671	0.0069	0.0005	0.0056	0.0023
T7IS	Gasoline	0.00%	0.00%	0.0233	0.2260	2.2269	0.0011	0.0061	0.0024
UBUS	Gasoline	0.02%	0.02%	0.0172	0.2280	0.2931	0.0129	0.1098	0.0463
UBUS	Diesel	0.00%	0.00%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UBUS	Natural Gas	0.10%	0.10%	0.3036	1.6151	165.5049	0.0000	0.3393	0.1310
		100.00%	100.00%	48.03	301.16	1,739.71	8.03	175.23	71.83

Year 2045 General Plan Update: Criteria Air Pollutants

Source: EMFAC2021 Version 1.0.3 web database. Emission Rates. Orange County (South Coast Air Basin) Subregion

Daily VMT	1,562,196								lbs/day
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
All Other Buses	Diesel	0.04%	0.04%	0.0111	1.8756	0.1115	0.0104	0.2167	0.0964
LDA	Gasoline	52.02%	52.02%	3.2044	29.5933	711.6950	3.4520	81.1617	32.7130
LDA	Diesel	0.65%	0.65%	0.1125	0.1953	3.7311	0.0329	1.0161	0.4124
LDA	Electricity	3.54%	3.54%	0.0000	0.0000	0.0000	0.0000	5.4592	2.1654
LDT1	Gasoline	6.08%	6.08%	0.4198	3.8258	84.7951	0.4675	9.4903	3.8310
LDT1	Diesel	0.00%	0.00%	0.0005	0.0010	0.0052	0.0001	0.0014	0.0006
LDT1	Electricity	0.25%	0.25%	0.0000	0.0000	0.0000	0.0000	0.3800	0.1507
LDT2	Gasoline	16.89%	16.89%	1.5293	9.9181	268.5270	1.2850	26.3594	10.6303
LDT2	Diesel	0.17%	0.17%	0.1025	0.1910	1.0508	0.0118	0.2959	0.1323
LDT2	Electricity	0.56%	0.56%	0.0000	0.0000	0.0000	0.0000	0.8594	0.3409
LHD1	Gasoline	1.15%	1.15%	0.1288	3.6303	4.7097	0.2507	3.3786	1.4142
LHD1	Diesel	1.33%	1.33%	1.7522	3.1705	8.2771	0.1626	4.3032	1.8777
LHD2	Gasoline	0.20%	0.20%	0.0226	0.7152	0.8347	0.0511	0.6888	0.2892
LHD2	Diesel	0.52%	0.52%	0.7100	2.0829	3.4298	0.0708	2.0502	0.9601
MCY	Gasoline	0.48%	0.48%	37.2119	18.1772	276.1543	0.0347	0.2990	0.1369
MDV	Gasoline	10.52%	10.52%	1.0821	6.9527	171.4165	0.9746	16.4334	6.6310
MDV	Diesel	0.38%	0.38%	0.0756	0.1334	2.4765	0.0332	0.5990	0.2443
MDV	Electricity	0.41%	0.41%	0.0000	0.0000	0.0000	0.0000	0.6281	0.2491
MH	Gasoline	0.06%	0.06%	0.0194	0.3983	0.3535	0.0281	0.3106	0.1297
MH	Diesel	0.03%	0.03%	0.0426	2.0452	0.1294	0.0073	0.1663	0.0804
Motor Coach	Diesel	0.02%	0.02%	0.0121	1.4059	0.1304	0.0085	0.1266	0.0587
OBUS	Gasoline	0.04%	0.04%	0.0167	0.5566	0.3479	0.0196	0.2172	0.0907
PTO	Diesel	0.05%	0.05%	0.0425	7.6891	0.6809	0.0237	0.0082	0.0079
SBUS	Gasoline	0.04%	0.04%	0.0148	0.1808	0.2659	0.0088	0.9427	0.4032
SBUS	Diesel	0.04%	0.04%	0.0139	2.5910	0.1771	0.0117	1.0705	0.4588
T6 CAIRP heavy	Diesel	0.02%	0.02%	0.0054	0.7848	0.0541	0.0051	0.1236	0.0537
T6 CAIRP small	Diesel	0.00%	0.00%	0.0007	0.1067	0.0072	0.0007	0.0163	0.0071
T6 instate construction heavy	Diesel	0.02%	0.02%	0.0066	1.1028	0.0658	0.0061	0.1278	0.0569
T6 instate construction small	Diesel	0.13%	0.13%	0.0309	4.7803	0.3108	0.0306	0.6688	0.2932
T6 instate heavy	Diesel	0.95%	0.95%	0.2354	37.5184	2.3655	0.2096	4.9194	2.1673
T6 instate small	Diesel	1.26%	1.26%	0.2993	46.2054	3.0077	0.2964	6.4790	2.8401
T6 OOS heavy	Diesel	0.01%	0.01%	0.0030	0.4436	0.0306	0.0029	0.0700	0.0304
T6 OOS small	Diesel	0.00%	0.00%	0.0004	0.0650	0.0044	0.0004	0.0099	0.0043
T6 Public	Diesel	0.01%	0.01%	0.0030	0.3674	0.0263	0.0030	0.0624	0.0270
T6 utility	Diesel	0.01%	0.01%	0.0013	0.1563	0.0126	0.0015	0.0330	0.0141
T6TS	Gasoline	0.24%	0.24%	0.0733	0.6790	1.5028	0.1055	1.1731	0.4898
T7 Ag	Diesel	0.00%	0.00%	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000
T7 CAIRP	Diesel	0.23%	0.23%	0.1294	15.8059	1.3972	0.0659	0.9059	0.4115
T7 CAIRP construction	Diesel	0.02%	0.02%	0.0101	1.2367	0.1090	0.0057	0.0703	0.0320
T7 NNOOS	Diesel	0.28%	0.28%	0.1482	17.5657	1.6000	0.0804	1.0837	0.4818
T7 NOOS	Diesel	0.09%	0.09%	0.0509	6.2217	0.5496	0.0259	0.3561	0.1618
T7 POLA	Diesel	0.39%	0.39%	0.2321	29.1155	2.5052	0.1219	1.5630	0.7237
T7 Public	Diesel	0.02%	0.02%	0.0143	1.3625	0.1150	0.0081	0.0872	0.0366
T7 Single	Diesel	0.24%	0.24%	0.1206	13.8862	1.3021	0.0817	0.9263	0.4022
T7 single construction	Diesel	0.04%	0.04%	0.0219	2.5177	0.2356	0.0148	0.1675	0.0727
T7 SWCV	Diesel	0.00%	0.00%	0.0005	0.5465	0.0015	0.0018	0.0043	0.0019
T7 SWCV	Natural Gas	0.07%	0.07%	0.1765	1.3176	35.0851	0.0000	0.2424	0.0924
T7 tractor	Diesel	0.33%	0.33%	0.1886	23.0927	2.0358	0.0980	1.3182	0.5991
T7 tractor construction	Diesel	0.04%	0.04%	0.0213	2.6535	0.2299	0.0119	0.1453	0.0668
T7 utility	Diesel	0.00%	0.00%	0.0006	0.0680	0.0070	0.0005	0.0057	0.0023
T7IS	Gasoline	0.00%	0.00%	0.0236	0.2289	2.2555	0.0011	0.0062	0.0024
UBUS	Gasoline	0.02%	0.02%	0.0174	0.2309	0.2969	0.0131	0.1112	0.0469
UBUS	Diesel	0.00%	0.00%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UBUS	Natural Gas	0.10%	0.10%	0.3075	1.6358	167.6298	0.0000	0.3437	0.1327
		100.00%	100.00%	48.65	305.03	1,762.04	8.14	177.48	72.76

Year 2045 Existing: Criteria Air Pollutants

Source: EMFAC2021 Version 1.0.3 web database. Emission Rates. Orange County (South Coast Air Basin) Subregion

Daily VMT	1,374,016								lbs/day
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
All Other Buses	Diesel	0.04%	0.04%	0.0098	1.6497	0.0980	0.0091	0.1906	0.0848
LDA	Gasoline	52.02%	52.02%	2.8184	26.0285	625.9652	3.0362	71.3850	28.7724
LDA	Diesel	0.65%	0.65%	0.0990	0.1717	3.2816	0.0289	0.8937	0.3628
LDA	Electricity	3.54%	3.54%	0.0000	0.0000	0.0000	0.0000	4.8016	1.9045
LDT1	Gasoline	6.08%	6.08%	0.3692	3.3649	74.5808	0.4112	8.3471	3.3695
LDT1	Diesel	0.00%	0.00%	0.0004	0.0008	0.0046	0.0001	0.0013	0.0006
LDT1	Electricity	0.25%	0.25%	0.0000	0.0000	0.0000	0.0000	0.3342	0.1326
LDT2	Gasoline	16.89%	16.89%	1.3451	8.7234	236.1806	1.1302	23.1842	9.3498
LDT2	Diesel	0.17%	0.17%	0.0902	0.1680	0.9242	0.0103	0.2602	0.1164
LDT2	Electricity	0.56%	0.56%	0.0000	0.0000	0.0000	0.0000	0.7558	0.2998
LHD1	Gasoline	1.15%	1.15%	0.1133	3.1930	4.1424	0.2205	2.9716	1.2438
LHD1	Diesel	1.33%	1.33%	1.5411	2.7886	7.2801	0.1430	3.7849	1.6516
LHD2	Gasoline	0.20%	0.20%	0.0199	0.6290	0.7342	0.0450	0.6059	0.2544
LHD2	Diesel	0.52%	0.52%	0.6245	1.8320	3.0167	0.0623	1.8032	0.8445
MCY	Gasoline	0.48%	0.48%	32.7294	15.9876	242.8891	0.0306	0.2630	0.1204
MDV	Gasoline	10.52%	10.52%	0.9517	6.1152	150.7679	0.8572	14.4539	5.8323
MDV	Diesel	0.38%	0.38%	0.0665	0.1173	2.1782	0.0292	0.5268	0.2149
MDV	Electricity	0.41%	0.41%	0.0000	0.0000	0.0000	0.0000	0.5524	0.2191
MH	Gasoline	0.06%	0.06%	0.0171	0.3503	0.3109	0.0247	0.2732	0.1141
MH	Diesel	0.03%	0.03%	0.0375	1.7989	0.1138	0.0065	0.1463	0.0707
Motor Coach	Diesel	0.02%	0.02%	0.0106	1.2365	0.1147	0.0074	0.1114	0.0516
OBUS	Gasoline	0.04%	0.04%	0.0147	0.4896	0.3060	0.0172	0.1910	0.0798
PTO	Diesel	0.05%	0.05%	0.0374	6.7629	0.5989	0.0209	0.0072	0.0069
SBUS	Gasoline	0.04%	0.04%	0.0130	0.1590	0.2338	0.0078	0.8292	0.3546
SBUS	Diesel	0.04%	0.04%	0.0122	2.2789	0.1558	0.0103	0.9415	0.4036
T6 CAIRP heavy	Diesel	0.02%	0.02%	0.0047	0.6902	0.0476	0.0045	0.1087	0.0473
T6 CAIRP small	Diesel	0.00%	0.00%	0.0006	0.0938	0.0064	0.0007	0.0143	0.0062
T6 instate construction heavy	Diesel	0.02%	0.02%	0.0058	0.9700	0.0579	0.0054	0.1124	0.0500
T6 instate construction small	Diesel	0.13%	0.13%	0.0272	4.2045	0.2734	0.0269	0.5882	0.2579
T6 instate heavy	Diesel	0.95%	0.95%	0.2070	32.9990	2.0806	0.1844	4.3268	1.9063
T6 instate small	Diesel	1.26%	1.26%	0.2632	40.6396	2.6454	0.2607	5.6986	2.4979
T6 OOS heavy	Diesel	0.01%	0.01%	0.0027	0.3902	0.0269	0.0025	0.0616	0.0268
T6 OOS small	Diesel	0.00%	0.00%	0.0004	0.0572	0.0039	0.0004	0.0087	0.0038
T6 Public	Diesel	0.01%	0.01%	0.0027	0.3231	0.0231	0.0026	0.0549	0.0237
T6 utility	Diesel	0.01%	0.01%	0.0011	0.1375	0.0111	0.0013	0.0291	0.0124
T6TS	Gasoline	0.24%	0.24%	0.0645	0.5972	1.3218	0.0928	1.0317	0.4308
T7 Ag	Diesel	0.00%	0.00%	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000
T7 CAIRP	Diesel	0.23%	0.23%	0.1139	13.9020	1.2289	0.0580	0.7968	0.3619
T7 CAIRP construction	Diesel	0.02%	0.02%	0.0089	1.0877	0.0958	0.0050	0.0618	0.0282
T7 NNOOS	Diesel	0.28%	0.28%	0.1304	15.4498	1.4073	0.0707	0.9532	0.4238
T7 NOOS	Diesel	0.09%	0.09%	0.0448	5.4722	0.4834	0.0228	0.3132	0.1423
T7 POLA	Diesel	0.39%	0.39%	0.2041	25.6083	2.2035	0.1072	1.3747	0.6365
T7 Public	Diesel	0.02%	0.02%	0.0126	1.1984	0.1012	0.0072	0.0767	0.0322
T7 Single	Diesel	0.24%	0.24%	0.1061	12.2135	1.1453	0.0718	0.8147	0.3538
T7 single construction	Diesel	0.04%	0.04%	0.0193	2.2144	0.2072	0.0130	0.1473	0.0640
T7 SWCV	Diesel	0.00%	0.00%	0.0004	0.4807	0.0013	0.0016	0.0038	0.0017
T7 SWCV	Natural Gas	0.07%	0.07%	0.1553	1.1589	30.8588	0.0000	0.2132	0.0813
T7 tractor	Diesel	0.33%	0.33%	0.1659	20.3109	1.7906	0.0862	1.1594	0.5269
T7 tractor construction	Diesel	0.04%	0.04%	0.0188	2.3339	0.2022	0.0105	0.1278	0.0588
T7 utility	Diesel	0.00%	0.00%	0.0006	0.0598	0.0062	0.0005	0.0050	0.0020
T7IS	Gasoline	0.00%	0.00%	0.0207	0.2013	1.9838	0.0010	0.0055	0.0021
UBUS	Gasoline	0.02%	0.02%	0.0153	0.2031	0.2611	0.0115	0.0978	0.0412
UBUS	Diesel	0.00%	0.00%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UBUS	Natural Gas	0.10%	0.10%	0.2704	1.4388	147.4373	0.0000	0.3023	0.1167
		100.00%	100.00%	42.79	268.28	1,549.79	7.16	156.10	63.99

Year 2045 Current General Plan: Greenhouse Gas Emissions

Source: EMFAC2021 Version 1.0.3 web database. Orange County (South Coast Air Basin) Subregion

Adjusted Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the 2008 Climate Change Scoping Plan Measure Documentation Supplement.

				CO_2	CH_4	N_2O	
				AR5 GWP	AR5 GWP	AR5 GWP	
Annual VMT 535,210,371				1	28	265	
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
All Other Buses	Diesel	0.04%	0.04%	171	0.000	0.027	178
LDA	Gasoline	52.02%	52.02%	54,210	0.183	0.793	54,425
LDA	Diesel	0.65%	0.65%	540	0.001	0.085	563
LDA	Electricity	3.54%	3.54%	0	0.000	0.000	0
LDT1	Gasoline	6.08%	6.08%	7,342	0.023	0.098	7,368
LDT1	Diesel	0.00%	0.00%	1	0.000	0.000	1
LDT1	Electricity	0.25%	0.25%	0	0.000	0.000	0
LDT2	Gasoline	16.89%	16.89%	20,180	0.083	0.259	20,250
LDT2	Diesel	0.17%	0.17%	193	0.001	0.030	201
LDT2	Electricity	0.56%	0.56%	0	0.000	0.000	0
LHD1	Gasoline	1.15%	1.15%	3,938	0.006	0.047	3,950
LHD1	Diesel	1.33%	1.33%	2,673	0.013	0.420	2,784
LHD2	Gasoline	0.20%	0.20%	803	0.001	0.009	805
LHD2	Diesel	0.52%	0.52%	1,164	0.005	0.183	1,212
MCY	Gasoline	0.48%	0.48%	546	0.861	0.164	613
MDV	Gasoline	10.52%	10.52%	15,305	0.056	0.171	15,352
MDV	Diesel	0.38%	0.38%	546	0.001	0.086	569
MDV	Electricity	0.41%	0.41%	0	0.000	0.000	0
MH	Gasoline	0.06%	0.06%	441	0.001	0.006	442
MH	Diesel	0.03%	0.03%	121	0.000	0.019	126
Motor Coach	Diesel	0.02%	0.02%	139	0.000	0.022	145
OBUS	Gasoline	0.04%	0.04%	308	0.001	0.005	309
PTO	Diesel	0.05%	0.05%	390	0.000	0.061	406
SBUS	Gasoline	0.04%	0.04%	139	0.001	0.002	139
SBUS	Diesel	0.04%	0.04%	193	0.000	0.030	201
T6 CAIRP heavy	Diesel	0.02%	0.02%	84	0.000	0.013	87
T6 CAIRP small	Diesel	0.00%	0.00%	12	0.000	0.002	13
T6 instate construction heavy	Diesel	0.02%	0.02%	101	0.000	0.016	105
T6 instate construction small	Diesel	0.13%	0.13%	503	0.000	0.079	524
T6 instate heavy	Diesel	0.95%	0.95%	3,448	0.002	0.542	3,592
T6 instate small	Diesel	1.26%	1.26%	4,875	0.002	0.766	5,078
T6 OOS heavy	Diesel	0.01%	0.01%	47	0.000	0.007	49
T6 OOS small	Diesel	0.00%	0.00%	7	0.000	0.001	8
T6 Public	Diesel	0.01%	0.01%	49	0.000	0.008	51
T6 utility	Diesel	0.01%	0.01%	25	0.000	0.004	26
T6TS	Gasoline	0.24%	0.24%	1,657	0.003	0.010	1,660
T7 Ag	Diesel	0.00%	0.00%	0	0.000	0.000	0
T7 CAIRP	Diesel	0.23%	0.23%	1,084	0.001	0.170	1,129
T7 CAIRP construction	Diesel	0.02%	0.02%	93	0.000	0.015	97
T7 NNOOS	Diesel	0.28%	0.28%	1,322	0.001	0.208	1,377
T7 NOOS	Diesel	0.09%	0.09%	426	0.000	0.067	444
T7 POLA	Diesel	0.39%	0.39%	2,005	0.002	0.315	2,089
T7 Public	Diesel	0.02%	0.02%	134	0.000	0.021	139
T7 Single	Diesel	0.24%	0.24%	1,343	0.001	0.211	1,399
T7 single construction	Diesel	0.04%	0.04%	243	0.000	0.038	253
T7 SWCV	Diesel	0.00%	0.00%	29	0.000	0.005	30
T7 SWCV	Natural Gas	0.07%	0.07%	972	1.507	0.198	1,067
T7 tractor	Diesel	0.33%	0.33%	1,612	0.001	0.253	1,679
T7 tractor construction	Diesel	0.04%	0.04%	196	0.000	0.031	204
T7 utility	Diesel	0.00%	0.00%	9	0.000	0.001	9
T7IS	Gasoline	0.00%	0.00%	18	0.001	0.001	18
UBUS	Gasoline	0.02%	0.02%	206	0.001	0.003	207
UBUS	Diesel	0.00%	0.00%	0	0.000	0.000	0
UBUS	Natural Gas	0.10%	0.10%	1,047	3.344	0.213	1,197
		100.00%	**100.00%**	**130,890**	**6**	**6**	**132,577**

Year 2045 General Plan Update: Greenhouse Gas Emissions

Source: EMFAC2021 Version 1.0.3 web database. Orange County (South Coast Air Basin) Subregion

Adjusted Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the 2008 Climate Change Scoping Plan Measure Documentation Supplement.

