

Appendix E

Greenhouse Gas Emissions Modeling Results

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

City of Berkeley Housing Element Operational (Single Family)

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	113.00	Dwelling Unit	36.69	203,400.00	323

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	64
Climate Zone	5			Operational Year	2031
Utility Company	User Defined				
CO2 Intensity (lb/MW hr)	135	CH4 Intensity (lb/MW hr)	0	N2O Intensity (lb/MW hr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Bay Community Energy is the primary electricity provider, for conservative analysis will use Bright Choice Plan (40 percent renewable)

Land Use - Based on EIR growth assumption of 113 single-family units and 323 new residents.

Construction Phase - Operational model, no construction

Off-road Equipment - Operational model, no construction

Trips and VMT - Operational model, no construction

Architectural Coating - BAAQMD Regulation 8 Rule 3, Nonflat Coating

Vehicle Trips - Default CalEEMod trip generation rates used

Woodstoves - Berkeley Natural Gas prohibition, BAAQMD Regulation 6 Rule 3: No woodburning devices

Area Coating - BAAQMD Regulation 8 Rule 3, Nonflat Coating

Energy Use - Assume 90 percent of development will not include natural gas pursuant to BMC Section 12.80 (natural gas ban)

Water And Wastewater - EBMUD Wastewater treatment plant 100 percent aerobic

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation - BAAQMD Regulation 8 Rule 3, Nonflat Coating

Water Mitigation - Pursuant to CalGreen 20 percent indoor water use reduction

Energy Mitigation - Pursuant to Section 150.1(c)(14) of the 2019 Building Energy Efficiency Standards, low-rise residential up to 3 stories must install PV systems

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	100
tblAreaCoating	Area_EF_Residential_Exterior	150	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	150
tblConstructionPhase	NumDays	55.00	1.00
tblEnergyUse	NT24E	6,155.97	6,845.71
tblEnergyUse	NT24NG	2,615.00	261.50
tblEnergyUse	T24E	45.71	9,534.91
tblEnergyUse	T24NG	35,976.14	3,597.64
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	28.25	0.00
tblFireplaces	NumberNoFireplace	9.04	0.00
tblFireplaces	NumberWood	48.59	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	135
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblWoodstoves	NumberCatalytic	4.52	0.00
tblWoodstoves	NumberNoncatalytic	4.52	0.00
tblWoodstoves	WoodstoveDayYear	21.06	0.00
tblWoodstoves	WoodstoveWoodMass	956.80	0.00

2.0 Emissions Summary

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	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
Year	tons/yr										MT/yr					
2023											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated Construction

	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
Year	tons/yr										MT/yr					
2023											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

		Highest	
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2.2 Overall Operational

Unmitigated Operational

	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	tons/yr										MT/yr					
Area											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032
Energy											0.0000	147.7500	147.7500	4.5000e-004	4.3000e-004	147.8883
Mobile											0.0000	684.6657	684.6657	0.0410	0.0313	695.0092
Waste											27.5378	0.0000	27.5378	1.6274	0.0000	68.2236
Water											2.6048	3.4343	6.0391	8.9700e-003	5.6600e-003	7.9513
Total											30.1426	837.2205	867.3631	1.6792	0.0374	920.4756

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	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	tons/yr										MT/yr					
Area											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032
Energy											0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093
Mobile											0.0000	684.6657	684.6657	0.0410	0.0313	695.0092
Waste											27.5378	0.0000	27.5378	1.6274	0.0000	68.2236
Water											2.0839	2.9464	5.0302	7.1700e-003	4.5300e-003	6.5600
Total											29.6216	712.2536	741.8753	1.6774	0.0362	794.6053

	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.73	14.93	14.47	0.11	3.02	13.67

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/2/2023	1/2/2023	5	1	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	tons/yr										MT/yr					
Mitigated											0.0000	684.6657	684.6657	0.0410	0.0313	695.0092
Unmitigated											0.0000	684.6657	684.6657	0.0410	0.0313	695.0092

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,066.72	1,078.02	966.15	2,434,250	2,434,250
Total	1,066.72	1,078.02	966.15	2,434,250	2,434,250

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.555274	0.059572	0.187289	0.120548	0.022031	0.005855	0.011319	0.007376	0.000945	0.000497	0.025792	0.000881	0.002622

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Percent of Electricity Use Generated with Renewable Energy

	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	tons/yr										MT/yr					
Electricity Mitigated											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated											0.0000	124.4790	124.4790	0.0000	0.0000	124.4790
NaturalGas Mitigated											0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093
NaturalGas Unmitigated											0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	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	tons/yr										MT/yr					
Single Family Housing	436083											0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093
Total												0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093

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	tons/yr										MT/yr					
Single Family Housing	436083											0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093
Total												0.0000	23.2710	23.2710	4.5000e-004	4.3000e-004	23.4093

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	2.03281e+006	124.4790	0.0000	0.0000	124.4790
Total		124.4790	0.0000	0.0000	124.4790

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	tons/yr										MT/yr					
Mitigated											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032
Unmitigated											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032

