Mammoth Lake Zoning Code
Draft EIR
Appendix B, Air Quality Data Worksheets

B.1 Operational Model Inputs

B.2 Operational Mobile Emissions
- Mobile Source Emissions
- Road Dust Emissions

B.3 Operational Emissions
- Operations - CalEEMod Output (Summer)
- Operations - CalEEMod Output (Winter)

Appendix B.1
Operational Model Inputs

Mammoth Lakes Zoning Update

CalEEMod Inputs

PROJECT LAND USE

Land Use Designation/Proposed Maximum DU/AC and FAR	Total Land Area (acres) [1]	Vacant Land Area (acres) [1]	Existing Units [2]	Existing Commercial and Industrial (sq ft) [3]	Assumed Density and Intensity for Future Development [4]	New Future Units [2 5]	New Commercial and Industrial (sq ft) [3]	Total Units at Buildout [5]	Total Population at Buildout [6]	Total Commercial and Industrial (sq ft) at Buildout [3]
COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL PUBLIC										
Commercial 1 (C-1) - 0.75 - 2.0 FAR [14]	32	2	226	24,984	2.0 FAR	180	1,857	406	1,409	26,841
Commercial 2 (C-2) - 0.75 - 2.0 FAR [14]	90	8	559	1,021,994	2.0 FAR	659	339,520	1,218	4,226	1,361,514
	122	**11**	**785**	**1,046,978**	**2.0 FAR**	**839**	**341,377**	**1,624**	**5,635**	**1,388,355**

WATER DEMAND

CalEEMod Type	Units	AFY	Water Use (gpy) Total	Indoor	Outdoor
Retail	341,377	134	43,664,034	27,071,701	16,592,333

WASTE GENERATION

CalEEMod Type	Units *KSF*	Employee *per KSF*	Quantity *KSF/employees/*	Generation Factor[a]	Rate Units	Solid Waste Generated *tons/year*
Retail	341,377	0.00271	925	2.41	tons/employee/yr	2,230

Appendix B.2
Operational Mobile Emissions

- Mobile Source Emissions
- Road Dust Emissions

Town of Mammoth Lakes - Land Use Element / Zoning Code Amendments and Mobility Element Update
Mobile Source Emissions - AQ

		Emission Factors (tons/mi) [a]					
Year	**Period**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2_5**
2015	Winter	1.01E-07	9.81E-08	7.31E-07	1.18E-09	1.47E-08	6.36E-09
2030	Winter	4.08E-08	2.31E-08	2.41E-07	8.78E-10	1.88E-08	7.79E-09

			Emissions (lbs/day)									
Scenario	**Year**	**Daily VMT [b]**	**ROG**	**NOx**	**CO**	**SOx**	**PM10 Exhuast**	**PM10 Road Dust**	**Total PM10**	**PM 2.5 Exhuast**	**PM 2.5 Road Dust**	**Total PM2_5**
Existing	2015	152,844	31	30	223	0.4	5	5881	5885	2	1444	1445
Existing with Mobility Element	2015	149,444	30	29	219	0.4	4	5750	5755	2	1411	1413
Future New FAR with Existing Network	2030	184,217	15	9	89	0.3	7	7088	7095	3	1740	1743
Future New FAR with Mobility Element	2030	178,638	15	8	86	0.3	7	6873	6880	3	1687	1690

Notes:

a. California Air Resources Board, EMFAC2014, Mono County.

b. LSC Transportation Consultants, Inc., Mammoth Mobility Element, Transportation Impact Analysis, (2016).
Daily VMT for Scenarios 3-6 are based on the adjusted values shown in Table 3.

Town of Mammoth Lakes - Land Use Element / Zoning Code Amendments and Mobility Element Update
Road Dust Emission Factors

Paved Road Dust Emission Factors (Assumes No Precipitation)

Formula: $EF_{Dust,P} = (k\ (sL)^{0.91} \times (W)^{1.02})$

Where:

$EF_{Dust,P}$ = Paved Road Dust Emission Factor (having the same units as k)
k = particle size multiplier (g/VMT)
sL = road surface silt loading (g/m^2)
W = average fleet vehicle weight (tons) (CARB uses 2.4 tons as a fleet average vehicle weight factor)

	Emission Factor (grams per VMT)	
	PM10	PM2.5
k	0.9979	0.2449
sL	8.7	8.7
W	2.4	2.4
$EF_{Dust,P}$	1.75E+01	4.28E+00

Sources:

SCAQMD, CalEEMod, Version 2011.1.