				CO_2	CH_4	N_2O	
				AR5 GWP	AR5 GWP	AR5 GWP	
Annual VMT 542,082,012				1	28	265	
Vehicle Type	**Fuel Type**	**Percent of VMT**	**Percent for Fountain Valley (Default)**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
All Other Buses	Diesel	0.04%	0.04%	173	0.000	0.027	181
LDA	Gasoline	52.02%	52.02%	54,906	0.186	0.803	55,124
LDA	Diesel	0.65%	0.65%	547	0.001	0.086	570
LDA	Electricity	3.54%	3.54%	0	0.000	0.000	0
LDT1	Gasoline	6.08%	6.08%	7,436	0.024	0.099	7,463
LDT1	Diesel	0.00%	0.00%	1	0.000	0.000	1
LDT1	Electricity	0.25%	0.25%	0	0.000	0.000	0
LDT2	Gasoline	16.89%	16.89%	20,439	0.084	0.262	20,510
LDT2	Diesel	0.17%	0.17%	196	0.001	0.031	204
LDT2	Electricity	0.56%	0.56%	0	0.000	0.000	0
LHD1	Gasoline	1.15%	1.15%	3,988	0.007	0.048	4,001
LHD1	Diesel	1.33%	1.33%	2,707	0.013	0.425	2,820
LHD2	Gasoline	0.20%	0.20%	813	0.001	0.009	816
LHD2	Diesel	0.52%	0.52%	1,179	0.005	0.185	1,228
MCY	Gasoline	0.48%	0.48%	553	0.872	0.166	621
MDV	Gasoline	10.52%	10.52%	15,502	0.057	0.173	15,549
MDV	Diesel	0.38%	0.38%	553	0.001	0.087	576
MDV	Electricity	0.41%	0.41%	0	0.000	0.000	0
MH	Gasoline	0.06%	0.06%	447	0.001	0.006	448
MH	Diesel	0.03%	0.03%	122	0.000	0.019	127
Motor Coach	Diesel	0.02%	0.02%	141	0.000	0.022	147
OBUS	Gasoline	0.04%	0.04%	312	0.001	0.005	313
PTO	Diesel	0.05%	0.05%	395	0.000	0.062	412
SBUS	Gasoline	0.04%	0.04%	140	0.001	0.003	141
SBUS	Diesel	0.04%	0.04%	196	0.000	0.031	204
T6 CAIRP heavy	Diesel	0.02%	0.02%	85	0.000	0.013	88
T6 CAIRP small	Diesel	0.00%	0.00%	12	0.000	0.002	13
T6 instate construction heavy	Diesel	0.02%	0.02%	102	0.000	0.016	106
T6 instate construction small	Diesel	0.13%	0.13%	510	0.000	0.080	531
T6 instate heavy	Diesel	0.95%	0.95%	3,493	0.002	0.549	3,638
T6 instate small	Diesel	1.26%	1.26%	4,938	0.002	0.776	5,144
T6 OOS heavy	Diesel	0.01%	0.01%	48	0.000	0.008	50
T6 OOS small	Diesel	0.00%	0.00%	7	0.000	0.001	8
T6 Public	Diesel	0.01%	0.01%	49	0.000	0.008	52
T6 utility	Diesel	0.01%	0.01%	25	0.000	0.004	27
T6TS	Gasoline	0.24%	0.24%	1,679	0.003	0.010	1,681
T7 Ag	Diesel	0.00%	0.00%	0	0.000	0.000	0
T7 CAIRP	Diesel	0.23%	0.23%	1,098	0.001	0.173	1,144
T7 CAIRP construction	Diesel	0.02%	0.02%	94	0.000	0.015	98
T7 NNOOS	Diesel	0.28%	0.28%	1,339	0.001	0.211	1,395
T7 NOOS	Diesel	0.09%	0.09%	432	0.000	0.068	450
T7 POLA	Diesel	0.39%	0.39%	2,031	0.002	0.319	2,115
T7 Public	Diesel	0.02%	0.02%	135	0.000	0.021	141
T7 Single	Diesel	0.24%	0.24%	1,361	0.001	0.214	1,417
T7 single construction	Diesel	0.04%	0.04%	246	0.000	0.039	256
T7 SWCV	Diesel	0.00%	0.00%	29	0.000	0.005	31
T7 SWCV	Natural Gas	0.07%	0.07%	985	1.527	0.201	1,081
T7 tractor	Diesel	0.33%	0.33%	1,633	0.001	0.257	1,701
T7 tractor construction	Diesel	0.04%	0.04%	199	0.000	0.031	207
T7 utility	Diesel	0.00%	0.00%	9	0.000	0.001	9
T7IS	Gasoline	0.00%	0.00%	18	0.001	0.002	18
UBUS	Gasoline	0.02%	0.02%	208	0.001	0.003	209
UBUS	Diesel	0.00%	0.00%	0	0.000	0.000	0
UBUS	Natural Gas	0.10%	0.10%	1,060	3.387	0.216	1,212
		100.00%	**100.00%**	**132,571**	**6**	**6**	**134,279**

Source: EMFAC2021 (v1.0.3) Emission Rates

Region Type: County
Region: Orange (SC)
Calendar Year: 2045
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN

g/mile 2.205E-03

Vehicle Category	Fuel	VMT Total	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUNEX	PM10_PMTW	PM10_PMBW	PM10_TOTAL	PM2.5_RUNEX	PM2.5_PMTW	PM2.5_PMBW	PM2.5_TOTAL	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX	% of VMT
All Other Buses	Diesel	42,508	7.74E-03	1.31E+00	7.77E-02	7.25E-03	8.77E-03	1.20E-02	1.30E-01	1.51E-01	8.39E-03	3.00E-03	5.59E-02	6.72E-02	7.68E+02	3.59E-04	1.21E-01	0.04%
LDA	Gasoline	53,107,647	1.79E-03	1.65E-02	3.97E-01	1.93E-03	5.56E-04	8.00E-03	3.68E-02	4.53E-02	5.11E-04	2.00E-03	1.58E-02	1.83E-02	1.95E+02	6.59E-04	2.85E-03	52.02%
LDA	Diesel	661,954	5.04E-03	8.74E-03	1.67E-01	1.47E-03	7.54E-04	8.00E-03	3.68E-02	4.55E-02	7.21E-04	2.00E-03	1.58E-02	1.85E-02	1.56E+02	2.34E-04	2.45E-02	0.65%
LDA	Electricity	3,616,530	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	3.54%
LDT1	Gasoline	6,202,589	2.01E-03	1.83E-02	4.05E-01	2.23E-03	6.09E-04	8.00E-03	3.68E-02	4.54E-02	5.60E-04	2.00E-03	1.58E-02	1.83E-02	2.26E+02	7.20E-04	3.02E-03	6.08%
LDT1	Diesel	856	1.73E-02	3.35E-02	1.81E-01	2.79E-03	4.59E-03	8.00E-03	3.68E-02	4.93E-02	4.39E-03	2.00E-03	1.58E-02	2.21E-02	2.95E+02	8.02E-04	4.64E-02	0.00%
LDT1	Electricity	251,745	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.25%
LDT2	Gasoline	17,240,650	2.63E-03	1.71E-02	4.62E-01	2.21E-03	5.75E-04	8.00E-03	3.68E-02	4.53E-02	5.29E-04	2.00E-03	1.58E-02	1.83E-02	2.23E+02	9.15E-04	2.86E-03	16.89%
LDT2	Diesel	178,322	1.70E-02	3.18E-02	1.75E-01	1.96E-03	4.44E-03	8.00E-03	3.68E-02	4.92E-02	4.25E-03	2.00E-03	1.58E-02	2.20E-02	2.07E+02	7.92E-04	3.25E-02	0.17%
LDT2	Electricity	569,295	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.56%
LHD1	Gasoline	1,169,989	3.26E-03	9.20E-02	1.19E-01	6.35E-03	1.17E-03	8.00E-03	7.64E-02	8.56E-02	1.07E-03	2.00E-03	3.28E-02	3.58E-02	6.42E+02	1.05E-03	7.72E-03	1.15%
LHD1	Diesel	1,358,858	3.82E-02	6.92E-02	1.81E-01	3.55E-03	5.44E-03	1.20E-02	7.64E-02	9.39E-02	5.21E-03	3.00E-03	3.28E-02	4.10E-02	3.75E+02	1.78E-03	5.90E-02	1.33%
LHD2	Gasoline	207,649	3.23E-03	1.02E-01	1.19E-01	7.30E-03	1.16E-03	8.00E-03	8.92E-02	9.83E-02	1.07E-03	2.00E-03	3.82E-02	4.13E-02	7.38E+02	1.04E-03	8.34E-03	0.20%
LHD2	Diesel	534,075	3.94E-02	1.16E-01	1.90E-01	3.93E-03	1.26E-02	1.20E-02	8.92E-02	1.14E-01	1.21E-02	3.00E-03	3.82E-02	5.33E-02	4.16E+02	1.83E-03	6.53E-02	0.52%
MCY	Gasoline	486,124	2.27E+00	1.11E+00	1.68E+01	2.12E-03	2.47E-03	4.00E-03	1.18E-02	1.82E-02	2.31E-03	1.00E-03	5.04E-03	8.35E-03	2.14E+02	3.38E-01	6.42E-02	0.48%
MDV	Gasoline	10,743,751	2.99E-03	1.92E-02	4.73E-01	2.69E-03	5.95E-04	8.00E-03	3.68E-02	4.53E-02	5.47E-04	2.00E-03	1.58E-02	1.83E-02	2.72E+02	9.98E-04	3.04E-03	10.52%
MDV	Diesel	388,850	5.77E-03	1.02E-02	1.89E-01	2.53E-03	9.14E-04	8.00E-03	3.68E-02	4.57E-02	8.74E-04	2.00E-03	1.58E-02	1.86E-02	2.68E+02	2.68E-04	4.21E-02	0.38%
MDV	Electricity	416,072	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-03	3.68E-02	4.48E-02	0.00E+00	2.00E-03	1.58E-02	1.78E-02	0.00E+00	0.00E+00	0.00E+00	0.41%
MH	Gasoline	64,181	8.97E-03	1.84E-01	1.63E-01	1.30E-02	1.15E-03	1.20E-02	1.30E-01	1.43E-01	1.06E-03	3.00E-03	5.59E-02	5.99E-02	1.31E+03	3.26E-03	1.73E-02	0.06%
MH	Diesel	29,135	4.34E-02	2.08E+00	1.32E-01	7.46E-03	2.29E-02	1.60E-02	1.30E-01	1.69E-01	2.19E-02	4.00E-03	5.59E-02	8.18E-02	7.89E+02	2.01E-03	1.24E-01	0.03%
Motor Coach	Diesel	23,945	1.50E-02	1.74E+00	1.61E-01	1.05E-02	1.44E-02	1.20E-02	1.30E-01	1.57E-01	1.38E-02	3.00E-03	5.59E-02	7.27E-02	1.11E+03	6.95E-04	1.74E-01	0.02%
OBUS	Gasoline	44,874	1.10E-02	3.68E-01	2.30E-01	1.29E-02	1.14E-03	1.20E-02	1.30E-01	1.43E-01	1.05E-03	3.00E-03	5.59E-02	5.99E-02	1.31E+03	2.90E-03	2.16E-02	0.04%
PTO	Diesel	49,079	2.57E-02	4.64E+00	4.11E-01	1.43E-02	4.96E-03	0.00E+00	0.00E+00	4.96E-03	4.75E-03	0.00E+00	0.00E+00	4.75E-03	1.52E+03	1.19E-03	2.38E-01	0.05%
SBUS	Gasoline	37,046	1.18E-02	1.45E-01	2.13E-01	7.06E-03	1.59E-03	8.00E-03	7.45E-01	7.54E-01	1.46E-03	2.00E-03	3.19E-01	3.23E-01	7.14E+02	2.67E-03	1.28E-02	0.04%
SBUS	Diesel	41,704	9.89E-03	1.84E+00	1.26E-01	8.35E-03	4.14E-03	1.20E-02	7.45E-01	7.61E-01	3.96E-03	3.00E-03	3.19E-01	3.26E-01	8.83E+02	4.59E-04	1.39E-01	0.04%
T6 CAIRP heavy	Diesel	24,740	6.45E-03	9.40E-01	6.48E-02	6.09E-03	5.79E-03	1.20E-02	1.30E-01	1.48E-01	5.54E-03	3.00E-03	5.59E-02	6.44E-02	6.45E+02	2.99E-04	1.01E-01	0.02%
T6 CAIRP small	Diesel	3,250	6.56E-03	9.73E-01	6.60E-02	6.76E-03	6.06E-03	1.20E-02	1.30E-01	1.48E-01	5.80E-03	3.00E-03	5.59E-02	6.47E-02	7.16E+02	3.05E-04	1.12E-01	0.00%
T6 instate construction heavy	Diesel	25,067	7.81E-03	1.30E+00	7.78E-02	7.25E-03	8.78E-03	1.20E-02	1.30E-01	1.51E-01	8.40E-03	3.00E-03	5.59E-02	6.73E-02	7.68E+02	3.63E-04	1.21E-01	0.02%
T6 instate construction small	Diesel	132,900	6.90E-03	1.07E+00	6.93E-02	6.83E-03	6.84E-03	1.20E-02	1.30E-01	1.49E-01	6.54E-03	3.00E-03	5.59E-02	6.54E-02	7.23E+02	3.20E-04	1.14E-01	0.13%
T6 instate heavy	Diesel	973,552	7.17E-03	1.14E+00	7.20E-02	6.38E-03	7.46E-03	1.20E-02	1.30E-01	1.50E-01	7.14E-03	3.00E-03	5.59E-02	6.60E-02	6.76E+02	3.33E-04	1.06E-01	0.95%
T6 instate small	Diesel	1,287,714	6.89E-03	1.06E+00	6.92E-02	6.82E-03	6.82E-03	1.20E-02	1.30E-01	1.49E-01	6.52E-03	3.00E-03	5.59E-02	6.54E-02	7.22E+02	3.20E-04	1.14E-01	1.26%
T6 OOS heavy	Diesel	14,016	6.44E-03	9.38E-01	6.47E-02	6.09E-03	5.77E-03	1.20E-02	1.30E-01	1.48E-01	5.53E-03	3.00E-03	5.59E-02	6.44E-02	6.45E+02	2.99E-04	1.01E-01	0.01%
T6 OOS small	Diesel	1,968	6.59E-03	9.80E-01	6.62E-02	6.77E-03	6.12E-03	1.20E-02	1.30E-01	1.48E-01	5.85E-03	3.00E-03	5.59E-02	6.47E-02	7.17E+02	3.06E-04	1.13E-01	0.00%
T6 Public	Diesel	12,560	7.18E-03	8.67E-01	6.20E-02	7.01E-03	5.04E-03	1.20E-02	1.30E-01	1.47E-01	4.82E-03	3.00E-03	5.59E-02	6.37E-02	7.42E+02	3.34E-04	1.17E-01	0.01%
T6 utility	Diesel	6,705	5.55E-03	6.91E-01	5.58E-02	6.76E-03	3.71E-03	1.20E-02	1.30E-01	1.46E-01	3.55E-03	3.00E-03	5.59E-02	6.24E-02	7.15E+02	2.58E-04	1.12E-01	0.01%
T6TS	Gasoline	242,354	8.96E-03	8.31E-02	1.84E-01	1.29E-02	1.15E-03	1.20E-02	1.30E-01	1.43E-01	1.06E-03	3.00E-03	5.59E-02	5.99E-02	1.30E+03	2.45E-03	7.77E-03	0.24%
T7 Ag	Diesel	4	2.31E-02	4.00E+00	2.50E-01	1.53E-02	3.14E-02	3.60E-02	6.17E-02	1.29E-01	3.01E-02	9.00E-03	2.65E-02	6.55E-02	1.62E+03	1.07E-03	2.54E-01	0.00%
T7 CAIRP	Diesel	232,475	1.65E-02	2.02E+00	1.78E-01	8.41E-03	1.78E-02	3.60E-02	6.17E-02	1.16E-01	1.70E-02	9.00E-03	2.65E-02	5.25E-02	8.90E+02	7.67E-04	1.40E-01	0.23%
T7 CAIRP construction	Diesel	18,006	1.66E-02	2.04E+00	1.79E-01	9.32E-03	1.80E-02	3.60E-02	6.17E-02	1.16E-01	1.73E-02	9.00E-03	2.65E-02	5.27E-02	9.86E+02	7.72E-04	1.55E-01	0.02%
T7 NNOOS	Diesel	283,421	1.55E-02	1.84E+00	1.67E-01	8.41E-03	1.56E-02	3.60E-02	6.17E-02	1.13E-01	1.49E-02	9.00E-03	2.65E-02	5.04E-02	8.90E+02	7.20E-04	1.40E-01	0.28%
T7 NOOS	Diesel	91,342	1.65E-02	2.02E+00	1.78E-01	8.41E-03	1.78E-02	3.60E-02	6.17E-02	1.16E-01	1.71E-02	9.00E-03	2.65E-02	5.25E-02	8.90E+02	7.68E-04	1.40E-01	0.09%
T7 POLA	Diesel	394,089	1.75E-02	2.19E+00	1.88E-01	9.17E-03	1.98E-02	3.60E-02	6.17E-02	1.18E-01	1.90E-02	9.00E-03	2.65E-02	5.44E-02	9.71E+02	8.11E-04	1.53E-01	0.39%
T7 Public	Diesel	23,923	1.77E-02	1.69E+00	1.43E-01	1.01E-02	1.03E-02	3.60E-02	6.17E-02	1.08E-01	9.88E-03	9.00E-03	2.65E-02	4.53E-02	1.07E+03	8.22E-04	1.68E-01	0.02%
T7 Single	Diesel	247,172	1.45E-02	1.67E+00	1.56E-01	9.80E-03	1.34E-02	3.60E-02	6.17E-02	1.11E-01	1.28E-02	9.00E-03	2.65E-02	4.82E-02	1.04E+03	6.72E-04	1.63E-01	0.24%
T7 single construction	Diesel	44,670	1.45E-02	1.67E+00	1.56E-01	9.79E-03	1.34E-02	3.60E-02	6.17E-02	1.11E-01	1.28E-02	9.00E-03	2.65E-02	4.83E-02	1.04E+03	6.75E-04	1.63E-01	0.04%
T7 SWCV	Diesel	1,144	1.19E-02	1.42E+01	3.84E-02	4.57E-02	1.38E-02	3.60E-02	6.17E-02	1.12E-01	1.32E-02	9.00E-03	2.65E-02	4.87E-02	4.84E+03	5.53E-04	7.61E-01	0.00%
T7 SWCV	Natural Gas	71,223	7.35E-02	5.48E-01	1.46E+01	0.00E+00	3.15E-03	3.60E-02	6.17E-02	1.01E-01	3.02E-03	9.00E-03	2.65E-02	3.85E-02	2.60E+03	4.04E+00	5.31E-01	0.07%
T7 tractor	Diesel	338,076	1.65E-02	2.02E+00	1.79E-01	8.59E-03	1.78E-02	3.60E-02	6.17E-02	1.16E-01	1.71E-02	9.00E-03	2.65E-02	5.25E-02	9.10E+02	7.68E-04	1.43E-01	0.33%
T7 tractor construction	Diesel	36,849	1.72E-02	2.13E+00	1.85E-01	9.60E-03	1.91E-02	3.60E-02	6.17E-02	1.17E-01	1.83E-02	9.00E-03	2.65E-02	5.38E-02	1.02E+03	7.97E-04	1.60E-01	0.04%
T7 utility	Diesel	1,599	1.20E-02	1.26E+00	1.30E-01	1.00E-02	8.08E-03	3.60E-02	6.17E-02	1.06E-01	7.73E-03	9.00E-03	2.65E-02	4.32E-02	1.06E+03	5.59E-04	1.66E-01	0.00%
T7IS	Gasoline	2,217	3.15E-01	3.06E+00	3.02E+01	1.50E-02	1.16E-03	2.00E-02	6.17E-02	8.29E-02	1.07E-03	5.00E-03	2.65E-02	3.25E-02	1.52E+03	7.12E-02	1.28E-01	0.00%
UBUS	Gasoline	22,775	2.27E-02	3.01E-01	3.86E-01	1.70E-02	2.38E-03	1.20E-02	1.30E-01	1.45E-01	2.19E-03	3.00E-03	5.59E-02	6.10E-02	1.72E+03	6.81E-03	2.54E-02	0.02%
UBUS	Diesel	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00%
UBUS	Natural Gas	98,255	9.28E-02	4.94E-01	5.06E+01	0.00E+00	3.34E-03	3.46E-02	6.58E-02	1.04E-01	3.19E-03	8.65E-03	2.82E-02	4.00E-02	2.03E+03	6.49E+00	4.14E-01	0.10%
		102,099,492																**100.00%**

Source: EMFAC2021 (v1.0.3)

Region Type: County
Region: Orange (SC)
Calendar Year: 2045
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for T

		lbs/Mile														
Vehicle Category	Fuel	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+ACC)_RUNEX	CH4_RUNEX	N2O_RUNEX
All Other Buses	Diesel	1.705E-05	2.884E-03	1.714E-04	1.599E-05	1.932E-05	2.646E-05	2.873E-04	3.331E-04	1.849E-05	6.614E-06	1.231E-04	1.483E-04	1.693E+00	7.921E-07	2.661E-04
LDA	Gasoline	3.944E-06	3.642E-05	8.758E-04	4.248E-06	1.225E-06	1.764E-05	8.102E-05	9.988E-05	1.126E-06	4.409E-06	3.472E-05	4.026E-05	4.293E-01	1.452E-06	6.277E-06
LDA	Diesel	1.111E-05	1.928E-05	3.684E-04	3.244E-06	1.662E-06	1.764E-05	8.102E-05	1.003E-04	1.590E-06	4.409E-06	3.472E-05	4.072E-05	3.432E-01	5.160E-07	5.394E-05
LDA	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
LDT1	Gasoline	4.423E-06	4.031E-05	8.935E-04	4.926E-06	1.343E-06	1.764E-05	8.102E-05	1.000E-04	1.235E-06	4.409E-06	3.472E-05	4.037E-05	4.978E-01	1.588E-06	6.650E-06
LDT1	Diesel	3.804E-05	7.376E-05	3.987E-04	6.153E-06	1.012E-05	1.764E-05	8.102E-05	1.088E-04	9.680E-06	4.409E-06	3.472E-05	4.881E-05	6.508E-01	1.767E-06	1.023E-04
LDT1	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
LDT2	Gasoline	5.797E-06	3.760E-05	1.018E-03	4.871E-06	1.268E-06	1.764E-05	8.102E-05	9.992E-05	1.166E-06	4.409E-06	3.472E-05	4.030E-05	4.923E-01	2.017E-06	6.314E-06
LDT2	Diesel	3.757E-05	7.001E-05	3.851E-04	4.311E-06	9.786E-06	1.764E-05	8.102E-05	1.084E-04	9.363E-06	4.409E-06	3.472E-05	4.849E-05	4.560E-01	1.745E-06	7.168E-05
LDT2	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
LHD1	Gasoline	7.195E-06	2.028E-04	2.631E-04	1.401E-05	2.572E-06	1.764E-05	1.685E-04	1.887E-04	2.365E-06	4.409E-06	7.222E-05	7.900E-05	1.415E+00	2.318E-06	1.701E-05
LHD1	Diesel	8.427E-05	1.525E-04	3.981E-04	7.820E-06	1.200E-05	2.646E-05	1.685E-04	2.070E-04	1.148E-05	6.614E-06	7.222E-05	9.031E-05	8.271E-01	3.914E-06	1.300E-04
LHD2	Gasoline	7.116E-06	2.251E-04	2.627E-04	1.610E-05	2.561E-06	1.764E-05	1.966E-04	2.168E-04	2.354E-06	4.409E-06	8.426E-05	9.102E-05	1.626E+00	2.285E-06	1.840E-05
LHD2	Diesel	8.689E-05	2.549E-04	4.197E-04	8.663E-06	2.782E-05	2.646E-05	1.966E-04	2.509E-04	2.662E-05	6.614E-06	8.426E-05	1.175E-04	9.163E-01	4.036E-06	1.440E-04
MCY	Gasoline	5.003E-03	2.444E-03	3.713E-02	4.671E-06	5.455E-06	8.818E-06	2.593E-05	4.020E-05	5.086E-06	2.205E-06	1.111E-05	1.840E-05	4.720E-01	7.449E-04	1.415E-04
MDV	Gasoline	6.583E-06	4.229E-05	1.043E-03	5.929E-06	1.312E-06	1.764E-05	8.102E-05	9.997E-05	1.206E-06	4.409E-06	3.472E-05	4.034E-05	5.991E-01	2.200E-06	6.691E-06
MDV	Diesel	1.271E-05	2.241E-05	4.162E-04	5.582E-06	2.015E-06	1.764E-05	8.102E-05	1.007E-04	1.928E-06	4.409E-06	3.472E-05	4.106E-05	5.904E-01	5.904E-07	9.281E-05
MDV	Electricity	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.764E-05	8.102E-05	9.866E-05	0.000E+00	4.409E-06	3.472E-05	3.913E-05	0.000E+00	0.000E+00	0.000E+00
MH	Gasoline	1.977E-05	4.055E-04	3.600E-04	2.859E-05	2.532E-06	2.646E-05	2.873E-04	3.163E-04	2.328E-06	6.614E-06	1.231E-04	1.321E-04	2.889E+00	7.179E-06	3.811E-05
MH	Diesel	9.561E-05	4.588E-03	2.903E-04	1.645E-05	5.053E-05	3.527E-05	2.873E-04	3.732E-04	4.834E-05	8.818E-06	1.231E-04	1.803E-04	1.740E+00	4.441E-06	2.736E-04
Motor Coach	Diesel	3.298E-05	3.837E-03	3.560E-04	2.309E-05	3.183E-05	2.646E-05	2.873E-04	3.456E-04	3.045E-05	6.614E-06	1.231E-04	1.602E-04	2.444E+00	1.532E-06	3.842E-04
OBUS	Gasoline	2.430E-05	8.107E-04	5.067E-04	2.854E-05	2.521E-06	2.646E-05	2.873E-04	3.163E-04	2.318E-06	6.614E-06	1.231E-04	1.321E-04	2.884E+00	6.388E-06	4.758E-05
PTO	Diesel	5.658E-05	1.024E-02	9.067E-04	3.158E-05	1.094E-05	0.000E+00	0.000E+00	1.094E-05	1.047E-05	0.000E+00	0.000E+00	1.047E-05	3.343E+00	2.628E-06	5.255E-04
SBUS	Gasoline	2.611E-05	3.189E-04	4.690E-04	1.557E-05	3.508E-06	1.764E-05	1.642E-03	1.663E-03	3.226E-06	4.409E-06	7.037E-04	7.113E-04	1.574E+00	5.882E-06	2.832E-05
SBUS	Diesel	2.180E-05	4.060E-03	2.776E-04	1.840E-05	9.121E-06	2.646E-05	1.642E-03	1.678E-03	8.726E-06	6.614E-06	7.037E-04	7.190E-04	1.947E+00	1.013E-06	3.061E-04
T6 CAIRP heavy	Diesel	1.421E-05	2.073E-03	1.428E-04	1.343E-05	1.277E-05	2.646E-05	2.873E-04	3.266E-04	1.222E-05	6.614E-06	1.231E-04	1.420E-04	1.422E+00	6.601E-07	2.235E-04
T6 CAIRP small	Diesel	1.447E-05	2.145E-03	1.454E-04	1.490E-05	1.337E-05	2.646E-05	2.873E-04	3.272E-04	1.279E-05	6.614E-06	1.231E-04	1.426E-04	1.578E+00	6.721E-07	2.480E-04
T6 instate construction heavy	Diesel	1.722E-05	2.875E-03	1.716E-04	1.599E-05	1.936E-05	2.646E-05	2.873E-04	3.332E-04	1.852E-05	6.614E-06	1.231E-04	1.483E-04	1.692E+00	7.997E-07	2.660E-04
T6 instate construction small	Diesel	1.521E-05	2.351E-03	1.529E-04	1.505E-05	1.508E-05	2.646E-05	2.873E-04	3.289E-04	1.443E-05	6.614E-06	1.231E-04	1.442E-04	1.593E+00	7.065E-07	2.504E-04
T6 instate heavy	Diesel	1.580E-05	2.519E-03	1.588E-04	1.407E-05	1.645E-05	2.646E-05	2.873E-04	3.302E-04	1.573E-05	6.614E-06	1.231E-04	1.455E-04	1.490E+00	7.339E-07	2.342E-04
T6 instate small	Diesel	1.519E-05	2.345E-03	1.526E-04	1.504E-05	1.503E-05	2.646E-05	2.873E-04	3.288E-04	1.438E-05	6.614E-06	1.231E-04	1.441E-04	1.592E+00	7.055E-07	2.503E-04
T6 OOS heavy	Diesel	1.420E-05	2.069E-03	1.427E-04	1.343E-05	1.273E-05	2.646E-05	2.873E-04	3.265E-04	1.218E-05	6.614E-06	1.231E-04	1.419E-04	1.422E+00	6.594E-07	2.235E-04
T6 OOS small	Diesel	1.452E-05	2.159E-03	1.460E-04	1.493E-05	1.349E-05	2.646E-05	2.873E-04	3.273E-04	1.290E-05	6.614E-06	1.231E-04	1.427E-04	1.580E+00	6.745E-07	2.484E-04
T6 Public	Diesel	1.583E-05	1.912E-03	1.367E-04	1.545E-05	1.110E-05	2.646E-05	2.873E-04	3.249E-04	1.062E-05	6.614E-06	1.231E-04	1.404E-04	1.636E+00	7.352E-07	2.571E-04
T6 utility	Diesel	1.224E-05	1.523E-03	1.230E-04	1.489E-05	8.185E-06	2.646E-05	2.873E-04	3.220E-04	7.831E-06	6.614E-06	1.231E-04	1.376E-04	1.576E+00	5.683E-07	2.478E-04
T6TS	Gasoline	1.976E-05	1.831E-04	4.053E-04	2.846E-05	2.537E-06	2.646E-05	2.873E-04	3.163E-04	2.332E-06	6.614E-06	1.231E-04	1.321E-04	2.876E+00	5.394E-06	1.714E-05
T7 Ag	Diesel	5.098E-05	8.816E-03	5.502E-04	3.369E-05	6.929E-05	7.937E-05	1.361E-04	2.848E-04	6.629E-05	1.984E-05	5.833E-05	1.445E-04	3.566E+00	2.368E-06	5.605E-04
T7 CAIRP	Diesel	3.639E-05	4.444E-03	3.928E-04	1.853E-05	3.920E-05	7.937E-05	1.361E-04	2.547E-04	3.750E-05	1.984E-05	5.833E-05	1.157E-04	1.961E+00	1.690E-06	3.083E-04
T7 CAIRP construction	Diesel	3.665E-05	4.489E-03	3.955E-04	2.054E-05	3.975E-05	7.937E-05	1.361E-04	2.552E-04	3.803E-05	1.984E-05	5.833E-05	1.162E-04	2.174E+00	1.702E-06	3.418E-04
T7 NNOOS	Diesel	3.418E-05	4.051E-03	3.690E-04	1.854E-05	3.442E-05	7.937E-05	1.361E-04	2.499E-04	3.293E-05	1.984E-05	5.833E-05	1.111E-04	1.962E+00	1.588E-06	3.084E-04
T7 NOOS	Diesel	3.643E-05	4.452E-03	3.933E-04	1.854E-05	3.929E-05	7.937E-05	1.361E-04	2.548E-04	3.759E-05	1.984E-05	5.833E-05	1.158E-04	1.962E+00	1.692E-06	3.084E-04
T7 POLA	Diesel	3.849E-05	4.829E-03	4.155E-04	2.021E-05	4.374E-05	7.937E-05	1.361E-04	2.592E-04	4.184E-05	1.984E-05	5.833E-05	1.200E-04	2.140E+00	1.788E-06	3.363E-04
T7 Public	Diesel	3.900E-05	3.722E-03	3.142E-04	2.221E-05	2.277E-05	7.937E-05	1.361E-04	2.382E-04	2.178E-05	1.984E-05	5.833E-05	9.996E-05	2.351E+00	1.811E-06	3.695E-04
T7 Single	Diesel	3.190E-05	3.672E-03	3.443E-04	2.160E-05	2.946E-05	7.937E-05	1.361E-04	2.449E-04	2.818E-05	1.984E-05	5.833E-05	1.064E-04	2.286E+00	1.482E-06	3.593E-04
T7 single construction	Diesel	3.205E-05	3.684E-03	3.447E-04	2.158E-05	2.953E-05	7.937E-05	1.361E-04	2.450E-04	2.825E-05	1.984E-05	5.833E-05	1.064E-04	2.285E+00	1.489E-06	3.591E-04
T7 SWCV	Diesel	2.625E-05	3.122E-02	8.465E-05	1.008E-04	3.044E-05	7.937E-05	1.361E-04	2.459E-04	2.913E-05	1.984E-05	5.833E-05	1.073E-04	1.067E+01	1.219E-06	1.677E-03
T7 SWCV	Natural Gas	1.620E-04	1.209E-03	3.220E-02	0.000E+00	6.950E-06	7.937E-05	1.361E-04	2.224E-04	6.649E-06	1.984E-05	5.833E-05	8.482E-05	5.740E+00	8.901E-03	1.170E-03
T7 tractor	Diesel	3.646E-05	4.464E-03	3.936E-04	1.894E-05	3.935E-05	7.937E-05	1.361E-04	2.548E-04	3.764E-05	1.984E-05	5.833E-05	1.158E-04	2.005E+00	1.694E-06	3.152E-04
T7 tractor construction	Diesel	3.782E-05	4.706E-03	4.078E-04	2.117E-05	4.220E-05	7.937E-05	1.361E-04	2.577E-04	4.037E-05	1.984E-05	5.833E-05	1.185E-04	2.240E+00	1.757E-06	3.521E-04
T7 utility	Diesel	2.652E-05	2.778E-03	2.863E-04	2.204E-05	1.781E-05	7.937E-05	1.361E-04	2.333E-04	1.704E-05	1.984E-05	5.833E-05	9.521E-05	2.333E+00	1.232E-06	3.667E-04
T7IS	Gasoline	6.944E-04	6.748E-03	6.650E-02	3.314E-05	2.556E-06	4.409E-05	1.361E-04	1.828E-04	2.350E-06	1.102E-05	5.833E-05	7.171E-05	3.349E+00	1.570E-04	2.815E-04
UBUS	Gasoline	5.000E-05	6.626E-04	8.519E-04	3.758E-05	5.239E-06	2.646E-05	2.873E-04	3.190E-04	4.817E-06	6.614E-06	1.231E-04	1.346E-04	3.798E+00	1.501E-05	5.606E-05
UBUS	Diesel	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
UBUS	Natural Gas	2.045E-04	1.088E-03	1.115E-01	0.000E+00	7.357E-06	7.626E-05	1.450E-04	2.286E-04	7.038E-06	1.907E-05	6.214E-05	8.824E-05	4.480E+00	1.431E-02	9.132E-04

Source: EMFAC2021 (v1.0.3)

Region Type: County
Region: Orange (SC)
Calendar Year: 2045
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for T

		1.0E-06	MTons/Mile														
Vehicle Category	Fuel		ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_Total	PM2_5_PMTW	PM2_5_PMBW	PM2_5_RUNEX	PM2_5_Total	CO2(Pavley+AACC)_RUNEX	CH4_RUNEX	N2O_RUNEX
All Other Buses	Diesel		7.736E-09	1.308E-06	7.775E-08	7.255E-09	8.765E-09	1.200E-08	1.303E-07	1.511E-07	8.386E-09	3.000E-09	5.586E-08	6.725E-08	7.679E-04	3.593E-10	1.207E-07
LDA	Gasoline		1.789E-09	1.652E-08	3.973E-07	1.927E-09	5.556E-10	8.000E-09	3.675E-08	4.531E-08	5.109E-10	2.000E-09	1.575E-08	1.826E-08	1.947E-04	6.587E-10	2.847E-09
LDA	Diesel		5.039E-09	8.744E-09	1.671E-07	1.472E-09	7.537E-10	8.000E-09	3.675E-08	4.550E-08	7.211E-10	2.000E-09	1.575E-08	1.847E-08	1.557E-04	2.341E-10	2.447E-08
LDA	Electricity		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
LDT1	Gasoline		2.006E-09	1.829E-08	4.053E-07	2.234E-09	6.093E-10	8.000E-09	3.675E-08	4.536E-08	5.602E-10	2.000E-09	1.575E-08	1.831E-08	2.258E-04	7.204E-10	3.016E-09
LDT1	Diesel		1.726E-08	3.346E-08	1.808E-07	2.791E-09	4.589E-09	8.000E-09	3.675E-08	4.934E-08	4.391E-09	2.000E-09	1.575E-08	2.214E-08	2.952E-04	8.016E-10	4.640E-08
LDT1	Electricity		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
LDT2	Gasoline		2.630E-09	1.705E-08	4.617E-07	2.210E-09	5.752E-10	8.000E-09	3.675E-08	4.533E-08	5.289E-10	2.000E-09	1.575E-08	1.828E-08	2.233E-04	9.147E-10	2.864E-09
LDT2	Diesel		1.704E-08	3.176E-08	1.747E-07	1.955E-09	4.439E-09	8.000E-09	3.675E-08	4.919E-08	4.247E-09	2.000E-09	1.575E-08	2.200E-08	2.068E-04	7.916E-10	3.251E-08
LDT2	Electricity		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
LHD1	Gasoline		3.264E-09	9.198E-08	1.193E-07	6.353E-09	1.167E-09	8.000E-09	7.644E-08	8.561E-08	1.073E-09	2.000E-09	3.276E-08	3.583E-08	6.420E-04	1.051E-09	7.717E-09
LHD1	Diesel		3.823E-08	6.917E-08	1.806E-07	3.547E-09	5.441E-09	1.200E-08	7.644E-08	9.388E-08	5.206E-09	3.000E-09	3.276E-08	4.097E-08	3.752E-04	1.776E-09	5.897E-08
LHD2	Gasoline		3.228E-09	1.021E-07	1.192E-07	7.301E-09	1.162E-09	8.000E-09	8.918E-08	9.834E-08	1.068E-09	2.000E-09	3.822E-08	4.129E-08	7.378E-04	1.036E-09	8.345E-09
LHD2	Diesel		3.941E-08	1.156E-07	1.904E-07	3.929E-09	1.262E-08	1.200E-08	8.918E-08	1.138E-07	1.208E-08	3.000E-09	3.822E-08	5.330E-08	4.156E-04	1.831E-09	6.533E-08
MCY	Gasoline		2.269E-06	1.109E-06	1.684E-05	2.119E-09	2.474E-09	4.000E-09	1.176E-08	1.823E-08	2.307E-09	1.000E-09	5.040E-09	8.347E-09	2.141E-04	3.379E-07	6.417E-08
MDV	Gasoline		2.986E-09	1.918E-08	4.730E-07	2.689E-09	5.950E-10	8.000E-09	3.675E-08	4.535E-08	5.471E-10	2.000E-09	1.575E-08	1.830E-08	2.718E-04	9.977E-10	3.035E-09
MDV	Diesel		5.766E-09	1.017E-08	1.888E-07	2.532E-09	9.140E-10	8.000E-09	3.675E-08	4.566E-08	8.745E-10	2.000E-09	1.575E-08	1.862E-08	2.678E-04	2.678E-10	4.210E-08
MDV	Electricity		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.000E-09	3.675E-08	4.475E-08	0.000E+00	2.000E-09	1.575E-08	1.775E-08	0.000E+00	0.000E+00	0.000E+00
MH	Gasoline		8.966E-09	1.840E-07	1.633E-07	1.297E-08	1.149E-09	1.200E-08	1.303E-07	1.435E-07	1.056E-09	3.000E-09	5.586E-08	5.992E-08	1.310E-03	3.257E-09	1.729E-08
MH	Diesel		4.337E-08	2.081E-06	1.317E-07	7.463E-09	2.292E-08	1.600E-08	1.303E-07	1.693E-07	2.193E-08	4.000E-09	5.586E-08	8.179E-08	7.894E-04	2.014E-09	1.241E-07
Motor Coach	Diesel		1.496E-08	1.741E-06	1.615E-07	1.047E-08	1.444E-08	1.200E-08	1.303E-07	1.568E-07	1.381E-08	3.000E-09	5.586E-08	7.267E-08	1.109E-03	6.949E-10	1.743E-07
OBUS	Gasoline		1.102E-08	3.677E-07	2.298E-07	1.295E-08	1.144E-09	1.200E-08	1.303E-07	1.435E-07	1.051E-09	3.000E-09	5.586E-08	5.991E-08	1.308E-03	2.898E-09	2.158E-08
PTO	Diesel		2.567E-08	4.645E-06	4.113E-07	1.433E-08	4.965E-09	0.000E+00	0.000E+00	4.965E-09	4.750E-09	0.000E+00	0.000E+00	4.750E-09	1.516E-03	1.192E-09	2.384E-07
SBUS	Gasoline		1.184E-08	1.447E-07	2.128E-07	7.065E-09	1.591E-09	8.000E-09	7.448E-07	7.544E-07	1.463E-09	2.000E-09	3.192E-07	3.227E-07	7.139E-04	2.668E-09	1.285E-08
SBUS	Diesel		9.890E-09	1.842E-06	1.259E-07	8.346E-09	4.137E-09	1.200E-08	7.448E-07	7.609E-07	3.958E-09	3.000E-09	3.192E-07	3.262E-07	8.834E-04	4.593E-10	1.389E-07
T6 CAIRP heavy	Diesel		6.447E-09	9.404E-07	6.479E-08	6.094E-09	5.792E-09	1.200E-08	1.303E-07	1.481E-07	5.542E-09	3.000E-09	5.586E-08	6.440E-08	6.450E-04	2.994E-10	1.014E-07
T6 CAIRP small	Diesel		6.564E-09	9.729E-07	6.597E-08	6.761E-09	6.064E-09	1.200E-08	1.303E-07	1.484E-07	5.801E-09	3.000E-09	5.586E-08	6.466E-08	7.156E-04	3.049E-10	1.125E-07
T6 instate construction heavy	Diesel		7.810E-09	1.304E-06	7.783E-08	7.252E-09	8.780E-09	1.200E-08	1.303E-07	1.511E-07	8.401E-09	3.000E-09	5.586E-08	6.726E-08	7.676E-04	3.628E-10	1.207E-07
T6 instate construction small	Diesel		6.900E-09	1.066E-06	6.934E-08	6.828E-09	6.839E-09	1.200E-08	1.303E-07	1.492E-07	6.544E-09	3.000E-09	5.586E-08	6.540E-08	7.227E-04	3.205E-10	1.136E-07
T6 instate heavy	Diesel		7.167E-09	1.142E-06	7.203E-08	6.384E-09	7.460E-09	1.200E-08	1.303E-07	1.498E-07	7.137E-09	3.000E-09	5.586E-08	6.600E-08	6.757E-04	3.329E-10	1.062E-07
T6 instate small	Diesel		6.889E-09	1.064E-06	6.924E-08	6.823E-09	6.818E-09	1.200E-08	1.303E-07	1.492E-07	6.523E-09	3.000E-09	5.586E-08	6.538E-08	7.222E-04	3.200E-10	1.135E-07
T6 OOS heavy	Diesel		6.439E-09	9.383E-07	6.472E-08	6.093E-09	5.775E-09	1.200E-08	1.303E-07	1.481E-07	5.525E-09	3.000E-09	5.586E-08	6.439E-08	6.449E-04	2.991E-10	1.014E-07
T6 OOS small	Diesel		6.587E-09	9.795E-07	6.621E-08	6.772E-09	6.118E-09	1.200E-08	1.303E-07	1.485E-07	5.853E-09	3.000E-09	5.586E-08	6.471E-08	7.168E-04	3.060E-10	1.127E-07
T6 Public	Diesel		7.180E-09	8.672E-07	6.203E-08	7.009E-09	5.037E-09	1.200E-08	1.303E-07	1.474E-07	4.819E-09	3.000E-09	5.586E-08	6.368E-08	7.419E-04	3.335E-10	1.166E-07
T6 utility	Diesel		5.550E-09	6.910E-07	5.578E-08	6.756E-09	3.713E-09	1.200E-08	1.303E-07	1.461E-07	3.552E-09	3.000E-09	5.586E-08	6.241E-08	7.151E-04	2.578E-10	1.124E-07
T6TS	Gasoline		8.964E-09	8.306E-08	1.838E-07	1.291E-08	1.151E-09	1.200E-08	1.303E-07	1.435E-07	1.058E-09	3.000E-09	5.586E-08	5.992E-08	1.305E-03	2.447E-09	7.775E-09
T7 Ag	Diesel		2.312E-08	3.999E-06	2.496E-07	1.528E-08	3.143E-08	3.600E-08	6.174E-08	1.292E-07	3.007E-08	9.000E-09	2.646E-08	6.553E-08	1.617E-03	1.074E-09	2.542E-07
T7 CAIRP	Diesel		1.651E-08	2.016E-06	1.782E-07	8.405E-09	1.778E-08	3.600E-08	6.174E-08	1.155E-07	1.701E-08	9.000E-09	2.646E-08	5.247E-08	8.897E-04	7.667E-10	1.398E-07
T7 CAIRP construction	Diesel		1.662E-08	2.036E-06	1.794E-07	9.318E-09	1.803E-08	3.600E-08	6.174E-08	1.158E-07	1.725E-08	9.000E-09	2.646E-08	5.271E-08	9.863E-04	7.721E-10	1.550E-07
T7 NNOOS	Diesel		1.551E-08	1.837E-06	1.674E-07	8.408E-09	1.561E-08	3.600E-08	6.174E-08	1.134E-07	1.494E-08	9.000E-09	2.646E-08	5.040E-08	8.900E-04	7.202E-10	1.399E-07
T7 NOOS	Diesel		1.653E-08	2.019E-06	1.784E-07	8.409E-09	1.782E-08	3.600E-08	6.174E-08	1.156E-07	1.705E-08	9.000E-09	2.646E-08	5.251E-08	8.901E-04	7.676E-10	1.399E-07
T7 POLA	Diesel		1.746E-08	2.190E-06	1.885E-07	9.169E-09	1.984E-08	3.600E-08	6.174E-08	1.176E-07	1.898E-08	9.000E-09	2.646E-08	5.444E-08	9.706E-04	8.110E-10	1.526E-07
T7 Public	Diesel		1.769E-08	1.688E-06	1.425E-07	1.007E-08	1.033E-08	3.600E-08	6.174E-08	1.081E-07	9.881E-09	9.000E-09	2.646E-08	4.534E-08	1.066E-03	8.216E-10	1.676E-07
T7 Single	Diesel		1.447E-08	1.665E-06	1.562E-07	9.796E-09	1.336E-08	3.600E-08	6.174E-08	1.111E-07	1.278E-08	9.000E-09	2.646E-08	4.824E-08	1.037E-03	6.721E-10	1.630E-07
T7 single construction	Diesel		1.454E-08	1.671E-06	1.564E-07	9.790E-09	1.339E-08	3.600E-08	6.174E-08	1.111E-07	1.281E-08	9.000E-09	2.646E-08	4.827E-08	1.036E-03	6.753E-10	1.629E-07
T7 SWCV	Diesel		1.191E-08	1.416E-05	3.840E-08	4.572E-08	1.381E-08	3.600E-08	6.174E-08	1.115E-07	1.321E-08	9.000E-09	2.646E-08	4.867E-08	4.839E-03	5.530E-10	7.607E-07
T7 SWCV	Natural Gas		7.348E-08	5.484E-07	1.460E-05	0.000E+00	3.152E-09	3.600E-08	6.174E-08	1.009E-07	3.016E-09	9.000E-09	2.646E-08	3.848E-08	2.604E-03	4.037E-06	5.308E-07
T7 tractor	Diesel		1.654E-08	2.025E-06	1.785E-07	8.593E-09	1.785E-08	3.600E-08	6.174E-08	1.156E-07	1.708E-08	9.000E-09	2.646E-08	5.254E-08	9.095E-04	7.682E-10	1.430E-07
T7 tractor construction	Diesel		1.715E-08	2.135E-06	1.850E-07	9.601E-09	1.914E-08	3.600E-08	6.174E-08	1.169E-07	1.831E-08	9.000E-09	2.646E-08	5.377E-08	1.016E-03	7.968E-10	1.597E-07
T7 utility	Diesel		1.203E-08	1.260E-06	1.298E-07	9.996E-09	8.077E-09	3.600E-08	6.174E-08	1.058E-07	7.727E-09	9.000E-09	2.646E-08	4.319E-08	1.058E-03	5.587E-10	1.663E-07
T7IS	Gasoline		3.150E-07	3.061E-06	3.016E-05	1.503E-08	1.159E-09	2.000E-08	6.174E-08	8.290E-08	1.066E-09	5.000E-09	2.646E-08	3.253E-08	1.519E-03	7.121E-08	1.277E-07
UBUS	Gasoline		2.268E-08	3.006E-07	3.864E-07	1.705E-08	2.377E-09	1.200E-08	1.303E-07	1.447E-07	2.185E-09	3.000E-09	5.586E-08	6.105E-08	1.723E-03	6.809E-09	2.543E-08
UBUS	Diesel		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
UBUS	Natural Gas		9.277E-08	4.936E-07	5.058E-05	0.000E+00	3.337E-09	3.459E-08	6.576E-08	1.037E-07	3.193E-09	8.648E-09	2.818E-08	4.002E-08	2.032E-03	6.493E-06	4.142E-07