6.2 Area by SubCategory

Unmitigated

	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	tons/yr										MT/yr					
Architectural Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032
Total											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	tons/yr										MT/yr					
Architectural Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032
Total											0.0000	1.3706	1.3706	1.3100e-003	0.0000	1.4032

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	5.0302	7.1700e-003	4.5300e-003	6.5600
Unmitigated	6.0391	8.9700e-003	5.6600e-003	7.9513

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	7.3624 / 4.64152	6.0391	8.9700e-003	5.6600e-003	7.9513
Total		6.0391	8.9700e-003	5.6600e-003	7.9513

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	5.88992 / 4.64152	5.0302	7.1700e-003	4.5300e-003	6.5600
Total		5.0302	7.1700e-003	4.5300e-003	6.5600

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	27.5378	1.6274	0.0000	68.2236
Unmitigated	27.5378	1.6274	0.0000	68.2236

City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	135.66	27.5378	1.6274	0.0000	68.2236
Total		27.5378	1.6274	0.0000	68.2236

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	135.66	27.5378	1.6274	0.0000	68.2236
Total		27.5378	1.6274	0.0000	68.2236

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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City of Berkeley Housing Element Operational (Single Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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User Defined Equipment

Equipment Type	Number
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11.0 Vegetation

City of Berkeley Housing Element Operational (Multi-Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

City of Berkeley Housing Element Operational (Multi-Family)

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	17,427.00	Dwelling Unit	458.61	17,427,000.00	42630
Condo/Townhouse	1,570.00	Dwelling Unit	98.13	1,570,000.00	4490

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	64
Climate Zone	5			Operational Year	2031
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	135	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Bay Community Energy is the primary electricity provider, for conservative analysis will use Bright Choice Plan (40 percent renewable)

Land Use - Based on EIR growth assumption of 17,427 multi-family units, 1,570 condo/townhome units and 47,120 new residents. ADUs included as condo/townhouse for a conservative assumption.

Construction Phase - Operational model, no construction

Off-road Equipment - Operational model, no construction

Trips and VMT - Operational model, no construction

Architectural Coating - BAAQMD Regulation 8 Rule 3, Nonflat Coating

Vehicle Trips - Default CalEEMod trip generation rates used

Woodstoves - Berkeley Natural Gas prohibition, BAAQMD Regulation 6 Rule 3: No woodburning devices

Area Coating - BAAQMD Regulation 8 Rule 3, Nonflat Coating

Energy Use - Assume 90 percent of development will not include natural gas pursuant to BMC Section 12.80 (natural gas ban)

City of Berkeley Housing Element Operational (Multi-Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Water And Wastewater - EBMUD Wastewater treatment plant 100 percent aerobic

Area Mitigation - BAAQMD Regulation 8 Rule 3, Nonflat Coating

Water Mitigation - Pursuant to CalGreen 20 percent indoor water use reduction

Solid Waste -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	100
tblAreaCoating	Area_EF_Residential_Exterior	150	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	150
tblConstructionPhase	NumDays	660.00	1.00
tblEnergyUse	NT24E	3,054.10	3,743.84
tblEnergyUse	NT24E	3,795.01	4,484.75
tblEnergyUse	NT24NG	2,615.00	261.50
tblEnergyUse	NT24NG	2,615.00	261.50
tblEnergyUse	T24E	90.83	1,628.05
tblEnergyUse	T24E	42.95	4,847.25
tblEnergyUse	T24NG	5,828.01	582.80
tblEnergyUse	T24NG	18,214.40	1,821.44
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	2,614.05	0.00

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFireplaces	NumberGas	235.50	0.00
tblFireplaces	NumberNoFireplace	697.08	0.00
tblFireplaces	NumberNoFireplace	62.80	0.00
tblFireplaces	NumberWood	2,962.59	0.00
tblFireplaces	NumberWood	266.90	0.00
tblLandUse	Population	49,841.00	42,630.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	135
tblTripsAndVMT	WorkerTripNumber	2,736.00	0.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	348.54	0.00
tblWoodstoves	NumberCatalytic	31.40	0.00
tblWoodstoves	NumberNoncatalytic	348.54	0.00
tblWoodstoves	NumberNoncatalytic	31.40	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00

2.0 Emissions Summary

City of Berkeley Housing Element Operational (Multi-Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	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
Year	tons/yr										MT/yr					
2023											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated Construction

	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
Year	tons/yr										MT/yr					
2023											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

City of Berkeley Housing Element Operational (Multi-Family) - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

		Highest	
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2.2 Overall Operational

Unmitigated Operational

	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	tons/yr										MT/yr					
Area											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988
Energy											0.0000	8,476.8888	8,476.8888	0.0184	0.0176	8,482.5917
Mobile											0.0000	65,977.8089	65,977.8089	3.9499	3.0134	66,974.5558
Waste											1,773.8609	0.0000	1,773.8609	104.8322	0.0000	4,394.6653
Water											437.9112	577.3504	1,015.2616	1.5072	0.9523	1,336.7322
Total											2,211.7721	75,262.4588	77,474.2308	110.5273	3.9833	81,424.4437