CARB, *Entrained Dust from Paved Road Travel: Emission Estimation Methodology Background Document* , (1997).

USEPA, *AP-42* , Fifth Edition, Volume I, Chapter 13.2.1 - Paved Roads, (2011).

ESA-PCR Services Corporation, 2016.

Mammoth Lakes AQMP

	Daily	**Emissions (pounds/day)**	
Scenario	**VMT**	**PM10 - Road Dust**	**PM2.5- Road Dust**
Existing	152,844	5,881	1,444
Existing with Mobility Element	149,444	5,750	1,411
Future New FAR with Existing Network	184,217	7,088	1,740
Future New FAR with Mobility Element	178,638	6,873	1,687

Appendix B.3
Operational Emissions

- Operations : CalEEMod Output (Summer)
- Operations : CalEEMod Output (Winter)

Mammoth Lakes Ops Net New FAR

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	341.38	1000sqft	7.84	341,377.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	1			**Operational Year**	2030
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Mobile emissions calculated outside of CalEEMod

Water And Wastewater - See "Operational Inputs"

Solid Waste -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2030
tblWater	IndoorWaterUseRate	25,286,877.38	27,071,701.00
tblWater	OutdoorWaterUseRate	15,498,408.72	16,592,333.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	9.4762	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788
Energy	0.0574	0.5220	0.4385	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.3622	626.3622	0.0120	0.0115	630.1741
Total	**9.5336**	**0.5223**	**0.4731**	**3.1300e-003**	**0.0000**	**0.0398**	**0.0398**	**0.0000**	**0.0398**	**0.0398**		**626.4369**	**626.4369**	**0.0122**	**0.0115**	**630.2529**

5.0 Energy Detail

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0574	0.5220	0.4385	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.3622	626.3622	0.0120	0.0115	630.1741
NaturalGas Unmitigated	0.0766	0.6960	0.5846	4.1800e-003		0.0529	0.0529		0.0529	0.0529		835.1495	835.1495	0.0160	0.0153	840.2321

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Strip Mall	5.32408	0.0574	0.5220	0.4385	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.3622	626.3622	0.0120	0.0115	630.1741
Total		**0.0574**	**0.5220**	**0.4385**	**3.1300e-003**		**0.0397**	**0.0397**		**0.0397**	**0.0397**		**626.3622**	**626.3622**	**0.0120**	**0.0115**	**630.1741**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	9.4762	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788
Unmitigated	9.4762	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.1675					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3055					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.1700e-003	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788
Total	**9.4762**	**3.1000e-004**	**0.0347**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**		**0.0747**	**0.0747**	**1.9000e-004**		**0.0788**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Mammoth Lakes Ops Net New FAR

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	341.38	1000sqft	7.84	341,377.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	1			**Operational Year**	2030
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Mobile emissions calculated outside of CalEEMod

Water And Wastewater - See "Operational Inputs"

Solid Waste -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2030
tblWater	IndoorWaterUseRate	25,286,877.38	27,071,701.00
tblWater	OutdoorWaterUseRate	15,498,408.72	16,592,333.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	9.4762	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788
Energy	0.0574	0.5220	0.4385	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.3622	626.3622	0.0120	0.0115	630.1741
Total	**9.5336**	**0.5223**	**0.4731**	**3.1300e-003**	**0.0000**	**0.0398**	**0.0398**	**0.0000**	**0.0398**	**0.0398**		**626.4369**	**626.4369**	**0.0122**	**0.0115**	**630.2529**

5.0 Energy Detail

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0574	0.5220	0.4385	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.3622	626.3622	0.0120	0.0115	630.1741
NaturalGas Unmitigated	0.0766	0.6960	0.5846	4.1800e-003		0.0529	0.0529		0.0529	0.0529		835.1495	835.1495	0.0160	0.0153	840.2321

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Strip Mall	5.32408	0.0574	0.5220	0.4385	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.3622	626.3622	0.0120	0.0115	630.1741
Total		**0.0574**	**0.5220**	**0.4385**	**3.1300e-003**		**0.0397**	**0.0397**		**0.0397**	**0.0397**		**626.3622**	**626.3622**	**0.0120**	**0.0115**	**630.1741**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	9.4762	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788
Unmitigated	9.4762	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.1675					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3055					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.1700e-003	3.1000e-004	0.0347	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004		0.0747	0.0747	1.9000e-004		0.0788
Total	**9.4762**	**3.1000e-004**	**0.0347**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**		**0.0747**	**0.0747**	**1.9000e-004**		**0.0788**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation