CREEKWOOD SUBDIVISION CONSTRUCTION HEALTH RISK AND GREENHOUSE GAS ASSESSMENT

Petaluma, California

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Prepared for:

Doyle Heaton
Falcon Point Associates, LLC
c/o DRG Builders
3496 Buskirk Avenue, #104
Pleasant Hill, CA 94523

Prepared by:

Zachary Palm &
James A. Reyff

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

429 East Cotati Avenue
Cotati, CA 94931
(707) 794-0400

I&R Project#: 21-192

Introduction

The purpose of this report is to address the potential community risk impacts associated with the construction of the proposed Creekwood Subdivision located at 270 and 280 Casa Grande Road in Petaluma, California. The air quality impacts from this project would be associated with construction of the new buildings. Air pollutant emissions associated with construction of the project were predicted using appropriate computer models. In addition, the potential project construction health risk impacts and the impact of existing toxic air contaminant (TAC) sources affecting the nearby and proposed sensitive receptors were evaluated. The analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).[1] BAAQMD recommends using a 1,000-foot screening radius around the project site for purposes of identifying community health risk from existing sources of TACs.

Project Description

The project site is comprised of two parcels, 270 Casa Grande Road and 280 Casa Grande Road, that contain one single-family home. The project proposes to demolish the existing home to construct 35 single-family homes and 24 townhomes. Construction is proposed to begin in January 2023 and be completed by July 2024.

Setting

The project is located in Sonoma County, which is in the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

Air Pollutants of Concern

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NO_X). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

[1] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017.

Toxic Air Contaminants

Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

Regulatory Setting

Federal Regulations

The United States Environmental Protection Agency (EPA) sets nationwide emission standards for mobile sources, which include on-road (highway) motor vehicles such trucks, buses, and automobiles, and non-road (off-road) vehicles and equipment used in construction, agricultural, industrial, and mining activities (such as bulldozers and loaders). The EPA also sets nationwide fuel standards. California also has the ability to set motor vehicle emission standards and standards for fuel used in California, as long as they are the same or more stringent than the federal standards.

In the past decade the EPA has established a number of emission standards for on- and non-road heavy-duty diesel engines used in trucks and other equipment. This was done in part because diesel engines are a significant source of NO_X and particulate matter (PM_{10} and $PM_{2.5}$) and because the EPA has identified DPM as a probable carcinogen. Implementation of the heavy-duty diesel on-road vehicle standards and the non-road diesel engine standards are estimated to reduce particulate matter and NO_X emissions from diesel engines up to 95 percent in 2030 when the heavy-duty vehicle fleet is completely replaced with newer heavy-duty vehicles that comply with these emission standards.[2]

In concert with the diesel engine emission standards, the EPA has also substantially reduced the amount of sulfur allowed in diesel fuels. The sulfur contained in diesel fuel is a significant contributor to the formation of particulate matter in diesel-fueled engine exhaust. The new standards reduced the amount of sulfur allowed by 97 percent for highway diesel fuel (from 500 parts per million by weight [ppmw] to 15 ppmw), and by 99 percent for off-highway diesel fuel

[2] USEPA, 2000. *Regulatory Announcement, Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements*. EPA420-F-00-057. December.

(from about 3,000 ppmw to 15 ppmw). The low sulfur highway fuel (15 ppmw sulfur), also called ultra-low sulfur diesel (ULSD), is currently required for use by all vehicles in the U.S.

All of the above federal diesel engine and diesel fuel requirements have been adopted by California, in some cases with modifications making the requirements more stringent or the implementation dates sooner.

State Regulations

To address the issue of diesel emissions in the state, CARB developed the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles.[3] In addition to requiring more stringent emission standards for new on-road and off-road mobile sources and stationary diesel-fueled engines to reduce particulate matter emissions by 90 percent, a significant component of the plan involves application of emission control strategies to existing diesel vehicles and equipment. Many of the measures of the Diesel Risk Reduction Plan have been approved and adopted, including the federal on-road and non-road diesel engine emission standards for new engines, as well as adoption of regulations for low sulfur fuel in California.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy-duty diesel trucks that represent the bulk of DPM emissions from California highways. CARB regulations require on-road diesel trucks to be retrofitted with particulate matter controls or replaced to meet 2010 or later engine standards that have much lower DPM and $PM_{2.5}$ emissions. This regulation will substantially reduce these emissions between 2013 and 2023. While new trucks and buses will meet strict federal standards, this measure is intended to accelerate the rate at which the fleet either turns over so there are more cleaner vehicles on the road or is retrofitted to meet similar standards. With this regulation, older, more polluting trucks would be removed from the roads sooner.

CARB has also adopted and implemented regulations to reduce DPM and NO_X emissions from in-use (existing) and new off-road heavy-duty diesel vehicles (e.g., loaders, tractors, bulldozers, backhoes, off-highway trucks, etc.). The regulations apply to diesel-powered off-road vehicles with engines 25 horsepower (hp) or greater. The regulations are intended to reduce particulate matter and NO_X exhaust emissions by requiring owners to turn over their fleet (replace older equipment with newer equipment) or retrofit existing equipment in order to achieve specified fleet-averaged emission rates. Implementation of this regulation, in conjunction with stringent federal off-road equipment engine emission limits for new vehicles, will significantly reduce emissions of DPM and NO_X.

Bay Area Air Quality Management District (BAAQMD)

BAAQMD has jurisdiction over an approximately 5,600-square mile area, commonly referred to as the San Francisco Bay Area (Bay Area). The District's boundary encompasses the nine San Francisco Bay Area counties, including Alameda County, Contra Costa County, Marin County,

[3] California Air Resources Board, 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. October.

San Francisco County, San Mateo County, Santa Clara County, Napa County, southwestern Solano County, and southern Sonoma County.

BAAQMD is the lead agency in developing plans to address attainment and maintenance of the National Ambient Air Quality Standards and California Ambient Air Quality Standards. The District also has permit authority over most types of stationary equipment utilized for the proposed project. The BAAQMD is responsible for permitting and inspection of stationary sources; enforcement of regulations, including setting fees, levying fines, and enforcement actions; and ensuring that public nuisances are minimized.

BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area.[4] The program examines TAC emissions from point sources, area sources, and on-road and off-road mobile sources with an emphasis on diesel exhaust, which is a major contributor to airborne health risk in California. The CARE program is an on-going program that encourages community involvement and input. The technical analysis portion of the CARE program is being implemented in three phases that includes an assessment of the sources of TAC emissions, modeling and measurement programs to estimate concentrations of TAC, and an assessment of exposures and health risks. Throughout the program, information derived from the technical analyses will be used to focus emission reduction measures in areas with high TAC exposures and high density of sensitive populations. Risk reduction activities associated with the CARE program are focused on the most at-risk communities in the Bay Area. Overburdened communities are areas located (i) within a census tract identified by the California Communities Environmental Health Screening Tool (CalEnviroScreen), Version 4.0 implemented by OEHHA, as having an overall CalEnviroScreen score at or above the 70th percentile, or (ii) within 1,000 feet of any such census tract.[5] The BAAQMD has identified six communities as impacted: Concord, Richmond/San Pablo, Western Alameda County, San José, Redwood City/East Palo Alto, and Eastern San Francisco. The project site is not within a CARE area and not within a BAAQMD overburdened area as identified by CalEnviroScreen.

The BAAQMD California Environmental Quality Act (*CEQA) Air Quality Guidelines*[6] were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process consistent with CEQA requirements including thresholds of significance, mitigation measures, and background air quality information. They also include assessment methodologies for air toxics, odors, and greenhouse gas emissions. *Attachment 1* includes detailed community risk modeling methodology.

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[4] See BAAQMD: https://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program , accessed 2/18/2021.
[5] See BAAQMD: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-2-permits/2021-amendments/documents/20210722_01_appendixd_mapsofoverburdenedcommunities-pdf.pdf?la=en , accessed 10/1/2021.
[6] Bay Area Air Quality Management District, 2017. *CEQA Air Quality Guidelines*. May.

City of Petaluma General Plan 2025

The City of Petaluma General Plan 2025[7] includes policies and programs to reduce exposure of the City's sensitive population to exposure of air pollution and TACs. The following policies and programs are applicable to the proposed project:

4-P-15 Improve air quality by reducing emissions from stationary point sources of air pollution (e.g. equipment at commercial and industrial facilities) and stationary area sources (e.g. wood-burning fireplaces & gas powered lawn mowers) which cumulatively emit large quantities of emissions.