We Can Model Regional Emissions, But Are the Results Meaningful for CEQA?

Authors: AEP Climate Change Committee (Michael Hendrix, Dave Mitchell, Haseeb Qureshi, Jennifer Reed, Brian Schuster, Nicole Vermilion, and Rich Walters)

On December 24, 2018, the California Supreme Court, *Sierra Club v. County of Fresno (Friant Ranch, L.P.] (2018) 6 Cal.5th 502, Case No. S219783 (Friant Ranch*), held that simply identifying that a project exceeds an emissions threshold is not sufficient to identify a project's significant effect on the environment relative to the health effects of project emissions. The Court found that an EIR should make a reasonable effort to substantively connect a project's criteria pollutant emissions to likely health consequences, or explain why it is not currently feasible to provide such an analysis. In 2019, there were several CEQA documents that included health effects modeling to provide additional analysis for projects with criteria air pollutant emissions that exceed a significance threshold. While it is technically possible to conduct this modeling, we argue that this additional layer of quantitative analysis may not always provide decision-makers and the public with additional meaningful information. It is the air districts that are best suited to provide frameworks for how to identify health effects of regional criteria pollutant emissions under CEQA.

Introduction

Significance thresholds for regional criteria pollutants used by California air districts and lead agencies represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable national or state ambient air quality standard (AAQS). By analyzing the project's emissions against these thresholds, the CEQA document assesses whether these emissions directly contribute to any regional or local exceedances of the applicable AAQS and exposure levels. The basis of the ruling in Friant Ranch was that the EIR did not provide a meaningful analysis of the adverse health effects that would be associated with the project's criteria pollutant emissions, which were identified as being far above the relevant thresholds. The discussion of the adverse health effects in the EIR was general in nature and did not connect the levels of the pollutants that would be emitted by the project to adverse health effects.

The process of correlating project-related criteria pollutant emissions to health-based consequences is called a health impact assessment (HIA). An HIA involves two steps: 1) running a regional photochemical grid model (PGM) to estimate the small increases in concentrations of ozone and particulate matter (PM) in the region as a result of a project's emissions of criteria and precursor pollutants; and 2) running the U.S. EPA Benefits Mapping and Analysis Program (BenMAP) to estimate the resulting health impacts from these increases in concentrations of ozone and PM.

Limitations of Regional-Scale Dispersion Models

It is technically feasible to conduct regional-scale criteria pollutant modeling for a development project. Particulate matter (PM) can be divided into two categories: directly emitted PM and secondary PM. Secondary PM, is formed via complex chemical reactions in the atmosphere between precursor chemicals such as sulfur oxides (SO_x) and NO_x, Ozone (O_3) is a secondary pollutant formed from the oxidation of reactive organic gases (ROGs) and nitrogen oxides (NOx) in the presence of sunlight. Rates of ozone formation are a function of a variety of complex physical factors, including the presence of sunlight and precursor pollutants, natural topography, nearby structures that cause building downwash, atmospheric stability, and wind patterns.. Secondary formation of PM and ozone can occur far from the original emissions source from regional transport due to wind and topography (e.g. low-level jet stream). As such, modeling concentrations of secondary PM and ozone require photochemical grid models (PGMs), such as CMAQ and CAMx. These models have a much larger "grid" system and much lower resolution than localized dispersion modeling (e.g., AERMOD). For example, common grid cells in PGMs are 4x4 kilometers, while AERMOD can identify concentrations at the meter-level.

Photochemical modeling also depends on all emission sources in the entire domain. Low resolution and spatial averaging produces "noise" and model uncertainty that can exceed a project's specific emissions. Additionally, regional-scale models are highly contingent upon background concentrations. Factors such as meteorology and topography greatly affect the certainty levels of predicted concentrations at receptor points. As a result, there are statistical ranges of uncertainty through all the modeling steps. Due to these factors, it is difficult to predict ground-level secondary PM and ozone concentrations associated with relatively small emission sources with a high degree of certainty. While it is possible to use a regional-scale model to predict these regional concentrations, when a project's emissions are less than the regional model's resolution, the resultant ambient air quality concentrations will be within the margin of uncertainty. In CEQA terms, this would fit the definition of "speculative". Only when the scale of emissions would result in changes in ambient air quality beyond the model margin of uncertainty would the results not be "speculative" as defined by CEQA.

Identifying Health Effects due to Ambient Air Quality Changes

BenMap is a model developed by the USEPA to understand the health effects from changes in ozone and PM concentrations. If there is an acceptable level of confidence that the results provided by the regional dispersion modeling are valid, then these concentrations can be translated into health outcomes using BenMap. The health outcomes in BenMap are based on changes in ambient air concentrations and the population exposed to these changes. Data provided by this analysis may indicate increased number of workdays lost to illness, hospital admissions (respiratory), emergency room visits (asthma), or mortality, among other health effects. These are called "health incidences."

Translating the incremental increase in PM and ozone concentrations to specific health effects is also subject to uncertainty. For example, regional models assign the same toxicity to PM regardless of the source of PM (such as road dust as exhaust), and thus potentially overpredict adverse health effects of PM. BenMap also assumes that health effects can occur at any concentration, including small incremental concentrations, and assumes that impacts seen at large concentration differences can be linearly scaled down to small increases in concentration, with no consideration of potential thresholds below which health impacts may not occur. Additionally, BenMap is used for assessing impacts over large areas and populations and was not intended to be used for individual projects. For health incidences, the number of hospitalizations or increase in morbidity predicted by BenMap is greatly affected by the population characteristics.[1] Small increases in emissions in an area with a high population have a much greater affect than large increases in emissions over an area with a small population. As a result, the same amount of emissions generated in an urban area could result in greater health consequences than if the same emissions occurred on the urban periphery, where fewer people may be affected. This will also depend on other factors including meteorology and photochemistry, as discussed above. Emissions in areas with conditions that favor high air dispersion or unfavorable ozone formation will likely have relatively lower effects on ambient air quality and health outcomes.

While BenMap provides additional statistical information about health consequences requested by the Court in the Friant Ranch decision, this information is only meaningful when presented with the full health context of the region or locality at hand. For example, if the BenMap analysis says that the project would result in two additional hospital admissions, this result alone is not useful unless one identifies how many hospital admissions are caused by poor air quality now (without the project) and how many hospital admissions occur

[1] BenMap assigns prevalence rate for asthma and other health effects based on indicators such as gender, race, age, ethnicity, etc. The BenMap user manual specifically states that there are a wide range of variables that can be included in the health effect function. The health effect function was developed based on epidemiological studies, and specifically states that "there are a number of issues that arise when deriving and choosing between health effect functions that go well beyond this user manual. Hence, it is important to have a trained health researcher assist in developing the impact function data file."

overall (due to air quality and other causes). Because health is not solely influenced by ambient air quality, and has many factors that are highly variable across geographies and populations, there is an added level of uncertainty in using a generalized identification of health effects due to air quality conditions overlaid onto a specific diverse set of health conditions and other factors. Regardless of the uncertainty levels, if regional health effects are identified for a project, then the CEQA analysis needs to provide a full health baseline for decision-makers and the public to be able to understand the marginal change due to project criteria pollutant emissions. Given the margin of uncertainty at each step in the process (regional scale modeling, existing ambient air quality effects on health, population health conditions vulnerability, and marginal health effects of air pollution), the identification of marginal health effects due to individual projects using regional air quality modelling and tools such as BenMap are likely to be within the level of uncertainty and thus defined as "speculative" per CEQA.

The Role of Air Districts

Regional, community, multiscale air quality modeling conducted by the air districts for each individual air basin or locality within the air basin would be the most appropriate indictor of health effects for projects. The AQMPs provide a forecast of regional emissions based on regional dispersion modeling for all sources within the air basin. Regional-scale models attempt to account for all emissions sources within an air basin.

The regional scale model requires inputs such as existing and future regional sources of pollutants and global meteorological data, which are generally not accessible by CEQA practitioners. Modeling of future years should consider future concentrations of air pollutants based on regional growth projections and existing programs, rules, and regulations adopted by Federal, State, and local air districts. In general, air pollution in California is decreasing as a result of Federal and State laws. Based on the air quality management plans (AQMPs) required for air districts in a nonattainment area, air quality in the air basins are anticipated to improve despite an increase in population and employment growth. Air districts are charged with assessing programs, rules, and regulations so that the increase in population and employment does not conflict with the mandate to achieve the AAQS. Because emissions forecasting and health outcomes based on the regional growth projections to achieve the AAQS is under the purview of the air districts, it should also fall on the air districts to identify the potential health outcomes associated with individual project's criteria pollutant emissions.

The South Coast Air Quality Management District (South Coast AQMD) and the Sacramento Metropolitan Air Quality Management District (Sacramento Metropolitan AQMD) are exploring concepts for project-level analysis in light of Friant Ranch to assist local lead agencies.

» South Coast AQMD is looking at the largest land use development project they have had in the air basin and doing a sensitivity analysis (using CAMx for photochemical grid modeling and BenMap for health outcomes) to see how locating a very large project in different parts of the air basin (Los Angeles, Inland Empire, v. Orange County) would affect the health incidence.

» Sacramento Metropolitan AQMD is also looking at a screening process. Rather than looking at the upper end (i.e., largest project in the air basin), Sacramento Metropolitan AQMD is starting at the smallest project that exceeds the regional significance threshold and running CAMx and BenMap at different locations in the air basin to see how it affects regional health incidences.

Guidance from Air Districts would be the most effective way to incorporate meaningful information concerning regional health effects of project criteria pollutants in CEQA analyses, including guidance as to when modelling is and is not useful and meaningful, how modelling should be conducted, and how to best present additional information to inform decision-makers and the public about a project's impacts.

So…until air districts do their part, what should we do?

PROJECTS WITH CRITERIA POLLUTANT EMISSIONS BELOW AIR DISTRICT THRESHOLDS

The Friant Ranch ruling was about providing disclosure of health effects of project emissions that were well over the significance thresholds. Since the air district thresholds are tied to a level the air districts find to not have a significant effect on ambient air quality, there should be no need to discuss the health effects of criteria pollutant emissions that are less than the significance thresholds.

PROJECTS WITH CRITERIA POLLUTANT EMISSIONS ABOVE AIR DISTRICT THRESHOLDS

Pursuant to Section 15125 of the CEQA Guidelines, the environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. For CEQA, the health effects associated with buildout of a project would occur at the project's horizon year. Because CEQA requires an analysis of the change from existing conditions, the change in effects would be associated with changes in ambient air quality and associated health outcomes between existing conditions and the project's horizon year. Therefore, in order to show how a project affects health outcomes in an air basin, the CEQA documents will need to qualitatively or quantitatively address: (1) existing ambient criteria pollutant concentrations, health incidences due to existing air quality, and health incidences overall; 2) future (without project) ambient criteria pollutant concentrations and health incidences, and 3) future (with project) ambient criteria pollutant concentrations and health incidences.

Projects with significant criteria pollutant emissions could use regional modelling and BenMap to identify health effects of project emissions, but it is likely that many (or most) projects that are not regionally substantial in scale will be shown to have minimal regional changes in PM and ozone concentrations and therefore minimal changes in associated health effects. In addition, many projects may have emissions that are less than the uncertainty level of regional air quality models and BenMap health effects modeling; in these cases, quantitative results will not be meaningful. Thus, absent better direction from air districts, CEQA lead agencies will have to determine on a case by case basis whether a qualitative discussion of health effects will suffice, or whether regional modeling, despite its limitations, should be conducted for the project.

Where a project has substantial criteria pollutant emissions when considered on a regional scale, and there is reason to believe that the modeling of ambient air quality and regional health effects would produce non-speculative results when considering modeling uncertainties, then CEQA lead agencies should use regional modelling.

Conclusion

The purpose of CEQA is to inform the public as to the potential for a project to result in one or more significant adverse effects on the environment (including health effects). A CEQA document must provide an understandable and clear environmental analysis and provide an adequate basis for decision making and public disclosure. Regional dispersion modeling of criteria pollutants and secondary pollutants like PM and ozone can provide additional information, but that information may be within the margin of modelling uncertainty and/or may not be meaningful for the public and decision-makers unless a full health context is presented in the CEQA document. Simply providing health outcomes based on use of a regional-scale model and BenMap may not satisfy the goal to provide decision-makers and the public with information that would assist in weighting the environmental consequences of a project. A CEQA document must provide an analysis that is understandable for decision making and public disclosure. Regional scale modeling may provide a technical method for this type of analysis, but it does not necessarily provide a meaningful way to connect the magnitude of a project's criteria pollutant emissions to health effects without speculation.

In order to accurately connect the dots, we urge California air districts to provide more guidance on how to identify and describe the health effects of exceeding regional criteria pollutant thresholds. The air districts are the primary agency responsible for ensuring that the air basins attain the AAQS and ensure the health and welfare of its residents relative to air quality. Because emissions forecasting and health outcomes are based on the regional growth projections to achieve the AAQS is under the purview of the air districts, it should fall on the air districts to identify the potential health outcomes associated with exceeding the CEQA thresholds for projects. The air districts should provide lead agencies with a consistent, reliable, and meaningful analytical approach to correlate specific health effects that may result from a project's criteria pollutant emissions.

Glossary

AAQS – Ambient Air Quality Standards

BenMap – Benefits Mapping and Analysis Program

CAMx – Comprehensive Air Quality Model with extensions

CMAQ – Community Multiscale Air Quality

NOx – Nitrogen Oxides

PM – Particulate Matter

SOx – Sulfur Oxides

State – California

USEPA – United States Environmental Protection Agency

S219783

IN THE SUPREME COURT OF C ALIFORNIA

SIERRA CLUB, REVIVE THE SAN JOAQUIN, and
LEAGUE OF WOMEN VOTERS OF FRESNO,

Plaintiffs and Appellants,

v.

COUNTY OF FRESNO,

Defendant and Respondent,

and,

FRIANT RANCH, L.P.,

Real Party in Interest and Respondent.

After a Published Decision by the Court of Appeal, filed May 27, 2014
Fifth Appellate District Case No. F066798

Appeal from the Superior Court of California, County of Fresno
Case No. 11CECG00726
Honorable Rosendo A. Pena, Jr.

APPLICATION OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT FOR LEAVE TO FILE BRIEF OF *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY AND *[PROPOSED]* BRIEF OF *AMICUS CURIAE*

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TO THE HONORABLE CHIEF JUSTICE AND JUSTICES OF THE SUPREME COURT:

APPLICATION FOR LEAVE TO FILE *AMICUS CURIAE* BRIEF

Pursuant to Rule 8.520(f) of the California Rules of Court, the South Coast Air Quality Management District (SCAQMD) respectfully requests leave to file the attached *amicus curiae* brief. Because SCAQMD's position differs from that of either party, we request leave to submit this amicus brief in support of neither party.

HOW THIS BRIEF WILL ASSIST THE COURT

SCAQMD's proposed amicus brief takes a position on two of the issues in this case. In both instances, its position differs from that of either party. The issues are:

1) Does the California Environmental Quality Act (CEQA) require an environmental impact report (EIR) to correlate a project's air pollution emissions with specific levels of health impacts?
2) What is the proper standard of review for determining whether an EIR provides sufficient information on the health impacts caused by a project's emission of air pollutants?

This brief will assist the Court by discussing the practical realities of correlating identified air quality impacts with specific health outcomes. In short, CEQA requires agencies to provide detailed information about a project's air quality impacts that is sufficient for the public and decisionmakers to adequately evaluate the project and meaningfully understand its impacts. However, the level of analysis is governed by a rule of reason; CEQA only requires agencies to conduct analysis if it is reasonably feasible to do so.

With regard to health-related air quality impacts, an analysis that correlates a project's air pollution emissions with specific levels of health impacts will be feasible in some cases but not others. Whether it is feasible depends on a variety of factors, including the nature of the project and the nature of the analysis under consideration. The feasibility of analysis may also change over time as air districts and others develop new tools for measuring projects' air quality related health impacts. Because SCAQMD has among the most sophisticated air quality modeling and health impact evaluation capability of any of the air districts in the State, it is uniquely situated to express an opinion on the extent to which the Court should hold that CEQA requires lead agencies to correlate air quality impacts with specific health outcomes.

SCAQMD can also offer a unique perspective on the question of the appropriate standard of review. SCAQMD submits that the proper standard of review for determining whether an EIR is sufficient as an informational document is more nuanced than argued by either party. In our view, this is a mixed question of fact and law. It includes determining whether additional analysis is feasible, which is primarily a factual question that should be reviewed under the substantial evidence standard. However, it also involves determining whether the omission of a particular analysis renders an EIR insufficient to serve CEQA's purpose as a meaningful, informational document. If a lead agency has not determined that a requested analysis is infeasible, it is the court's role to determine whether the EIR nevertheless meets CEQA's purposes, and courts should not defer to the lead agency's conclusions regarding the legal sufficiency of an EIR's analysis. The ultimate question of whether an EIR's analysis is "sufficient" to serve CEQA's informational purposes is predominately a question of law that courts should review de novo.

This brief will explain the rationale for these arguments and may assist the Court in reaching a conclusion that accords proper respect to a lead agency's factual conclusions while maintaining judicial authority over the ultimate question of what level of analysis CEQA requires.

STATEMENT OF INTEREST OF *AMICUS CURIAE*

The SCAQMD is the regional agency primarily responsible for air pollution control in the South Coast Air Basin, which consists of all of Orange County and the non-desert portions of the Los Angeles, Riverside, and San Bernardino Counties. (Health & Saf. Code § 40410; Cal. Code Regs., tit. 17, § 60104.) The SCAQMD participates in the CEQA process in several ways. Sometimes it acts as a lead agency that prepares CEQA documents for projects. Other times it acts as a responsible agency when it has permit authority over some part of a project that is undergoing CEQA review by a different lead agency. Finally, SCAQMD also acts as a commenting agency for CEQA documents that it receives because it is a public agency with jurisdiction by law over natural resources affected by the project.

In all of these capacities, SCAQMD will be affected by the decision in this case. SCAQMD sometimes submits comments requesting that a lead agency perform an additional type of air quality or health impacts analysis. On the other hand, SCAQMD sometimes determines that a particular type of health impact analysis is not feasible or would not produce reliable and informative results. Thus, SCAQMD will be affected by the Court's resolution of the extent to which CEQA requires EIRs to correlate emissions and health impacts, and its resolution of the proper standard of review.

CERTIFICATION REGARDING AUTHORSHIP AND FUNDING

No party or counsel in the pending case authored the proposed amicus curiae brief in whole or in part, or made any monetary contribution intended to fund the preparation or submission of the brief. No person or entity other than the proposed *Amicus Curiae* made any monetary contribution intended to fund the preparation or submission of the brief.

Respectfully submitted,

DATED: April 3, 2015

SOUTH COAST AIR QUALITY
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BRIEF OF AMICUS CURIAE

SUMMARY OF ARGUMENT

The South Coast Air Quality Management District (SCAQMD) submits that this Court should not try to establish a hard-and-fast rule concerning whether lead agencies are required to correlate emissions of air pollutants with specific health consequences in their environmental impact reports (EIR). The level of detail required in EIRs is governed by a few, core CEQA (California Environmental Quality Act) principles. As this Court has stated, "[a]n EIR must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." (*Laurel Heights Improvement Assn. v. Regents of the Univ of Cal.* (1988) 47 Cal.3d 376, 405 ["*Laurel Heights I*"]) Accordingly, "an agency must use its best efforts to find out and disclose all that it reasonably can." (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 428 (quoting CEQA Guidelines § 15144)[1].). However, "[a]nalysis of environmental effects need not be exhaustive, but will be judged in light of what is reasonably feasible." (*Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1390; CEQA Guidelines §§ 15151, 15204(a).)

With regard to analysis of air quality related health impacts, EIRs must generally quantify a project's pollutant emissions, but in some cases it is not feasible to correlate these emissions to specific, quantifiable health impacts (e.g., premature mortality; hospital admissions). In such cases, a general description of the adverse health impacts resulting from the pollutants at issue may be sufficient. In other cases, due to the magnitude

[1] The CEQA Guidelines are found at Cal. Code Regs., tit. 14 §§ 15000, *et seq.*

or nature of the pollution emissions, as well as the specificity of the project involved, it may be feasible to quantify health impacts. Or there may be a less exacting, but still meaningful analysis of health impacts that can feasibly be performed. In these instances, agencies should disclose those impacts.

SCAQMD also submits that whether or not an EIR complies with CEQA's informational mandates by providing sufficient, feasible analysis is a mixed question of fact and law. Pertinent here, the question of whether an EIR's discussion of health impacts from air pollution is sufficient to allow the public to understand and consider meaningfully the issues involves two inquiries: (1) Is it feasible to provide the information or analysis that a commenter is requesting or a petitioner is arguing should be required?; and (2) Even if it is feasible, is the agency relying on other policy or legal considerations to justify not preparing the requested analysis? The first question of whether an analysis is feasible is primarily a question of fact that should be judged by the substantial evidence standard. The second inquiry involves evaluating CEQA's information disclosure purposes against the asserted reasons to not perform the requested analysis. For example, an agency might believe that its EIR meets CEQA's informational disclosure standards even without a particular analysis, and therefore choose not to conduct that analysis. SCAQMD submits that this is more of a legal question, which should be reviewed de novo as a question of law.

ARGUMENT

I. RELEVANT FACTUAL AND LEGAL FRAMEWORK.

A. Air Quality Regulatory Background

The South Coast Air Quality Management District (SCAQMD) is one of the local and regional air pollution control districts and air quality

management districts in California. The SCAQMD is the regional air pollution agency for the South Coast Air Basin, which consists of all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. (Health & Saf. Code § 40410, 17 Cal. Code Reg. § 60104.) The SCAQMD also includes the Coachella Valley in Riverside County (Palm Springs area to the Salton Sea). (SCAQMD, *Final 2012 AQMP (Feb. 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "chapter 7" hyperlink; pp 7-1, 7-3 (last visited Apr. 1, 2015).) The SCAQMD's jurisdiction includes over 16 million residents and has the worst or nearly the worst air pollution levels in the country for ozone and fine particulate matter. (SCAQMD, *Final 2012 AQMP (Feb. 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "Executive Summary" hyperlink p. ES-1 (last visited Apr. 1, 2015).)

Under California law, the local and regional districts are primarily responsible for controlling air pollution from all sources except motor vehicles. (Health & Saf. Code § 40000.) The California Air Resources Board (CARB), part of the California Environmental Protection Agency, is primarily responsible for controlling pollution from motor vehicles. (*Id.*) The air districts must adopt rules to achieve and maintain the state and federal ambient air quality standards within their jurisdictions. (Health & Saf. Code § 40001.)

The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (EPA) to identify pollutants that are widely distributed and pose a threat to human health, developing a so-called "criteria" document. (42 U.S.C. § 7408; CAA § 108.) These pollutants are frequently called "criteria pollutants." EPA must then establish "national ambient air quality standards" at levels "requisite to protect public health",

allowing "an adequate margin of safety." (42 U.S.C. § 7409; CAA § 109.) EPA has set standards for six identified pollutants: ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter (PM), and lead. (U.S. EPA, National Ambient Air Quality Standards (NAAQS), http://www.epa.gov/air/criteria.html (last updated Oct. 21, 2014).)[2]

Under the Clean Air Act, EPA sets emission standards for motor vehicles and "nonroad engines" (mobile farm and construction equipment, marine vessels, locomotives, aircraft, etc.). (42 U.S.C. §§ 7521, 7547; CAA §§ 202, 213.) California is the only state allowed to establish emission standards for motor vehicles and most nonroad sources; however, it may only do so with EPA's approval. (42 U.S.C. §§ 7543(b), 7543(e); CAA §§ 209(b), 209(c).) Sources such as manufacturing facilities, power plants and refineries that are not mobile are often referred to as "stationary sources." The Clean Air Act charges state and local agencies with the primary responsibility to attain the national ambient air quality standards. (42 U.S.C. § 7401(a)(3); CAA § 101(a)(3).) Each state must adopt and implement a plan including enforceable measures to achieve and maintain the national ambient air quality standards. (42 U.S.C. § 7410; CAA § 110.) The SCAQMD and CARB jointly prepare portion of the plan for the South Coast Air Basin and submit it for approval by EPA. (Health & Saf. Code §§ 40460, et seq.)

The Clean Air Act also requires state and local agencies to adopt a permit program requiring, among other things, that new or modified "major" stationary sources use technology to achieve the "lowest achievable emission rate," and to control minor stationary sources as

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[2] Particulate matter (PM) is further divided into two categories: fine particulate or $PM_{2.5}$ (particles with a diameter of less than or equal to 2.5 microns) and coarse particulate (PM_{10}) (particles with a diameter of 10 microns or less). (U.S. EPA, Particulate Matter (PM), http://www.epa.gov/airquality/particlepollution/ (last visited Apr. 1, 2015).)

needed to help attain the standards. (42 U.S.C. §§ 7502(c)(5), 7503(a)(2), 7410(a)(2)(C); CAA §§ 172(c)(5), 173(a)(2), 110(a)(2)(C).) The air districts implement these permit programs in California. (Health & Saf. Code §§ 42300, et seq.)

The Clean Air Act also sets out a regulatory structure for over 100 so-called "hazardous air pollutants" calling for EPA to establish "maximum achievable control technology" (MACT) for sources of these pollutants. (42 U.S.C. § 7412(d)(2); CAA § 112(d)(2).) California refers to these pollutants as "toxic air contaminants" (TACs) which are subject to two state-required programs. The first program requires "air toxics control measures" for specific categories of sources. (Health & Saf. Code § 39666.) The other program requires larger stationary sources and sources identified by air districts to prepare "health risk assessments" for impacts of toxic air contaminants. (Health & Saf. Code §§ 44320(b), 44322, 44360.) If the health risk exceeds levels identified by the district as "significant," the facility must implement a "risk reduction plan" to bring its risk levels below "significant" levels. Air districts may adopt additional more stringent requirements than those required by state law, including requirements for toxic air contaminants. (Health & Saf. Code § 41508; *Western Oil & Gas Assn. v. Monterey Bay Unified APCD* (1989) 49 Cal.3d 408, 414.) For example, SCAQMD has adopted a rule requiring new or modified sources to keep their risks below specified levels and use best available control technology (BACT) for toxics. (SCAQMD, *Rule 1401-New Source Review of Toxic Air Contaminants*, http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiv; then follow "Rule 1401" hyperlink (last visited Apr. 1, 2015).)

B. The SCAQMD's Role Under CEQA

The California Environmental Quality Act (CEQA) requires public agencies to perform an environmental review and appropriate analysis for projects that they implement or approve. (Pub. Resources Code § 21080(a).) The agency with primary approval authority for a particular project is generally the "lead agency" that prepares the appropriate CEQA document. (CEQA Guidelines §§ 15050, 15051.) Other agencies having a subsequent approval authority over all or part of a project are called "responsible" agencies that must determine whether the CEQA document is adequate for their use. (CEQA Guidelines §§ 15096(c), 15381.) Lead agencies must also consult with and circulate their environmental impact reports to "trustee agencies" and agencies "with jurisdiction by law" including "authority over resources which may be affected by the project." (Pub. Resources Code §§ 21104(a), 21153; CEQA Guidelines §§ 15086(a)(3), 15073(c).) The SCAQMD has a role in all these aspects of CEQA.

Fulfilling its responsibilities to implement its air quality plan and adopt rules to attain the national ambient air quality standards, SCAQMD adopts a dozen or more rules each year to require pollution reductions from a wide variety of sources. The SCAQMD staff evaluates each rule for any adverse environmental impact and prepares the appropriate CEQA document. Although most rules reduce air emissions, they may have secondary environmental impacts such as use of water or energy or disposal of waste—e.g., spent catalyst from control equipment.[3]

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[3] The SCAQMD's CEQA program for its rules is a "Certified Regulatory Program" under which it prepares a "functionally equivalent" document in lieu of a negative declaration or EIR. (Pub. Resources Code § 21080.5, CEQA Guidelines § 15251(l).)

The SCAQMD also approves a large number of permits every year to construct new, modified, or replacement facilities that emit regulated air pollutants. The majority of these air pollutant sources have already been included in an earlier CEQA evaluation for a larger project, are currently being evaluated by a local government as lead agency, or qualify for an exemption. However, the SCAQMD sometimes acts as lead agency for major projects where the local government does not have a discretionary approval. In such cases, SCAQMD prepares and certifies a negative declaration or environmental impact report (EIR) as appropriate.[4] SCAQMD evaluates perhaps a dozen such permit projects under CEQA each year. SCAQMD is often also a "responsible agency" for many projects since it must issue a permit for part of the projects (e.g., a boiler used to provide heat in a commercial building). For permit projects evaluated by another lead agency under CEQA, SCAQMD has the right to determine that the CEQA document is inadequate for its purposes as a responsible agency, but it may not do so because its permit program already requires all permitted sources to use the best available air pollution control technology. (SCAQMD, *Rule 1303(a)(1) – Requirements*, http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiii; then follow "Rule 1303" hyperlink (last visited Apr. 1, 2015).)

Finally, SCAQMD receives as many as 60 or more CEQA documents each month (around 500 per year) in its role as commenting agency or an agency with "jurisdiction by law" over air quality—a natural resource affected by the project. (Pub. Resources Code §§ 21104(a), 21153; CEQA Guidelines § 15366(a)(3).) The SCAQMD staff provides comments on as many as 25 or 30 such documents each month.

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[4] The SCAQMD's permit projects are not included in its Certified Regulatory Program, and are evaluated under the traditional local government CEQA analysis. (Pub. Resources Code §§ 21150-21154.)

(SCAQMD Governing Board Agenda, Apr. 3, 2015, Agenda Item 16, Attachment A, http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=governing-board-meeting-agenda-april-3-2015; then follow "16. Lead Agency Projects and Environmental Documents Received by SCAQMD" hyperlink (last visited Apr. 1, 2015).) Of course, SCAQMD focuses its commenting efforts on the more significant projects.

Typically, SCAQMD comments on the adequacy of air quality analysis, appropriateness of assumptions and methodology, and completeness of the recommended air quality mitigation measures. Staff may comment on the need to prepare a health risk assessment detailing the projected cancer and noncancer risks from toxic air contaminants resulting from the project, particularly the impacts of diesel particulate matter, which CARB has identified as a toxic air contaminant based on its carcinogenic effects. (California Air Resources Board, Resolution 98-35, Aug. 27, 1998, http://www.arb.ca.gov/regact/diesltac/diesltac.htm; then follow Resolution 98-35 hyperlink (last visited Apr. 1, 2015).) Because SCAQMD already requires new or modified stationary sources of toxic air contaminants to use the best available control technology for toxics and to keep their risks below specified levels, (SCAQMD Rule 1401, supra, note 15), the greatest opportunity to further mitigate toxic impacts through the CEQA process is by reducing emissions—particularly diesel emissions—from vehicles.

II. THIS COURT SHOULD NOT SET A HARD-AND-FAST RULE CONCERNING THE EXTENT TO WHICH AN EIR MUST CORRELATE A PROJECT'S EMISSION OF POLLUTANTS WITH RESULTING HEALTH IMPACTS.

Numerous cases hold that courts do not review the correctness of an EIR's conclusions but rather its sufficiency as an informative document. (*Laurel Heights 1, supra*, 47 Cal.3d at p. 392; *Citizens of Goleta Valley v.*

Bd. of Supervisors (1990) 52 Cal.3d 553, 569; *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1197.)

As stated by the Court of Appeal in this case, where an EIR has addressed a topic, but the petitioner claims that the information provided about that topic is insufficient, courts must "draw[] a line that divides *sufficient* discussions from those that are *insufficient*." (*Sierra Club v. County of Fresno* (2014) 226 Cal.App.4th 704 (superseded by grant of review) 172 Cal.Rptr.3d 271, 290.) The Court of Appeal readily admitted that "[t]he terms themselves – sufficient and insufficient – provide little, if any, guidance as to where the line should be drawn. They are simply labels applied once the court has completed its analysis." (*Id.*)

The CEQA Guidelines, however, provide guidance regarding what constitutes a sufficient discussion of impacts. Section 15151 states that "the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." Case law reflects this: "Analysis of environmental effects need not be exhaustive, but will be judged in light of what was reasonably feasible." (*Association of Irritated Residents v. County of Madera, supra,* 107 Cal.App.4th at p. 1390; see also CEQA Guidelines § 15204(a).)

Applying this test, this Court cannot realistically establish a hard-and-fast rule that an analysis correlating air pollution impacts of a project to quantified resulting health impacts is always required, or indeed that it is never required. Simply put, in some cases such an analysis will be "feasible"; in some cases it will not.

For example, air pollution control districts often require a proposed new source of toxic air contaminants to prepare a "health risk assessment" before issuing a permit to construct. District rules often limit the allowable cancer risk the new source may cause to the "maximally exposed individual" (worker and residence exposures). (*See, e.g.*, SCAQMD Rule 1401(c)(8); 1401(d)(1), *supra* note 15.) In order to perform this analysis, it

is necessary to have data regarding the sources and types of air toxic contaminants, location of emission points, velocity of emissions, the meteorology and topography of the area, and the location of receptors (worker and residence). (SCAQMD, *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588), pp. 11-16*; (last visited Apr. 1, 2015) http://www.aqmd.gov/home/library/documents-support-material; "Guidelines" hyperlink; AB2588; then follow AB2588 Risk Assessment Guidelines hyperlink.)

Thus, it is feasible to determine the health risk posed by a new gas station locating at an intersection in a mixed use area, where receptor locations are known. On the other hand, it may not be feasible to perform a health risk assessment for airborne toxics that will be emitted by a generic industrial building that was built on "speculation" (i.e., without knowing the future tenant(s)). Even where a health risk assessment can be prepared, however, the resulting maximum health risk value is only a calculation of risk—it does not necessarily mean anyone will contract cancer as a result of the project.

In order to find the "cancer burden" or expected additional cases of cancer resulting from the project, it is also necessary to know the numbers and location of individuals living within the "zone of impact" of the project: i.e., those living in areas where the projected cancer risk from the project exceeds one in a million. (SCAQMD, Health Risk Assessment Summary form, http://www.aqmd.gov/home/forms ; filter by "AB2588" category; then "Health Risk Assessment" hyperlink (last visited Apr. 1, 2015).) The affected population is divided into bands of those exposed to at least 1 in a million risk, those exposed to at least 10 in a million risk, etc. up to those exposed at the highest levels. (*Id.*) This data allows agencies to calculate an approximate number of additional cancer cases expected from

the project. However, it is not possible to predict which particular individuals will be affected.

For the so-called criteria pollutants[5], such as ozone, it may be more difficult to quantify health impacts. Ozone is formed in the atmosphere from the chemical reaction of the nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. (U.S. EPA, Ground Level Ozone, http://www.epa.gov/airquality/ozonepollution/ (last updated Mar. 25, 2015).) It takes time and the influence of meteorological conditions for these reactions to occur, so ozone may be formed at a distance downwind from the sources. (U.S. EPA, *Guideline on Ozone Monitoring Site Selection* (Aug. 1998) EPA-454/R-98-002 § 5.1.2, http://www.epa.gov/ttnamti1/archive/cpreldoc.html (last visited Apr. 1, 2015).) NO_x and VOC are known as "precursors" of ozone.