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	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	tons/yr										MT/yr					
Area											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988
Energy											0.0000	8,476.8888	8,476.8888	0.0184	0.0176	8,482.5917
Mobile											0.0000	65,977.8089	65,977.8089	3.9499	3.0134	66,974.5558
Waste											1,773.8609	0.0000	1,773.8609	104.8322	0.0000	4,394.6653
Water											350.3289	495.3279	845.6568	1.2058	0.7619	1,102.8333
Total											2,124.1898	75,180.4362	77,304.6260	110.2258	3.7929	81,190.5448

	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.96	0.11	0.22	0.27	4.78	0.29

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/2/2023	1/2/2023	5	1	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Architectural Coating - 2023

Mitigated Construction Off-Site

	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	tons/yr										MT/yr					
Hauling											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	tons/yr										MT/yr					
Mitigated											0.0000	65,977.8089	65,977.8089	3.9499	3.0134	66,974.5558
Unmitigated											0.0000	65,977.8089	65,977.8089	3.9499	3.0134	66,974.5558

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	94,802.88	85,566.57	71,276.43	208,147,551	208,147,551
Condo/Townhouse	11,492.40	12,779.80	9,859.60	26,428,968	26,428,968
Total	106,295.28	98,346.37	81,136.03	234,576,519	234,576,519

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Condo/Townhouse	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.555274	0.059572	0.187289	0.120548	0.022031	0.005855	0.011319	0.007376	0.000945	0.000497	0.025792	0.000881	0.002622
Condo/Townhouse	0.555274	0.059572	0.187289	0.120548	0.022031	0.005855	0.011319	0.007376	0.000945	0.000497	0.025792	0.000881	0.002622

5.0 Energy Detail

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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	tons/yr										MT/yr					
Electricity Mitigated											0.0000	7,517.2030	7,517.2030	0.0000	0.0000	7,517.2030
Electricity Unmitigated											0.0000	7,517.2030	7,517.2030	0.0000	0.0000	7,517.2030
NaturalGas Mitigated											0.0000	959.6858	959.6858	0.0184	0.0176	965.3887
NaturalGas Unmitigated											0.0000	959.6858	959.6858	0.0184	0.0176	965.3887

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	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	tons/yr										MT/yr					
Apartments Mid Rise	1.47136e+007											0.0000	785.1746	785.1746	0.0151	0.0144	789.8405
Condo/Townhouse	3.27022e+006											0.0000	174.5112	174.5112	3.3400e-003	3.2000e-003	175.5482
Total												0.0000	959.6858	959.6858	0.0184	0.0176	965.3887

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	tons/yr										MT/yr					
Apartments Mid Rise	1.47136e+007											0.0000	785.1746	785.1746	0.0151	0.0144	789.8405
Condo/Townhouse	3.27022e+006											0.0000	174.5112	174.5112	3.3400e-003	3.2000e-003	175.5482
Total												0.0000	959.6858	959.6858	0.0184	0.0176	965.3887

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	1.06537e+008	6,523.7901	0.0000	0.0000	6,523.7901
Condo/Townhouse	1.6223e+007	993.4129	0.0000	0.0000	993.4129
Total		7,517.2030	0.0000	0.0000	7,517.2030

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	1.06537e+008	6,523.7901	0.0000	0.0000	6,523.7901
Condo/Townhouse	1.6223e+007	993.4129	0.0000	0.0000	993.4129
Total		7,517.2030	0.0000	0.0000	7,517.2030

6.0 Area Detail

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	tons/yr										MT/yr					
Mitigated											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988
Unmitigated											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	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	tons/yr										MT/yr					
Architectural Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988
Total											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	tons/yr										MT/yr					
Architectural Coating											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988
Total											0.0000	230.4107	230.4107	0.2195	0.0000	235.8988

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	845.6568	1.2058	0.7619	1,102.8333
Unmitigated	1,015.2616	1.5072	0.9523	1,336.7322

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	1135.44 / 715.82	931.3557	1.3827	0.8736	1,226.2585
Condo/Townhouse	102.292 / 64.4883	83.9059	0.1246	0.0787	110.4737
Total		1,015.2616	1.5073	0.9523	1,336.7322

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	908.351 / 715.82	775.7678	1.1061	0.6989	1,011.6900
Condo/Townhouse	81.8335 / 64.4883	69.8890	0.0997	0.0630	91.1433
Total		845.6568	1.2058	0.7619	1,102.8333

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1,773.8609	104.8322	0.0000	4,394.6653
Unmitigated	1,773.8609	104.8322	0.0000	4,394.6653

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	8016.42	1,627.2608	96.1684	0.0000	4,031.4698
Condo/Townhouse	722.2	146.6001	8.6638	0.0000	363.1955
Total		1,773.8609	104.8322	0.0000	4,394.6653

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	8016.42	1,627.2608	96.1684	0.0000	4,031.4698
Condo/Townhouse	722.2	146.6001	8.6638	0.0000	363.1955
Total		1,773.8609	104.8322	0.0000	4,394.6653

9.0 Operational Offroad

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

Fire Pumps and Emergency Generators

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

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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User Defined Equipment

Equipment Type	Number
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11.0 Vegetation