A. Continue to work with the Bay Area Air Quality Management District to achieve emissions reductions for non-attainment pollutants; including carbon monoxide, ozone, and PM10, by implementation of air pollution control measures as required by State and federal statutes. The BAAQMD's CEQA Guidelines should be used as the foundation for the City's review of air quality impacts under CEQA.

B. Continue to use Petaluma's development review process and the CEQA regulations to evaluate and mitigate the local and cumulative effects of new development on air quality.

C. Continue to require development projects to abide by the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines. These measures would reduce exhaust and particulate emissions from construction and grading activities.

D. Reduce emissions from residential and commercial uses by requiring the following:
   - Use of high efficiency heating and other appliances, such as cooking equipment, refrigerators, and furnaces, and low NOx water heaters in new and existing residential units;
   - Compliance with or exceed requirements of CCR Title 24 for new residential and commercial buildings;
   - Incorporation of passive solar building design and landscaping conducive to passive solar energy use for both residential and commercial uses, i.e., building orientation in a south to southeast direction, encourage planting of deciduous trees on west sides of structures, landscaping with drought resistant species, and use of groundcovers rather than pavement to reduce heat reflection;
   - Encourage the use of battery-powered, electric, or other similar equipment that does not impact local air quality for nonresidential maintenance activities;
   - Provide natural gas hookups to fireplaces or require residential use of EPA-certified wood stoves, pellet stoves, or fireplace inserts. Current building code standards generally ban the installation of open-hearth, wood burning fireplaces and wood stoves in new construction. It does, however, allow for the use of low-polluting

[7] City of Petaluma, City of *Petaluma: General Plan 2025*, May 2008. Web: https://cityofpetaluma.org/documents/general-plan/

wood stoves and inserts in fireplaces approved by the federal Environmental Protection Agency, as well as fireplaces fueled by natural gas.

4-P-16 To reduce combustion emissions during construction and demolition phases, the contractor of future individual projects shall encourage the inclusion in construction contracts of the following requirements or measures shown to be equally effective:

- Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction;
- Minimize idling time of construction related equipment, including heavy-duty equipment, motor vehicles, and portable equipment;
- Use alternative fuel construction equipment (i.e., compressed natural gas, liquid petroleum gas, and unleaded gasoline);
- Use add-on control devices such as diesel oxidation catalysts or particulate filters;
- Use diesel equipment that meets the ARB's 2000 or newer certification standard for off-road heavy-duty diesel engines;
- Phase construction of the project;
- Limit the hours of operation of heavy duty equipment.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 16, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, and elementary schools. For cancer risk assessments, children are the most sensitive receptors, since they are more susceptible to cancer causing TACs. Residential locations are assumed to include infants and small children. The closest sensitive receptors to the project site are in the single-family residences to the south of the project site, and the multi-family residences to the north of the project site. The multi-family residences north of the project site are senior care apartments. However, for this project, it is assumed that infants and children are present there. Casa Grande High School and Sonoma Mountain High School are also near the project site. This project would introduce new sensitive receptors (i.e., residents) to the area.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA and these significance thresholds were contained in the District's 2011 CEQA Air Quality Guidelines. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The thresholds were challenged through a series of court challenges and were mostly upheld. BAAQMD updated the CEQA Air Quality Guidelines in 2017 to include the latest significance thresholds, which were used in this analysis and are summarized in Table 1. Impacts above these thresholds are considered potentially significant.

Table 1. BAAQMD CEQA Significance Thresholds

Criteria Air Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (Exhaust)	82	15
$PM_{2.5}$	54 (Exhaust)	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards	**Single Sources Within 1,000-foot Zone of Influence**	**Combined Sources (Cumulative from all sources within 1,000-foot zone of influence)**	
Excess Cancer Risk	10 per one million	100 per one million	
Hazard Index	1.0	10.0	
Incremental annual $PM_{2.5}$	0.3 $\mu g/m^3$	0.8 $\mu g/m^3$	
Greenhouse Gas Emissions			
Land Use Projects – direct and indirect emissions	Compliance with a Qualified GHG Reduction Strategy OR 1,100 metric tons annually or 4.6 metric tons per capita (for 2020) *		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less. GHG = greenhouse gases.