Scientifically, health effects from ozone are correlated with increases in the ambient level of ozone in the air a person breathes. (U.S. EPA, *Health Effects of Ozone in the General Population,* Figure 9, http://www.epa.gov/apti/ozonehealth/population.html#levels (last visited Apr. 1, 2015).) However, it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels over an entire region. For example, the SCAQMD's 2012 AQMP showed that reducing NO_x by 432 tons per day (157,680 tons/year) and reducing VOC by 187 tons per day (68,255 tons/year) would reduce ozone levels at the SCAQMD's monitor site with the highest levels by only 9 parts per billion. (South Coast Air Quality Management District, *Final 2012 AQMP (February 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "Appendix V: Modeling & Attainment Demonstrations" hyperlink,

[5] See discussion of types of pollutants, supra, Part I.A.

pp. v-4-2, v-7-4, v-7-24.) SCAQMD staff does not currently know of a way to accurately quantify ozone-related health impacts caused by NO_x or VOC emissions from relatively small projects.

On the other hand, this type of analysis may be feasible for projects on a regional scale with very high emissions of NO_x and VOCs, where impacts are regional. For example, in 2011 the SCAQMD performed a health impact analysis in its CEQA document for proposed Rule 1315, which authorized various newly-permitted sources to use offsets from the districts "internal bank" of emission reductions. This CEQA analysis accounted for essentially *all* the increases in emissions due to new or modified sources in the District between 2010 and 2030.[6] The SCAQMD was able to correlate this very large emissions increase (e.g., 6,620 pounds per day NO_x (1,208 tons per year), 89,180 pounds per day VOC (16,275 tons per year)) to expected health outcomes from ozone and particulate matter (e.g., 20 premature deaths per year and 89,947 school absences in the year 2030 due to ozone).[7] (SCAQMD Governing Board Agenda, February 4, 2011, Agenda Item 26, *Assessment for: Re-adoption of Proposed Rule 1315 – Federal New Source Review Tracking System* (see hyperlink in fn 6*)* at p. 4.1-35, Table 4.1-29.)

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[6] (SCAQMD Governing Board Agenda, February 4, 2011, Agenda Item 26, Attachment G, *Assessment for: Re-adoption of Proposed Rule 1315 – Federal New Source Review Tracking System, Vol. 1, p.4.0-6,* http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=governing-board-meeting-agenda-february-4-2011; the follow "26. Adopt Proposed Rule 1315 – Federal New Source Review Tracking System" (last visited April 1, 2015).)

[7] The SCAQMD was able to establish the location of future NO_x and VOC emissions by assuming that new projects would be built in the same locations and proportions as existing stationary sources. This CEQA document was upheld by the Los Angeles County Superior Court in *Natural Res. Def. Council v SCAQMD*, Los Angeles Superior Court No. BS110792).

However, a project emitting only 10 tons per year of NO_x or VOC is small enough that its regional impact on ambient ozone levels may not be detected in the regional air quality models that are currently used to determine ozone levels. Thus, in this case it would not be feasible to directly correlate project emissions of VOC or NO_x with specific health impacts from ozone. This is in part because ozone formation is not linearly related to emissions. Ozone impacts vary depending on the location of the emissions, the location of other precursor emissions, meteorology and seasonal impacts, and because ozone is formed some time later and downwind from the actual emission. (EPA Guideline on Ozone Monitoring Site Selection (Aug. 1998) EPA-454/R-98-002, § 5.1.2; https://www.epa.gov/ttnamti1/archive/cpreldoc.html; then search "Guideline on Ozone Monitoring Site Selection" click on pdf) (last viewed Apr. 1, 2015).)

SCAQMD has set its CEQA "significance" threshold for NO_x and VOC at 10 tons per year (expressed as 55 lb/day). (SCAQMD, *Air Quality Analysis Handbook*, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook; then follow "SCAQMD Air Quality Significance Thresholds" hyperlink (last visited Apr. 1, 2015).) This is because the federal Clean Air Act defines a "major" stationary source for "extreme" ozone nonattainment areas such as SCAQMD as one emitting 10 tons/year. (42 U.S.C. §§ 7511a(e), 7511a(f); CAA §§ 182(e), 182(f).) Under the Clean Air Act, such sources are subject to enhanced control requirements (42 U.S.C. §§ 7502(c)(5), 7503; CAA §§ 172(c)(5), 173), so SCAQMD decided this was an appropriate threshold for making a CEQA "significance" finding and requiring feasible mitigation. Essentially, SCAQMD takes the position that a source that emits 10 tons/year of NO_x or VOC would contribute cumulatively to ozone formation. Therefore, lead agencies that use SCAQMD's thresholds of significance may determine

that many projects have "significant" air quality impacts and must apply all feasible mitigation measures, yet will not be able to precisely correlate the project to quantifiable health impacts, unless the emissions are sufficiently high to use a regional modeling program.

In the case of particulate matter ($PM_{2.5}$)[8], another "criteria" pollutant, SCAQMD staff is aware of two possible methods of analysis. SCAQMD used regional modeling to predict expected health impacts from its proposed Rule 1315, as mentioned above. Also, the California Air Resources Board (CARB) has developed a methodology that can predict expected mortality (premature deaths) from large amounts of $PM_{2.5}$. (California Air Resources Board, *Health Impacts Analysis: PM Premature Death Relationship*, http://www.arb.ca.gov/research/health/pm-mort/pm-mort_arch.htm (last reviewed Jan. 19, 2012).) SCAQMD used the CARB methodology to predict impacts from three very large power plants (e.g., 731-1837 lbs/day). (Final Environmental Assessment for Rule 1315, *supra*, pp 4.0-12, 4.1-13, 4.1-37 (e.g., 125 premature deaths in the entire SCAQMD in 2030), 4.1-39 (0.05 to 1.77 annual premature deaths from power plants.) Again, this project involved large amounts of additional $PM_{2.5}$ in the District, up to 2.82 tons/day (5,650 lbs/day of $PM_{2.5}$, or, or 1029 tons/year. (*Id.* at table 4.1-4, p. 4.1-10.)

However, the primary author of the CARB methodology has reported that this $PM_{2.5}$ health impact methodology is not suited for small projects and may yield unreliable results due to various uncertainties. [9] (SCAQMD, *Final Subsequent Mitigated Negative Declaration for: Warren*

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[8] SCAQMD has not attained the latest annual or 24-hour national ambient air quality standards for "$PM_{2.5}$" or particulate matter less than 2.5 microns in diameter.

[9] Among these uncertainties are the representativeness of the population used in the methodology, and the specific source of PM and the corresponding health impacts. (*Id.* at p. 2-24.)

E&P, Inc. WTU Central Facility, New Equipment Project (certified July 19, 2011), http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents---year-2011; then follow "Final Subsequent Mitigated Negative Declaration for Warren E&P Inc. WTU Central Facility, New Equipment Project" hyperlink, pp. 2-22, 2-23 (last visited Apr. 1, 2015).) Therefore, when SCAQMD prepared a CEQA document for the expansion of an existing oil production facility, with very small $PM_{2.5}$ increases (3.8 lb/day) and a very small affected population, staff elected not to use the CARB methodology for using estimated $PM_{2.5}$ emissions to derive a projected premature mortality number and explained why it would be inappropriate to do so. (*Id.* at pp 2-22 to 2-24.) SCAQMD staff concluded that use of this methodology for such a small source could result in unreliable findings and would not provide meaningful information. (*Id.* at pp. 2-23, 2-25.) This CEQA document was not challenged in court.

In the above case, while it may have been technically possible to plug the data into the methodology, the results would not have been reliable or meaningful. SCAQMD believes that an agency should not be required to perform analyses that do not produce reliable or meaningful results. This Court has already held that an agency may decline to use even the "normal" "existing conditions" CEQA baseline where to do so would be misleading or without informational value. (*Neighbors for Smart Rail v. Exposition Metro Line* (2013) 57 Cal.4th 439, 448, 457.) The same should be true for a decision that a particular study or analysis would not provide reliable or meaningful results.[10]

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[10] Whether a particular study would result in "informational value" is a part of deciding whether it is "feasible." CEQA defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and

Therefore, it is not possible to set a hard-and-fast rule on whether a correlation of air quality impacts with specific quantifiable health impacts is required in all cases. Instead, the result turns on whether such an analysis is reasonably feasible in the particular case.[11] Moreover, what is reasonably feasible may change over time as scientists and regulatory agencies continually seek to improve their ability to predict health impacts. For example, CARB staff has been directed by its Governing Board to reassess and improve the methodology for estimating premature deaths. (California Air Resources Board, *Health Impacts Analysis: PM Mortality Relationship*, http://www.arb.ca.gov/research/health/pm-mort/pm-mort.htm (last reviewed Dec. 29, 2010).) This factor also counsels against setting any hard-and-fast rule in this case.

III. THE QUESTION OF WHETHER AN EIR CONTAINS SUFFICIENT ANALYSIS TO MEET CEQA'S REQUIREMENTS IS A MIXED QUESTION OF FACT AND LAW GOVERNED BY TWO DIFFERENT STANDARDS OF REVIEW.

A. Standard of Review for Feasibility Determination and Sufficiency as an Informative Document

A second issue in this case is whether courts should review an EIR's informational sufficiency under the "substantial evidence" test as argued by Friant Ranch or the "independent judgment" test as argued by Sierra Club.

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technological factors." (Pub. Resources Code § 21061.1.) A study cannot be "accomplished in a *successful* manner" if it produces unreliable or misleading results.

[11] In this case, the lead agency did not have an opportunity to determine whether the requested analysis was feasible because the comment was non-specific. Therefore, SCAQMD suggests that this Court, after resolving the legal issues in the case, direct the Court of Appeal to remand the case to the lead agency for a determination of whether the requested analysis is feasible. Because Fresno County, the lead agency, did not seek review in this Court, it seems likely that the County has concluded that at least some level of correlation of air pollution with health impacts is feasible.

As this Court has explained, "a reviewing court must adjust its scrutiny to the nature of the alleged defect, depending on whether the claim is predominantly one of improper procedure or a dispute over the facts." (*Vineyard Area Citizens v. City of Rancho Cordova, supra,* 40 Cal.4th at 435.) For questions regarding compliance with proper procedure or other legal questions, courts review an agency's action de novo under the "independent judgment" test. (*Id.*) On the other hand, courts review factual disputes only for substantial evidence, thereby "accord[ing] greater deference to the agency's substantive factual conclusions." (*Id.*)

Here, Friant Ranch and Sierra Club agree that the case involves the question of whether an EIR includes sufficient information regarding a project's impacts. However, they disagree on the proper standard of review for answering this question: Sierra Club contends that courts use the independent judgment standard to determine whether an EIR's analysis is sufficient to meet CEQA's informational purposes,[12] while Friant Ranch contends that the substantial evidence standard applies to this question.

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[12] Sierra Club acknowledges that courts use the substantial evidence standard when reviewing predicate factual issues, but argues that courts ultimately decide as a matter of law what CEQA requires. (Answering Brief, pp. 14, 23.)

SCAQMD submits that the issue is more nuanced than either party contends. We submit that, whether a CEQA document includes sufficient analysis to satisfy CEQA's informational mandates is a mixed question of fact and law,[13] containing two levels of inquiry that should be judged by different standards.[14]

The state CEQA Guidelines set forth standards for the adequacy of environmental analysis. Guidelines Section 15151 states:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection, but for adequacy, completeness, and a good-faith effort at full disclosure.

In this case, the basic question is whether the underlying analysis of air quality impacts made the EIR "sufficient" as an informative document. However, whether the EIR's analysis was sufficient is judged in light of what was reasonably feasible. This represents a mixed question of fact and law that is governed by two different standards of review.

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[13] Friant Ranch actually states that the claim that an EIR lacks sufficient relevant information is, "most properly thought of as raising mixed questions of fact and law." (Opening Brief, p. 27.) However, the remainder of its argument claims that the court should apply the substantial evidence standard of review to all aspects of the issue.

[14] Mixed questions of fact and law issues may implicate predominantly factual subordinate questions that are reviewed under the substantial evidence test even though the ultimate question may be reviewed by the independent judgment test. *Crocker National Bank v. City and County of San Francisco* (1989) 49 Cal.3d 881, 888-889.

SCAQMD submits that an EIR's sufficiency as an informational document is ultimately a legal question that courts should determine using their independent judgment. This Court's language in *Laurel Heights I* supports this position. As this Court explained: "The court does not pass upon the correctness of the EIR's environmental conclusions, but only upon its *sufficiency as an informative document.*" (*Laurel Heights I, supra,* 47 Cal.3d at 392-393) (emphasis added.) As described above, the Court in *Vineyard Area Citizens v. City of Rancho Cordova, supra,* 40 Cal.4th at 431, also used its independent judgment to determine what level of analysis CEQA requires for water supply impacts. The Court did not defer to the lead agency's opinion regarding the law's requirements; rather, it determined for itself what level of analysis was necessary to meet "[t]he law's informational demands." (*Id.* at p. 432.) Further, existing case law also holds that where an agency fails to comply with CEQA's information disclosure requirements, the agency has "failed to proceed in the manner required by law." (*Save Our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 118.)

However, whether an EIR satisfies CEQA's requirements depends in part on whether it was reasonably feasible for an agency to conduct additional or more thorough analysis. EIRs must contain "a detailed statement" of a project's impacts (Pub. Res. Code § 21061), and an agency must "use its best efforts to find out and disclose all that it reasonably can." (CEQA Guidelines § 15144.) Nevertheless, "the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." (CEQA Guidelines § 15151.)

SCAQMD submits that the question of whether additional analysis or a particular study suggested by a commenter is "feasible" is generally a question of fact. Courts have already held that whether a particular alternative is "feasible" is reviewed by the substantial evidence test.

(*Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587, 598-99; *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 883.) Thus, if a lead agency determines that a particular study or analysis is infeasible, that decision should generally be judged by the substantial evidence standard. However, SCAQMD urges this Court to hold that lead agencies must explain the basis of any determination that a particular analysis is infeasible in the EIR itself. An EIR must discuss information, including issues related to the feasibility of particular analyses "in sufficient detail to enable meaningful participation and criticism by the public. '[W]hatever is required to be considered in an EIR must be in that formal report; what any official might have known from other writings or oral presentations cannot supply what is lacking in the report.'" (*Laurel Heights I, supra*, 47 Cal.3d at p. 405 (quoting *Santiago County Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 831) (discussing analysis of alternatives).) The evidence on which the determination is based should also be summarized in the EIR itself, with appropriate citations to reference materials if necessary. Otherwise commenting agencies such as SCAQMD would be forced to guess where the lead agency's evidence might be located, thus thwarting effective public participation.

Moreover, if a lead agency determines that a particular study or analysis would not result in reliable or useful information and for that reason is not feasible, that determination should be judged by the substantial evidence test. (See *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority*, *supra*, 57 Cal.4th 439, 448, 457:

whether "existing conditions" baseline would be misleading or uninformative judged by substantial evidence standard.[15])

If the lead agency's determination that a particular analysis or study is not feasible is supported by substantial evidence, then the agency has not violated CEQA's information disclosure provisions, since it would be infeasible to provide additional information. This Court's decisions provide precedent for such a result. For example, this Court determined that the issue of whether the EIR should have included a more detailed discussion of future herbicide use was resolved because substantial evidence supported the agency's finding that "the precise parameters of future herbicide use could not be predicted." *Ebbetts Pass Forest Watch v. California Dept. of Forestry & Fire Protection* (2008) 43 Cal.4th 936, 955.

Of course, SCAQMD expects that courts will continue to hold lead agencies to their obligations to consult with, and not to ignore or misrepresent, the views of sister agencies having special expertise in the area of air quality. (*Berkeley Keep Jets Over the Bay v. Board of Port Commissioners* (2007) 91 Cal.App.4th 1344, 1364 n.11.) In some cases, information provided by such expert agencies may establish that the purported evidence relied on by the lead agency is not in fact "substantial". (*Id.* at pp. 1369-1371.)

In sum, courts retain ultimate responsibility to determine what CEQA requires. However, the law does not require exhaustive analysis, but only what is reasonably feasible. Agencies deserve deference for their factual determinations regarding what type of analysis is reasonably feasible. On the other hand, if a commenter requests more information, and the lead agency declines to provide it but does *not* determine that the

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[15] The substantial evidence standard recognizes that the courts "have neither the resources nor the scientific expertise" to weigh conflicting evidence on technical issues. (*Laurel Heights I, supra,* 47 Cal.3d 376, 393.)

requested study or analysis would be infeasible, misleading or uninformative, the question becomes whether the omission of that analysis renders the EIR inadequate to satisfy CEQA's informational purposes. (*Id.* at pp. 1370-71.) Again, this is predominantly a question of law and should be judged by the de novo or independent judgment standard of review. Of course, this Court has recognized that a "project opponent or reviewing court can always imagine some additional study or analysis that might provide helpful information. It is not for them to design the EIR. That further study...might be helpful does not make it necessary." (*Laurel Heights I, supra,* 47 Cal.3d 376, 415 – see also CEQA Guidelines § 15204(a) [CEQA "does not require a lead agency to conduct every test. . . recommended or demanded by commenters."].) Courts, then, must adjudicate whether an omission of particular information renders an EIR inadequate to serve CEQA's informational purposes.[16]

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[16] We recognize that there is case law stating that the substantial evidence standard applies to "challenges to the scope of an EIR's analysis of a topic" as well as the methodology used and the accuracy of the data relied on in the document "because these types of challenges involve factual questions." (*Bakersfield Citizens for Local Control v. City of Bakersfield, supra,* 124 Cal.App.4th 1184, 1198, and cases relied on therein.) However, we interpret this language to refer to situations where the question of the scope of the analysis really is factual—that is, where it involves whether further analysis is feasible, as discussed above. This interpretation is supported by the fact that the *Bakersfield* court expressly rejected an argument that a claimed "omission of information from the EIR should be treated as inquiries whether there is substantial evidence supporting the decision approving the project. " *Bakersfield, supra,* 124 Cal.App.4th at p. 1208. And the *Bakersfield* court ultimately decided that the lead agency must analyze the connection between the identified air pollution impacts and resulting health impacts, even though the EIR already included some discussion of air-pollution-related respiratory illnesses. *Bakersfield, supra,* 124 Cal.App.4th at p. 1220. Therefore, the court must not have interpreted this question as one of the "scope of the analysis" to be judged by the substantial evidence standard.

B. Friant Ranch's Rationale for Rejecting the Independent Judgment Standard of Review is Unsupported by Case Law.

In its brief, Friant Ranch makes a distinction between cases where a required CEQA topic is not discussed at all (to be reviewed by independent judgment as a failure to proceed in the manner required by law) and cases where a topic is discussed, but the commenter claims the information provided is insufficient (to be judged by the substantial evidence test). (Opening Brief, pp. 13-17.) The Court of Appeal recognized these two types of cases, but concluded that both raised questions of law. (*Sierra Club v. County of Fresno* (2014) 226 Cal.App.4th 704 (superseded by grant of review) 172 Cal.Rptr.3d 271, 290.) We believe the distinction drawn by Friant Ranch is unduly narrow, and inconsistent with cases which have concluded that CEQA documents are insufficient. In many instances, CEQA's requirements are stated broadly, and the courts must interpret the law to determine what level of analysis satisfies CEQA's mandate for providing meaningful information, even though the EIR discusses the issue to some extent.

For example, the CEQA Guidelines require discussion of the existing environmental baseline. In *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 954-955, the lead agency had discussed the environmental baseline by describing historic month-end water levels in the affected lakes. However, the court held that this was not an adequate baseline discussion because it failed to discuss the timing and amounts of past actual water releases, to allow comparison with the proposed project. The court evidently applied the independent judgment test to its decision, even though the agency discussed the issue to some extent.

Likewise, in *Vineyard Area Citizens* (2007) 40 Cal.4th 412, this Court addressed the question of whether an EIR's analysis of water supply impacts complied with CEQA. The parties agreed that the EIR was required to analyze the effects of providing water to the development project, "and that in order to do so the EIR had, in some manner, to identify the planned sources of that water." (*Vineyard Area Citizens, supra,* at p. 428.) However, the parties disagreed as to the level of detail required for this analysis and "what level of uncertainty regarding the availability of water supplies can be tolerated in an EIR . . . ." (*Id.*) In other words, the EIR had analyzed water supply impacts for the project, but the petitioner claimed that the analysis was insufficient.

This Court noted that neither CEQA's statutory language or the CEQA Guidelines specifically addressed the question of how precisely an EIR must discuss water supply impacts. (*Id.*) However, it explained that CEQA "states that '[w]hile foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can.'" (*Id.*, [Guidelines § 15144].) The Court used this general principle, along with prior precedent, to elucidate four "principles for analytical adequacy" that are necessary in order to satisfy "CEQA's informational purposes." (*Vineyard Area Citizens, supra,* at p. 430.) The Court did not defer to the agency's determination that the EIR's analysis of water supply impacts was sufficient. Rather, this Court used its independent judgment to determine for itself the level of analysis required to satisfy CEQA's fundamental purposes. (*Vineyard Area Citizens, supra*, at p. 441: an EIR does not serve its purposes where it neglects to explain likely sources of water and "... leaves long term water supply considerations to later stages of the project.")

Similarly, the CEQA Guidelines require an analysis of noise impacts of the project. (Appendix G, "Environmental Checklist Form."[17]) In *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1123, the court held that the lead agency's noise impact analysis was inadequate even though it had addressed the issue and concluded that the increase would not be noticeable. If the court had been using the substantial evidence standard, it likely would have upheld this discussion.

Therefore, we do not agree that the issue can be resolved on the basis suggested by Friant Ranch, which would apply the substantial evidence standard to *every* challenge to an analysis that addresses a required CEQA topic. This interpretation would subvert the courts' proper role in interpreting CEQA and determining what the law requires.

Nor do we agree that the Court of Appeal in this case violated CEQA's prohibition on courts interpreting its provisions "in a manner which imposes procedural or substantive requirements beyond those explicitly stated in this division or in the state guidelines." (Pub. Resources Code § 21083.1.) CEQA requires an EIR to describe *all* significant impacts of the project on the environment. (Pub. Resources Code § 21100(b)(2); *Vineyard Area Citizens, supra,* at p. 428.) Human beings are part of the environment, so CEQA requires EIRs to discuss a project's significant impacts on human health. However, except in certain particular circumstances,[18] neither the CEQA statute nor Guidelines specify the precise level of analysis that agencies must undertake to satisfy the law's requirements. (see, e.g., CEQA Guidelines § 15126.2(a) [EIRs must describe "health and safety problems caused by {a project's} physical changes"].) Accordingly, courts must interpret CEQA as a whole to

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[17] Association of Environmental Professionals, 2015 CEQA Statute and Guidelines (2015) p.287.

[18] E.g., Pub. Resources Code § 21151.8(C)(3)(B)(iii) (requiring specific type of health risk analysis for siting schools).

determine whether a particular EIR is sufficient as an informational document. A court determining whether an EIR's discussion of human health impacts is legally sufficient does not constitute imposing a new substantive requirement.[19] Under Friant Ranch's theory, the above-referenced cases holding a CEQA analysis inadequate would have violated the law. This is not a reasonable interpretation.

IV. COURTS MUST SCRUPULOUSLY ENFORCE THE REQUIREMENTS THAT LEAD AGENCIES CONSULT WITH AND OBTAIN COMMENTS FROM AIR DISTRICTS

Courts must "scrupulously enforce" CEQA's legislatively mandated requirements. (*Vineyard Area Citizens, supra*, 40 Cal.4th 412, 435.) Case law has firmly established that lead agencies must consult with the relevant air pollution control district before conducting an initial study, and must provide the districts with notice of the intention to adopt a negative declaration (or EIR). (*Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 958.) As *Schenck* held, neither publishing the notice nor providing it to the State Clearinghouse was a sufficient substitute for sending notice directly to the air district. (*Id.*) Rather, courts "must be satisfied that [administrative] agencies have fully complied with the procedural requirements of CEQA, since only in this way can the important public purposes of CEQA be protected from subversion." *Schenck,* 198 Cal.App.4th at p. 959 (citations omitted).[20]

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[19] We submit that Public Resources Code Section 21083.1 was intended to prevent courts from, for example, holding that an agency must analyze economic impacts of a project where there are no resulting environmental impacts (see CEQA Guidelines § 15131) , or imposing new procedural requirements, such as imposing additional public notice requirements not set forth in CEQA or the Guidelines.

[20] Lead agencies must consult air districts, as public agencies with jurisdiction by law over resources affected by the project, *before* releasing an EIR. (Pub. Resources Code §§ 21104(a); 21153.) Moreover, air

Lead agencies should be aware, therefore, that failure to properly seek and consider input from the relevant air district constitutes legal error which may jeopardize their project approvals. For example, the court in *Fall River Wild Trout Foundation v. County of Shasta,* (1999) 70 Cal.App.4th 482, 492 held that the failure to give notice to a trustee agency (Department of Fish and Game) was prejudicial error requiring reversal. The court explained that the lack of notice prevented the Department from providing any response to the CEQA document. (*Id.* at p. 492.) It therefore prevented relevant information from being presented to the lead agency, which was prejudicial error because it precluded informed decision-making. (*Id.*)[21]

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districts should be considered "state agencies" for purposes of the requirement to consult with "trustee agencies" as set forth in Public Resources Code § 20180.3(a). This Court has long ago held that the districts are not mere "local agencies" whose regulations are superseded by those of a state agency regarding matters of statewide concern, but rather have concurrent jurisdiction over such issues. (*Orange County Air Pollution Control District v. Public Util. Com.* (1971) 4 Cal.3d 945, 951, 954.) Since air pollution is a matter of statewide concern, *Id* at 952, air districts should be entitled to trustee agency status in order to ensure that this vital concern is adequately protected during the CEQA process.

[21] In *Schenck,* the court concluded that failure to give notice to the air district was not prejudicial, but this was partly because the trial court had already corrected the error before the case arrived at the Court of Appeal. The trial court issued a writ of mandate requiring the lead agency to give notice to the air district. The air district responded by concurring with the lead agency that air impacts were not significant. (*Schenck,* 198 Cal.App.4th 949, 960.) We disagree with the *Schenck* court that the failure to give notice to the air district would not have been prejudicial (even in the absence of the trial court writ) merely because the lead agency purported to follow the air district's published CEQA guidelines for significance. (*Id.*, 198 Cal.App.4th at p. 960.) In the first place, absent notice to the air district, it is uncertain whether the lead agency properly followed those guidelines. Moreover, it is not realistic to expect that an air district's published guidelines would necessarily fully address all possible air-quality related issues that can arise with a CEQA project, or that those

Similarly, lead agencies must obtain additional information requested by expert agencies, including those with jurisdiction by law, if that information is necessary to determine a project's impacts. (*Sierra Club v. State Bd. Of Forestry* (1994) 7 Cal.4th 1215, 1236-37.) Approving a project without obtaining that information constitutes a failure to proceed in the manner prescribed by CEQA. (*Id.* at p. 1236.)

Moreover, a lead agency can save significant time and money by consulting with the air district early in the process. For example, the lead agency can learn what the air district recommends as an appropriate analysis on the facts of its case, including what kinds of health impacts analysis may be available, and what models are appropriate for use. This saves the lead agency from the need to do its analysis all over again and possibly needing to recirculate the document after errors are corrected, if new significant impacts are identified. (CEQA Guidelines § 15088.5(a).) At the same time, the air district's expert input can help the lead agency properly determine whether another commenter's request for additional analysis or studies is reasonable or feasible. Finally, the air district can provide input on what mitigation measures would be feasible and effective.

Therefore, we suggest that this Court provide guidance to lead agencies reminding them of the importance of consulting with the relevant air districts regarding these issues. Otherwise, their feasibility decisions may be vulnerable to air district evidence that establishes that there is no substantial evidence to support the lead agency decision not to provide specific analysis. (*See Berkeley Keep Jets Over the Bay, supra,* 91 Cal.App.4th 1344, 1369-1371.)

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guidelines would necessarily be continually modified to reflect new developments. Therefore we believe that, had the trial court not already ordered the lead agency to obtain the air district's views, the failure to give notice would have been prejudicial, as in *Fall River, supra,* 70 Cal.App.4th 482, 492.

CONCLUSION

The SCAQMD respectfully requests this Court *not* to establish a hard-and-fast rule concerning whether CEQA requires a lead agency to correlate identified air quality impacts of a project with resulting health outcomes. Moreover, the question of whether an EIR is "sufficient as an informational document" is a mixed question of fact and law containing two levels of inquiry. Whether a particular proposed analysis is feasible is predominantly a question of fact to be judged by the substantial evidence standard of review. Where the requested analysis is feasible, but the lead agency relies on legal or policy reasons not to provide it, the question of whether the EIR is nevertheless sufficient as an informational document is predominantly a question of law to be judged by the independent judgment standard of review.

Respectfully submitted,

DATED: April 3, 2015

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
KURT R. WIESE, GENERAL COUNSEL
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CERTIFICATE OF WORD COUNT

Pursuant to Rule 8.520(c)(1) of the California Rules of Court, I hereby certify that this brief contains 8,476 words, including footnotes, but excluding the Application, Table of Contents, Table of Authorities, Certificate of Service, this Certificate of Word Count, and signature blocks. I have relied on the word count of the Microsoft Word Vista program used to prepare this Certificate.

DATED: April 3, 2015 Respectfully submitted,

Barbara Baird

Barbara Baird

PROOF OF SERVICE

I am employed in the County of Los Angeles, California. I am over the age of 18 years and not a party to the within action. My business address is 21865 Copley Drive, Diamond Bar, California 91765.

On April 3, 2015 I served true copies of the following document(s) described as **APPLICATION OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT FOR LEAVE TO FILE BRIEF OF *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY AND *[PROPOSED]* BRIEF OF *AMICUS CURIAE*** by placing a true copy of the foregoing document(s) in a sealed envelope addressed as set forth on the attached service list as follows:

BY MAIL: I enclosed the document(s) in a sealed envelope or package addressed to the persons at the addresses listed in the Service List and placed the envelope for collection and mailing following our ordinary business practices. I am readily familiar with this District's practice for collection and processing of correspondence for mailing. Under that practice, the correspondence would be deposited with the United States Postal Service, with postage thereon fully prepaid at Diamond Bar, California, in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on April 3, 2015 at Diamond Bar, California.

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CASE NO. S219783

IN THE SUPREME COURT OF CALIFORNIA

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LEAGUE OF WOMEN VOTERS OF FRESNO,
Plaintiffs and Appellants

v.

COUNTY OF FRESNO,
Defendant and Respondent

FRIANT RANCH, L.P.,
Real Party in Interest and Respondent

After a Decision by the Court of Appeal, filed May 27, 2014
Fifth Appellate District Case No. F066798

Appeal from the Superior Court of California, County of Fresno
Case No. 11CECG00726

APPLICATION FOR LEAVE TO FILE AMICUS CURIAE BRIEF OF SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT IN SUPPORT OF DEFENDANT AND RESPONDENT, COUNTY OF FRESNO AND REAL PARTY IN INTEREST AND RESPONDENT, FRIANT RANCH, L.P.

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APPLICATION

Pursuant to California Rules of Court 8.520(f)(1), proposed Amicus Curiae San Joaquin Valley Unified Air Pollution Control District hereby requests permission from the Chief Justice to file an amicus brief in support of Defendant and Respondent, County of Fresno, and Defendant and Real Parties in Interest Friant Ranch, L.P. Pursuant to Rule 8.520(f)(5) of the California Rules of Court, the proposed amicus curiae brief is combined with this Application. The brief addresses the following issue certified by this Court for review:

> Is an EIR adequate when it identifies the health impacts of air pollution and quantifies a project's expected emissions, or does CEQA further require the EIR to *correlate* a project's air quality emissions to specific health impacts?

As of the date of this filing, the deadline for the final reply brief on the merits was March 5, 2015. Accordingly, under Rule 8.520(f)(2), this application and brief are timely.

1. Background and Interest of San Joaquin Valley Unified Air Pollution Control District

The San Joaquin Valley Unified Air Pollution Control District ("Air District") regulates air quality in the eight counties comprising the San Joaquin Valley ("Central Valley"): Kern, Tulare, Madera, Fresno, Merced, San Joaquin, Stanislaus, and Kings, and is primarily responsible for attaining air quality standards within its jurisdiction. After billions of dollars of investment by Central Valley businesses, pioneering air quality regulations, and consistent efforts by residents, the Central Valley air basin has made historic improvements in air quality.

The Central Valley's geographical, topographical and meteorological features create exceptionally challenging air quality

conditions. For example, it receives air pollution transported from the San Francisco Bay Area and northern Central Valley communities, and the southern portion of the Central Valley includes three mountain ranges (Sierra, Tehachapi, and Coastal) that, under some meteorological conditions, effectively trap air pollution. Central Valley air pollution is only a fraction of what the Bay Area and Los Angeles produce, but these natural conditions result in air quality conditions that are only marginally better than Los Angeles, even though about ten times more pollution is emitted in the Los Angeles region. Bay Area air quality is much better than the Central Valley's, even though the Bay Area produces about six times more pollution. The Central Valley also receives air pollution transported from the Bay Area and northern counties in the Central Valley, including Sacramento, and transboundary anthropogenic ozone from as far away as China.

Notwithstanding these challenges, the Central Valley has reduced emissions at the same or better rate than other areas in California and has achieved unparalleled milestones in protecting public health and the environment:

- In the last decade, the Central Valley became the first air basin classified by the federal government under the Clean Air Act as a "serious nonattainment" area to come into attainment of health-based National Ambient Air Quality Standard ("NAAQS") for coarse particulate matter (PM10), an achievement made even more notable given the Valley's extensive agricultural sector. Unhealthy levels of particulate matter can cause and exacerbate a range of chronic and acute illnesses.
- In 2013, the Central Valley became the first air basin in the country to improve from a federal designation of "extreme" nonattainment to

actually attain (and quality for an attainment designation) of the 1-hour ozone NAAQS; ozone creates "smog" and, like PM10, causes adverse health impacts.

- The Central Valley also is in full attainment of federal standards for lead, nitrogen dioxide, sulfur dioxide, and carbon monoxide.
- The Central Valley continues to make progress toward compliance with its last two attainment standards, with the number of exceedences for the 8-hour ozone NAAQS reduced by 74% (for the 1997 standard) and 38% (for the 2008 standard) since 1991, and for the small particulate matter (PM2.5) NAAQS reduced by 85% (for the 1997 standard) and 61% (for the 2006 standard).

Sustained improvement in Central Valley air quality requires a rigorous and comprehensive regulatory framework that includes prohibitions (e.g., on wood-burning fireplaces in new residences), mandates (e.g., requiring the installation of best available pollution reduction technologies on new and modified equipment and industrial operations), innovations (e.g., fees assessed against residential development to fund pollution reduction actions to "offset" vehicular emissions associated with new residences), incentive programs (e.g., funding replacements of older, more polluting heavy duty trucks and school buses)[1], ongoing planning for continued air quality improvements, and enforcement of Air District permits and regulations.

The Air District is also an expert air quality agency for the eight counties and cities in the San Joaquin Valley. In that capacity, the Air District has developed air quality emission guidelines for use by the Central

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[1] San Joaquin's incentive program has been so successful that through 2012, it has awarded over $ 432 million in incentive funds and has achieved 93,349 tons of lifetime emissions reductions. *See* SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, 2012 PM2.5 PLAN, 6-6 (2012) *available at* http://www.valleyair.org/Workshops/postings/2012/12-20-12PM25/FinalVersion/06%20Chapter%206%20Incentives.pdf.

Valley counties and cities that implement the California Environment Quality Act (CEQA).[2] In its guidance, the Air District has distinguished between toxic air contaminants and criteria air pollutants.[3] Recognizing this distinction, the Air District's CEQA Guidance has adopted distinct thresholds of significance for *criteria* pollutants (i.e., ozone, PM2.5 and their respective precursor pollutants) based upon scientific and factual data which demonstrates the level that can be accommodated on a cumulative basis in the San Joaquin Valley without affecting the attainment of the applicable NAAQS.[4] For *toxic air* pollutants, the District has adopted different thresholds of significance which scientific and factual data demonstrates has the potential to expose sensitive receptors (i.e., children, the elderly) to levels which may result in localized health impacts.[5]

The Air District's CEQA Guidance was followed by the County of Fresno in its environment review of the Friant Ranch project, for which the Air District also served as a commenting agency. The Court of Appeal's holding, however, requiring correlation between the project's criteria

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[2] *See, e.g.*, SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, PLANNING DIVISION, GUIDE FOR ASSESSING AND MITIGATING AIR QUALITY IMPACTS (2015), *available at* http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf ("CEQA Guidance").

[3] Toxic air contaminants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as birth defects. There are currently 189 toxic air contaminants regulated by the United States Environmental Protection Agency ("EPA") and the states pursuant to the Clean Air Act. 42 U.S.C. § 7412. Common TACs include benzene, perchloroethylene and asbestos. *Id.* at 7412(b).

In contrast, there are only six (6) criteria air pollutants: ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide and lead. Although criteria air pollutants can also be harmful to human health, they are distinguishable from toxic air contaminants and are regulated separately. For instance, while criteria pollutants are regulated by numerous sections throughout Title I of the Clean Air Act, the regulation of toxic air contaminants occurs solely under section 112 of the Act. Compare 42 U.S.C. §§ 7407 – 7411 & 7501 – 7515 with 42 U.S.C. § 7411.

[4] See, e.g., CEQA Guidance at http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf, pp. 64-66, 80.

[5] See, e.g., CEQA Guidance at http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf, pp. 66, 99-101.

pollutants and local health impacts, departs from the Air District's Guidance and approved methodology for assessing criteria pollutants. A close reading of the administrative record that gave rise to this issue demonstrates that the Court's holding is based on a misunderstanding of the distinction between toxic air contaminants (for which a local health risk assessment is feasible and routinely performed) and criteria air pollutants (for which a local health risk assessment is not feasible and would result in speculative results).[6] The Air District has a direct interest in ensuring the lawfulness and consistent application of its CEQA Guidance, and will explain how the Court of Appeal departed from the Air District's long-standing CEQA Guidance in addressing criteria pollutants and toxic air contaminants in this amicus brief.

2. How the Proposed Amicus Curiae Brief Will Assist the Court

As counsel for the proposed amicus curiae, we have reviewed the briefs filed in this action. In addition to serving as a "commentary agency" for CEQA purposes over the Friant Ranch project, the Air District has a strong interest in assuring that CEQA is used for its intended purpose, and believes that this Court would benefit from additional briefing explaining the distinction between criteria pollutants and toxic air contaminants and the different methodologies employed by local air pollution control agencies such as the Air District to analyze these two categories of air pollutants under CEQA. The Air District will also explain how the Court of Appeal's opinion is based upon a fundamental misunderstanding of these two different approaches by requiring the County of Fresno to correlate the project's *criteria* pollution emissions with *local* health impacts. In doing

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[6] CEQA does not require speculation. *See, e.g., Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.*, 6 Cal. 4th 1112, 1137 (1993) (upholding EIR that failed to evaluate cumulative toxic air emission increases given absence of any acceptable means for doing so).

so, the Air District will provide helpful analysis to support its position that at least insofar as criteria pollutants are concerned, CEQA does not require an EIR to correlate a project's air quality emissions to specific health impacts, because such an analysis is not reasonably feasible.

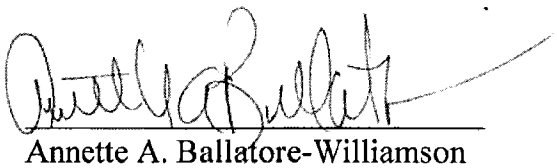
Rule 8.520 Disclosure

Pursuant to Cal. R. 8.520(f)(4), neither the Plaintiffs nor the Defendant or Real Party In Interest or their respective counsel authored this brief in whole or in part. Neither the Plaintiffs nor the Defendant or Real Party in Interest or their respective counsel made any monetary contribution towards or in support of the preparation of this brief.

CONCLUSION

On behalf of the San Joaquin Valley Unified Air Pollution Control District, we respectfully request that this Court accept the filing of the attached brief.

Dated: April 2, 2015



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SAN JOAQUIN VALLEY UNIFIED
AIR POLLUTION CONTROL
DISTRICT

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I. INTRODUCTION.

The San Joaquin Valley Unified Air Pollution Control District ("Air District") respectfully submits that the Court of Appeal erred when it held that the air quality analysis contained in the Environmental Impact Report ("EIR") for the Friant Ranch development project was inadequate under the California Environmental Quality Act ("CEQA") because it did not include an analysis of the correlation between the project's criteria air pollutants and the potential adverse human health impacts. A close reading of the portion of the administrative record that gave rise to this issue demonstrates that the Court's holding is based on a misunderstanding of the distinction between toxic air contaminants and criteria air pollutants.

Toxic air contaminants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as birth defects. There are currently 189 toxic air contaminants (hereinafter referred to as "TACs") regulated by the United States Environmental Protection Agency ("EPA") and the states pursuant to the Clean Air Act. 42 U.S.C. § 7412. Common TACs include benzene, perchloroethylene and asbestos. *Id.* at 7412(b).

In contrast, there are only six (6) criteria air pollutants: ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide and lead. Although criteria air pollutants can also be harmful to human health,

they are distinguishable from TACs and are regulated separately. For instance, while criteria pollutants are regulated by numerous sections throughout Title I of the Clean Air Act, the regulation of TACs occurs solely under section 112 of the Act. *Compare* 42 U.S.C. §§ 7407 – 7411 & 7501 – 7515 *with* 42 U.S.C. § 7411.