*BAAQMD does not have a recommended post-2020 GHG threshold.

Construction Community Risk Impacts and Mitigation Measures

Project impacts related to increased community risk can occur either by generating emissions of TACs and air pollutants and by introducing a new sensitive receptor in proximity to an existing source of TACs. Temporary project construction activity would generate emissions of DPM from equipment and trucks and also generate dust on a temporary basis that could affect nearby sensitive receptors. A construction community health risk assessment was prepared to address project construction impacts on the surrounding off-site sensitive receptors.

Additionally, the project could introduce new residents that are sensitive receptors, who would be exposed to existing sources of TACs and localized air pollutants in the vicinity of the project. However, no existing sources of TACs were located within 1,000 feet of the project site. Therefore, the impact of the existing sources of TAC upon the existing sensitive receptors and new incoming sensitive receptors was not assessed.

Community risk impacts are addressed by predicting increased lifetime cancer risk, the increase in annual $PM_{2.5}$ concentrations, and computing the Hazard Index (HI) for non-cancer health risks. Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. These exhaust emissions pose health risks for sensitive receptors such as surrounding residents. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to $PM_{2.5}$. A health risk assessment of the project construction activities was conducted that evaluated potential health effects to nearby sensitive receptors from construction emissions of DPM and $PM_{2.5}$.[8] This assessment included dispersion modeling to predict the offsite and onsite concentrations resulting from project construction, so that lifetime cancer risks and non-cancer health effects could be evaluated. The methodology for computing community risks impacts is contained in *Attachment 1*.

Construction Period Emissions

The California Emissions Estimator Model (CalEEMod) Version 2020.4.0 was used to estimate emissions from on-site construction activity, construction vehicle trips, and evaporative emissions. The project land use types and size, and anticipated construction schedule were input to CalEEMod. The CARB EMission FACtors 2021 (EMFAC2021) model was used to predict emissions from construction traffic, which includes worker travel, vendor trucks, and haul trucks.[9] The CalEEMod model output along with construction inputs are included in *Attachment 2* and EMFAC2021 vehicle emissions modeling outputs are included in *Attachment 3*.

<u>CalEEMod Modeling</u>

Land Use Inputs

The proposed project land uses were entered into CalEEMod as described in Table 2.

[8] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.
[9] See CARB's EMFAC2021 Emissions Inventory at https://arb.ca.gov/emfac/emissions-inventory.

Table 2. Summary of Project Land Use Inputs

Project Land Uses	Size	Units	Square Feet (sf)	Acreage
Single Family Housing	35	Dwelling Unit	51,275	4.5
Condo/Townhouse	24	Dwelling Unit	35,160	
Other Asphalt Surfaces	0.75	Acre	32,670	

Construction Inputs

CalEEMod computes annual emissions for construction that are based on the project type, size and acreage. The model provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions, while off-site activity includes worker, hauling, and vendor traffic. The construction build-out scenario for both phases, including equipment list and schedule, were based on information provided by the project applicant.

The construction equipment worksheets provided by the applicant included the schedule for each phase. Within each phase, the quantity of equipment to be used was provided by the applicant. The average hours per day and total number of workdays was set to the default values in CalEEMod. Where CalEEMod does not provide default values, conservative values were estimated for equipment required and hours operated. Since different equipment would have different estimates of the working days per phase, the hours per day for each phase was computed by dividing the total number of hours that the equipment would be used by the total number of days in that phase. The construction schedule assumed that the earliest possible start date would be January 2023 and would be built out over a period of approximately 19 months, or 400 construction workdays. The earliest year of full operation was assumed to be 2025.

Construction Truck Traffic Emissions

Construction would produce traffic in the form of worker trips and truck traffic. The traffic-related emissions are based on worker and vendor trip estimates produced by CalEEMod and haul trips that were computed based on the estimate of soil material imported and/or exported to the site and the estimate of cement and asphalt truck trips. CalEEMod provides daily estimates of worker and vendor trips for each applicable phase. The total trips for those were computed by multiplying the daily trip rate by the number of days in that phase. Haul trips for demolition and grading were estimated from the anticipated grading volumes by assuming each truck could carry 10 tons per load. The number of concrete and asphalt total round haul trips were estimated for the project and converted to total one-way trips, assuming two trips per delivery.