The most relevant difference between criteria pollutants and TACs for purposes of this case is the manner in which human health impacts are accounted for. While it is common practice to analyze the correlation between an individual facility's TAC emissions and the expected localized human health impacts, such is not the case for criteria pollutants. Instead, the human health impacts associated with criteria air pollutants are analyzed and taken into consideration when EPA sets the national ambient air quality standard ("NAAQS") for each criteria pollutant. 42 U.S.C. § 7409(b)(1). The health impact of a particular criteria pollutant is analyzed on a regional and not a facility level based on how close the area is to complying with (attaining) the NAAQS. Accordingly, while the type of individual facility / health impact analysis that the Court of Appeal has required is a customary practice for TACs, it is not feasible to conduct a similar analysis for criteria air pollutants because currently available computer modeling tools are not equipped for this task.

It is clear from a reading of both the administrative record and the Court of Appeal's decision that the Court did not have the expertise to fully

appreciate the difference between TACs and criteria air pollutants. As a result, the Court has ordered the County of Fresno to conduct an analysis that is not practicable and not likely yield valid information. The Air District respectfully requests that this portion of the Court of Appeal's decision be reversed.

II. THE COURT OF APPEAL ERRED IN FINDING THE FRIANT RANCH EIR INADEQUATE FOR FAILING TO ANALYZE THE SPECIFIC HUMAN HEALTH IMPACTS ASSOCIATED CRITERIA AIR POLLUTANTS.

Although the Air District does not take lightly the amount of air emissions at issue in this case, it submits that the Court of Appeal got it wrong when it required Fresno County to revise the Friant Ranch EIR to include an analysis correlating the criteria air pollutant emissions associated with the project with specific, localized health-impacts. The type of analysis the Court of Appeal has required will not yield reliable information because currently available modeling tools are not well suited for this task. Further, in reviewing this issue de novo, the Court of Appeal failed to appreciate that it lacked the scientific expertise to appreciate the significant differences between a health risk assessment commonly performed for toxic air contaminants and a similar type of analysis it felt should have been conducted for criteria air pollutants.

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A. Currently Available Modeling Tools are not Equipped to Provide a Meaningful Analysis of the Correlation between an Individual Development Project's Air Emissions and Specific Human Health Impacts.

In order to appreciate the problematic nature of the Court of Appeals' decision requiring a health risk type analysis for criteria air pollutants, it is important to understand how the relevant criteria pollutants (ozone and particulate matter) are formed, dispersed and regulated.

Ground level ozone (smog) is not directly emitted into the air, but is formed when precursor pollutants such as oxides of nitrogen (NOx) and volatile organic compounds (VOCs) are emitted into the atmosphere and undergo complex chemical reactions in the process of sunlight.[1] Once formed, ozone can be transported long distances by wind.[2] Because of the complexity of ozone formation, a specific tonnage amount of NOx or VOCs emitted in a particular area does not equate to a particular concentration of ozone in that area. In fact, even rural areas that have relatively low tonnages of emissions of NOx or VOCs can have high levels of ozone concentration simply due to wind transport.[3] Conversely, the San Francisco Bay Area has six times more NOx and VOC emissions per square mile than the San Joaquin Valley, but experiences lower

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[1] *See* United States Environmental Protection Agency, *Ground-level Ozone: Basic Information*, available at: http://www.epa.gov/airquality/ozonepollution/basic.html (visited March 10, 2015).
[2] *Id.*
[3] *Id.*

concentrations of ozone (and better air quality) simply because sea breezes disperse the emissions.[4]

Particulate matter ("PM") can be divided into two categories: directly emitted PM and secondary PM.[5] While directly emitted PM can have a localized impact, the tonnage emitted does not always equate to the local PM concentration because it can be transported long distances by wind.[6] Secondary PM, like ozone, is formed via complex chemical reactions in the atmosphere between precursor chemicals such as sulfur dioxides (SOx) and NOx.[7] Because of the complexity of secondary PM formation, the tonnage of PM-forming precursor emissions in an area does not necessarily result in an equivalent concentration of secondary PM in that area.

The disconnect between the *tonnage* of precursor pollutants (NOx, SOx and VOCs) and the *concentration* of ozone or PM formed is important because it is not necessarily the tonnage of precursor pollutants that causes human health effects, but the concentration of resulting ozone or PM. Indeed, the national ambient air quality standards ("NAAQS"), which are statutorily required to be set by the United States Environmental Protection

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[4] *San Joaquin Valley Air Pollution Control District 2007 Ozone Plan*, Executive Summary p. ES-6, available at: http://www.valleyair.org/Air_Quality_Plans/docs/AQ_Ozone_2007_Adopted/03%20Executive%20Summary.pdf (visited March 10, 2015).

[5] United States Environmental Protection Agency, *Particulate Matter: Basic Information*, available at: http://www.epa.gov/airquality/particlepollution/basic.html (visited March 10, 2015).

[6] *Id.*

[7] *Id.*

Agency ("EPA") at levels that are "requisite to protect the public health," 42 U.S.C. § 7409(b)(1), are established as concentrations of ozone or particulate matter and not as tonnages of their precursor pollutants.[8]

Attainment of a particular NAAQS occurs when the concentration of the relevant pollutant remains below a set threshold on a consistent basis throughout a particular region. For example, the San Joaquin Valley attained the 1-hour ozone NAAQS when ozone concentrations remained at or below 0.124 parts per million Valley-wide on 3 or fewer days over a 3-year period.[9] Because the NAAQS are focused on achieving a particular concentration of pollution region-wide, the Air District's tools and plans for attaining the NAAQS are regional in nature.

For instance, the computer models used to simulate and predict an attainment date for the ozone or particulate matter NAAQS in the San Joaquin Valley are based on regional inputs, such as regional inventories of precursor pollutants (NOx, SOx and VOCs) and the atmospheric chemistry and meteorology of the Valley.[10] At a very basic level, the models simulate future ozone or PM levels based on predicted changes in precursor

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[8] See, e.g., United States Environmental Protection Agency, *Table of National Ambient Air Quality Standards*, available at: http://www.epa.gov/air/criteria.html#3 (visited March 10, 2015).

[9] *San Joaquin Valley Unified Air Pollution Control District 2013 Plan for the Revoked 1-Hour Ozone Standard*, Ch. 2 p. 2-16, available at: http://www.valleyair.org/Air_Quality_Plans/OzoneOneHourPlan2013/02Chapter2ScienceTrendsModeling.pdf (visited March 10, 2015).

[10] *Id.* at Ch. 2 p. 2-19 (visited March 12, 2015); *San Joaquin Valley Unified Air Pollution Control District 2008 PM2.5 Plan*, Appendix F, pp. F-2 – F-5, available at: http://www.valleyair.org/Air_Quality_Plans/docs/AQ_Final_Adopted_PM2.5/20%20Appendix%20F.pdf (visited March 19, 2015).

emissions Valley wide.[11] Because the NAAQS are set levels necessary to protect human health, the closer a region is to attaining a particular NAAQS, the lower the human health impact is from that pollutant.

The goal of these modeling exercises is not to determine whether the emissions generated by a particular factory or development project will affect the date that the Valley attains the NAAQS. Rather, the Air District's modeling and planning strategy is regional in nature and based on the extent to which *all* of the emission-generating sources in the Valley (current and future) must be controlled in order to reach attainment.[12]

Accordingly, the Air District has based its thresholds of significance for CEQA purposes on the levels that scientific and factual data demonstrate that the Valley can accommodate without affecting the attainment date for the NAAQS.[13] The Air District has tied its CEQA significance thresholds to the level at which stationary pollution sources permitted by the Air District must "offset" their emissions.[14] This "offset"

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[11] *Id.*

[12] Although the Air District does have a dispersion modeling tool used during its air permitting process that is used to predict whether a particular project's directly emitted PM will either cause an exceedance of the PM NAAQS or contribute to an existing exceedance, this model bases the prediction on a worst case scenario of emissions and meteorology and has no provision for predicting any associated human health impacts. Further, this analysis is only performed for stationary sources (factories, oil refineries, etc.) that are required to obtain a New Source Review permit from the Air District and not for development projects such as Friant Ranch over which the Air District has no preconstruction permitting authority. *See* San Joaquin Valley Unified Air Pollution Control District Rule 2201 §§ 2.0; 3.3.9; 4.14.1, available at: http://www.valleyair.org/rules/currntrules/Rule2201041l.pdf (visited March 19, 2015).

[13] *San Joaquin Valley Unified Air Pollution Control District Guide to Assessing and Mitigating Air Quality Impacts*, (March 19, 2015) p. 22, available at: http://www.valleyair.org/transportation/CEQA%20Rules/GAMAQI%20Jan%202002%20Rev.pdf (visited March 30, 2015).

[14] *Id.* at pp. 22, 25.

level allows for growth while keeping the cumulative effects of all new sources at a level that will not impede attainment of the NAAQS.[15] In the Valley, these thresholds are 15 tons per year of PM, and 10 tons of NOx or VOC per year. *Sierra Club*, *supra*, 172 Cal.Rptr.3d at 303; AR 4554. Thus, the CEQA air quality analysis for criteria pollutants is not really a localized, project-level impact analysis but one of regional, "cumulative impacts."

Accordingly, the significance thresholds applied in the Friant Ranch EIR (15 tons per year of PM and 10 tons of NOx or VOCs) are not intended to be indicative of any localized human health impact that the project may have. While the health effects of air pollution are of primary concern to the Air District (indeed, the NAAQS are established to protect human health), the Air District is simply not equipped to analyze whether and to what extent the criteria pollutant emissions of an individual CEQA project directly impact human health in a particular area. This is true even for projects with relatively high levels of emissions of criteria pollutant precursor emissions.

For instance, according to the EIR, the Friant Ranch project is estimated to emit 109.52 tons per year of ROG (VOC), 102.19 tons per year of NOx, and 117.38 tons per year of PM. Although these levels well

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[15] [15] *San Joaquin Valley Unified Air Pollution Control District Environmental Review Guidelines* (Aug. 2000) p. 4-11, available at: http://www.valleyair.org/transportation/CEQA%20Rules/ERG%20Adopted%20_August%202000_.pdf (visited March 12, 2015).

exceed the Air District's CEQA significance thresholds, this does not mean that one can easily determine the concentration of ozone or PM that will be created at or near the Friant Ranch site on a particular day or month of the year, or what specific health impacts will occur. Meteorology, the presence of sunlight, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone or PM. This is especially true for a project like Friant Ranch where most of the criteria pollutant emissions derive not from a single "point source," but from area wide sources (consumer products, paint, etc.) or mobile sources (cars and trucks) driving to, from and around the site.

In addition, it would be extremely difficult to model the impact on NAAQS attainment that the emissions from the Friant Ranch project may have. As discussed above, the currently available modeling tools are equipped to model the impact of *all* emission sources in the Valley on attainment. According to the most recent EPA-approved emission inventory, the NOx inventory for the Valley is for the year 2014 is 458.2 tons per day, or 167,243 tons per year and the VOC (or ROG) inventory is 361.7 tons per day, or 132,020.5 tons per year.[16] Running the photochemical grid model used for predicting ozone attainment with the

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[16] *San Joaquin Valley Unified Air Pollution Control District 2007 Ozone Plan*, Appendix B pp. B-6, B-9,
available at:
http://www.valleyair.org/Air_Quality_Plans/docs/AQ_Ozone_2007_Adopted/19%20Appendix%20B%20April%202007.pdf (visited March 12, 2015).

emissions solely from the Friant Ranch project (which equate to less than one-tenth of one percent of the total NOx and VOC in the Valley) is not likely to yield valid information given the relative scale involved.

Finally, even once a model is developed to accurately ascertain local increases in concentrations of photochemical pollutants like ozone and some particulates, it remains impossible, using today's models, to correlate that increase in concentration to a specific health impact. The reason is the same: such models are designed to determine regional, population-wide health impacts, and simply are not accurate when applied at the local level.

For these reasons, it is not the norm for CEQA practitioners, including the Air District, to conduct an analysis of the localized health impacts associated with a project's criteria air pollutant emissions as part of the EIR process. When the accepted scientific method precludes a certain type of analysis, "the court cannot impose a legal standard to the contrary." *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 717 n. 8. However, that is exactly what the Court of Appeal has done in this case. Its decision upends the way CEQA air quality analysis of criteria pollutants occurs and should be reversed.

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B. The Court of Appeal Improperly Extrapolated a Request for a Health Risk Assessment for Toxic Air Contaminants into a Requirement that the EIR contain an Analysis of Localized Health Impacts Associated with Criteria Air Pollutants.

The Court of Appeal's error in requiring the new health impact analysis for criteria air pollutants clearly stems from a misunderstanding of terms of art commonly used in the air pollution field. More specifically, the Court of Appeal (and Appellants Sierra Club et al.) appear to have confused the health risk analysis ("HRA") performed to determine the health impacts associated with a project's toxic air contaminants ("TACs"), with an analysis correlating a project's criteria air pollutants (ozone, PM and the like) with specific localized health impacts.

The first type of analysis, the HRA, is commonly performed during the Air District's stationary source permitting process for projects that emit TACs and is, thus, incorporated into the CEQA review process. An HRA is a comprehensive analysis to evaluate and predict the dispersion of TACs emitted by a project and the potential for exposure of human populations. It also assesses and quantifies both the individual and population-wide health risks associated with those levels of exposure. There is no similar analysis conducted for criteria air pollutants. Thus, the second type of analysis (required by the Court of Appeal), is not currently part of the Air District's process because, as outlined above, the health risks associated

with exposure to criteria pollutants are evaluated on a regional level based on the region's attainment of the NAAQS.

The root of this confusion between the types of analyses conducted for TACs versus criteria air pollutants appears to stem from a comment that was presented to Fresno County by the City of Fresno during the administrative process.

In its comments on the draft EIR, the City of Fresno (the only party to raise this issue) stated:

> [t]he EIR must disclose the human health related effects of the Project's air pollution impacts. (CEQA Guidelines section 15126.2(a).) The EIR fails completely in this area. The EIR should be revised to disclose and determine the significance of TAC impacts, and of human health risks due to exposure to Project-related air emissions.

(AR 4602.)

In determining that the issue regarding the correlation between the Friant Ranch project's criteria air pollutants and adverse health impacts was adequately exhausted at the administrative level, the Court of Appeal improperly read the first two sentences of the City of Fresno's comment in isolation rather than in the context of the entire comment. *See Sierra Club v. County of Fresno* (2014) 172 Cal.Rptr.3d 271, 306. Although the comment first speaks generally in terms of "human health related effects" and "air pollution," it requests only that the EIR be revised to disclose "the significance of TACs" and the "human health risks due to exposure."

The language of this request in the third sentence of the comment is significant because, to an air pollution practitioner, the language would only have indicated only that a HRA for TACs was requested, and not a separate analysis of the health impacts associated with the project's criteria air pollutants. Fresno County clearly read the comment as a request to perform an HRA for TACs and limited its response accordingly. (AR 4602.)[17] The Air District submits that it would have read the City's comment in the same manner as the County because the City's use of the terms "human health risks" and "TACs" signal that an HRA for TACs is being requested. Indeed, the Air District was also concerned that an HRA be conducted, but understood that it was not possible to conduct such an analysis until the project entered the phase where detailed site specific information, such as the types of emission sources and the proximity of the sources to sensitive receptors became available. (AR 4553.)[18] The City of Fresno was apparently satisfied with the County's discussion of human health risks, as it did not raise the issue again when it commented on the final EIR. (AR 8944 – 8960.)

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[17] Appellants do not challenge the manner in which the County addressed TACs in the EIR. (Appellants' Answer Brief p. 28 fn. 7.)

[18] Appellants rely on the testimony of Air District employee, Dan Barber, as support for their position that the County should have conducted an analysis correlating the project's criteria air pollutant emissions with localized health impacts. (Appellants Answer Brief pp. 10-11; 28.) However, Mr. Barber's testimony simply reinforces the Air District's concern that a risk assessment (HRA) be conducted once the actual details of the project become available. (AR 8863.) As to criteria air pollutants, Mr. Barber's comments are aimed at the Air District's concern about the amount of emissions and the fact that the emissions will make it "more difficult for Fresno County and the Valley to reach attainment which means that the health of Valley residents maybe [sic] adversely impacted." Mr. Barber says nothing about conducting a separate analysis of the localized health impacts the project's emissions may have.

The Court of Appeal's holding, which incorrectly extrapolates a request for an HRA for TACs into a new analysis of the localized health impacts of the project's criteria air pollutants, highlights two additional errors in the Court's decision.

First, the Court of Appeal's holding illustrates why the Court should have applied the deferential substantial evidence standard of review to the issue of whether the EIR's air quality analysis was sufficient. The regulation of air pollution is a technical and complex field and the Court of Appeal lacked the expertise to fully appreciate the difference between TACs and criteria air pollutants and tools available for analyzing each type of pollutant.

Second, it illustrates that the Court likely got it wrong when it held that the issue regarding the criteria pollutant / localized health impact analysis was properly exhausted during the administrative process. In order to preserve an issue for the court, '[t]he "exact issue" must have been presented to the administrative agency....' [Citation.] *Citizens for Responsible Equitable Environmental Development v. City of San Diego*, (2011) 196 Cal.App.4th 515, 527 129 Cal.Rptr.3d 512, 521; *Sierra Club v. City of Orange* (2008) 163 Cal.App.4th 523, 535, 78 Cal.Rptr.3d 1, 13. "'[T]he objections must be sufficiently specific so that the agency has the

opportunity to evaluate and respond to them.' [Citation.]" *Sierra Club v. City of Orange*,163 Cal.App.4th at 536.[19]

As discussed above, the City's comment, while specific enough to request a commonly performed HRA for TACs, provided the County with no notice that it should perform a new type of analysis correlating criteria pollutant tonnages to specific human health effects. Although the parties have not directly addressed the issue of failure to exhaust administrative remedies in their briefs, the Air District submits that the Court should consider how it affects the issues briefed by the parties since "[e]xhaustion of administrative remedies is a jurisdictional prerequisite to maintenance of a CEQA action." *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1199, 22 Cal.Rptr.3d 203.

III. CONCLUSION

For all of the foregoing reasons, the Air District respectfully requests that the portion of the Court of Appeal's decision requiring an analysis correlating the localized human health impacts associated with an individual project's criteria air pollutant emissions be reversed.

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[19] *Sierra Club v. City of Orange*, is illustrative here. In that case, the plaintiffs challenged an EIR approved for a large planned community on the basis that the EIR improperly broke up the various environmental impacts by separate project components or "piecemealed" the analysis in violation of CEQA. In evaluating the defense that the plaintiffs had failed to adequately raise the issue at the administrative level, the Court held that comments such as *"the use of a single document for both a project-level and a program-level EIR [is] 'confusing',"* and *"[t]he lead agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project,"* were too vague to fairly raise the argument of piecemealing before the agency. *Sierra Club v. City of Orange*, 163 Cal.App.4th at 537.

correlating the localized human health impacts associated with an individual project's criteria air pollutant emissions be reversed.

Respectfully submitted,

Dated: April 2, 2015

Catherine T. Redmond
Attorney for Proposed Amicus Curiae

SAN JOAQUIN VALLEY
UNIFIED
AIR POLLUTION CONTROL
DISTRICT

CERTIFICATE OF WORD COUNT

Pursuant to Rule 8.204 of the California Rules of Court, I hereby certify that this document, based on the Word County feature of the Microsoft Word software program used to compose and print this document, contains, exclusive of caption, tables, certificate of word count, signature block and certificate of service, 3806 words.

Dated: April 2, 2015

Annette A. Ballatore-Williamson
District Counsel (SBN 192176)

Sierra Club et al, v. County of Fresno, et al
Supreme Court of California Case No.: S219783
Fifth District Court of Appeal Case No.: F066798
Fresno County Superior Court Case No.: 11CECG00726

PROOF OF SERVICE

I am over the age of 18 years and not a p[arty to the above-captioned action; that my business address is San Joaquin Valley Unified Air Pollution Control District located at 1990 E. Gettysburg Avenue, Fresno, California 93726.

On April 2, 2015, I served the document described below:

APPLICATION FOR LEAVE TO FILE AMICUS CURIAE BRIEF OF SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT IN SUPPORT OF DEFENDANT AND RESPONDENT, COUNTY OF FRESNO

On all parties to this action at the following addresses and in the following manner:

PLEASE SEE ATTACHED SERVICE LIST

(XX) **(BY MAIL)** I caused a true copy of each document(s) to be laced in a sealed envelope with first-class postage affixed and placed the envelope for collection. Mail is collected daily at my office and placed in a United State Postal Service collection box for pick-up and delivery that same day.

( ) **(BY ELECTRONIC MAIL)** I caused a true and correct scanned image (.PDF file) copy to be transmitted via electronic mail transfer system in place at the San Joaquin Valley Unified Air Pollution Control District ("District"), originating from the undersigned at 1990 E. Gettysburg Avenue, Fresno, CA, to the address(es) indicated below.

( ) **(BY OVERNIGHT MAIL)** I caused a true and correct copy to be delivered via Federal Express to the following person(s) or their representative at the address(es) listed below.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that I executed this document on April 2, 2015, at Fresno, California.

Esthela Soto

SERVICE LIST

Sierra Club et al, v. County of Fresno, et al
Supreme Court of California Case No.: S219783
Fifth District Court of Appeal Case No.: F066798
Fresno County Superior Court Case No.: 11CECG00726

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