The latest version of the CalEEMod model is based on the older version of the CARB EMFAC2017 motor vehicle emission factor model. This model has been superseded by the EMFAC2021 model; however, CalEEMod has not been updated to include EMFAC2021. Therefore, the construction traffic information was combined with EMFAC2021 motor vehicle emissions factors. EMFAC2021 provides aggregate emission rates in grams per mile for each vehicle type. The vehicle mix for this study was based on CalEEMod default assumptions, where worker trips are assumed to be comprised of light-duty autos (EMFAC category LDA) and light

duty trucks (EMFAC category LDT1and LDT2). Vendor trips are comprised of delivery and large trucks (EMFAC category MHDT and HHDT) and haul trips, including cement trucks, are comprised of large trucks (EMFAC category HHDT). Travel distances are based on CalEEMod default lengths, which are 10.8 miles for worker travel, 7.3 miles for vendor trips and 20 miles for hauling (soil import/export). Since CalEEMod does not address cement trucks, these were treated as vendor travel distances. Each trip was assumed to include an idle time of 5 minutes. Emissions associated with vehicle starts were also included. On road emissions in Sonoma County for 2023-2024 was used in these calculations. Table 3 provides the traffic inputs that were combined with the EMFAC2021 emission database to compute vehicle emissions.

Table 3. Construction Traffic Data Used for EMFAC2021 Model Runs

CalEEMod Run/Land Uses and Construction Phase	Trips by Trip Type			Notes
	Total Worker[1]	Total Vendor[1]	Total Haul[2]	
Vehicle mix[1]	50% LDA 25% LDT1 25% LDT2	50% MHDT 50% HHDT	100% HHDT	
Trip Length (miles)	10.8	7.3	20.0	CalEEMod default distance with 5-min truck idle time.
Demolition	80	-	10	2,200-sf building demo. CalEEMod default worker trips.
Site Preparation	200	-	-	CalEEMod default worker trips.
Grading	400	-	-	CalEEMod default worker trips.
Trenching	295	-	-	CalEEMod default worker trips.
Building Construction	13,200	3,600	768	Est 86,500-sf concrete. CalEEMod default worker and vendor trips.
Architectural Coating	180	-	-	CalEEMod default worker trips.
Paving	360	-	77	Est. 32,670 asphalt. CalEEMod default worker trips.

Notes: [1] Based on 2023-2024 EMFAC2021 light-duty vehicle fleet mix for Sonoma County.
[2] Includes demolition trips estimated by CalEEMod based on amount of material to be removed. Cement and asphalt trips estimated based on project size and land uses.

Summary of Computed Construction Period Emissions

Average daily emissions were annualized for each year of construction by dividing the annual construction emissions and dividing those emissions by the number of active workdays during that year. Table 4 shows the annualized average daily construction emissions of ROG, NO_X, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of the project. As indicated in Table 4, predicted annualized project construction emissions would not exceed the BAAQMD significance thresholds during any year of construction.

Table 4. Construction Period Emissions

Year	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Construction Emissions Per Year (Tons)				
2023	0.13	1.20	0.06	0.05
2024	0.66	0.35	0.02	0.01
Average Daily Construction Emissions Per Year (pounds/day)				
2023 (261 construction workdays)	0.98	9.19	0.43	0.38
2024 (139 construction workdays)	9.46	5.10	0.26	0.21
BAAQMD Thresholds (pounds per day)	*54* lbs./day	*54* lbs./day	*82* lbs./day	*54* lbs./day
Exceed Threshold?	No	No	No	No

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less-than-significant if best management practices are implemented to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-recommended best management practices.*

***Mitigation Measure AQ-1:* Include measures to control dust and exhaust during construction.**

During any construction period ground disturbance, the applicant shall ensure that the project contractor implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. Additional measures are identified to reduce construction equipment exhaust emissions. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne

toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Effectiveness of Mitigation Measure AQ-1

The measures above are consistent with BAAQMD-recommended basic control measures for reducing fugitive particulate matter that are contained in the BAAQMD CEQA Air Quality Guidelines.

Operational Period Emissions

Operational air emissions from the project would be generated primarily from autos driven by residents. Evaporative ROG emissions from architectural coatings and maintenance products (classified as consumer products) are associated with these types of projects. CalEEMod was used to estimate emissions from operation of the proposed project assuming full build-out.

<u>CalEEMod Inputs</u>

Land Uses

The project land uses were input to CalEEMod as described above for the construction period modeling.

Model Year

Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Therefore, the earlier the year analyzed in the model, the higher the emission rates utilized by CalEEMod. The earliest year of full operation would be 2025 if construction begins in 2023. Emissions associated with build-out later than 2025 would be lower.

Traffic Information

CalEEMod allows the user to enter specific vehicle trip generation rates. CalEEMod default trip rates were used for this project, which are the same as those used in the Project traffic study.[10] The default trip lengths and trip types specified by CalEEMod were used..

[10] W-Trans. 2021. *Focused Traffic Study for the Creekwood Residential Development*. November 10.

EMFAC2021 Adjustment

The vehicle emission factors and fleet mix used in CalEEMod are based on EMFAC2017, which is an older CARB emission inventory for on road and off-road mobile sources. Since the release of CalEEMod Version 2020.4.0, new emission factors have been produced by CARB. EMFAC2021 became available for use in January 2021. It includes the latest data on California's car and truck fleets and travel activity. The CalEEMod default vehicle emission factors and fleet mix were updated using the emission rates and fleet mix from EMFAC2021. On road emission rates from 2025 Sonoma County were used (See *Attachment 3*). More details about the updates in emissions calculation methodologies and data are available in the EMFAC2021 Technical Support Document.[11]

Energy

CalEEMod defaults for energy use were used, which include the 2019 Title 24 Building Standards. GHG emissions modeling includes those indirect emissions from electricity consumption. The electricity produced emission rate was modified in CalEEMod. CalEEMod has a default emission factor of 120 pounds of CO_2 per megawatt of electricity produced, which is based on Sonoma Clean Power's 2019 emissions rate.

Other Inputs

Default model assumptions for emissions associated with solid waste generation use were applied to the project. Water/wastewater use were changed to 100% aerobic conditions to represent wastewater treatment plant conditions. Further, it was assumed that no hearths or fireplaces would be installed as part of the project per BAAQMD Regulation 6, Rule 3, which requires that new building construction not install a wood-burning device (effective as of November 1, 2016). Since Petaluma has passed a reach code banning natural gas in new residential buildings and requires solar panels with battery storage that fully offset electricity usage for each dwelling unit,[12] all Title 24 and Non-Title 24 natural gas intensity was changed to zero.

Existing Uses

The existing land uses on the project site include one, 2,200 square foot single family home. Given the minimal emissions use of the existing site, a CalEEMod run was not developed to compute emissions from the use of the existing land.

<u>Summary of Computed Operational Period Emissions</u>

Annual emissions were predicted using CalEEMod. The daily emissions were estimated assuming 365 days of operation. Table 5 shows average daily emissions of ROG, NO_X, total PM_{10}, and total

[11] See CARB 2021: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-modeling-tools-emfac

[12] https://cityofpetaluma.org/all-electric-building-rules/#:~:text=The%20City%20of%20Petaluma%20is,our%20community's%20greenhouse%20gas%20emissions.

$PM_{2.5}$ during operation of the project. The operational period emissions would not exceed the BAAQMD significance thresholds.

Table 5. Operational Period Emissions

Scenario	ROG	NOx	PM_{10}	$PM_{2.5}$
2025 Project Operational Emissions (*tons/year*)	0.83	0.35	0.40	0.11
BAAQMD Thresholds (tons /year)	*10 tons*	*10 tons*	*15 tons*	*10 tons*
Exceed Thresholds?	No	No	No	No
2025 Project Operational Emissions (*lbs./day*)[1]	4.55	1.92	2.19	0.58
BAAQMD Thresholds (lbs./day)	*54 lbs.*	*54 lbs.*	*82 lbs.*	*54 lbs.*
Exceed Threshold?	No	No	No	No

Notes: [1] Assumes 365-day operation.

Community Health Risk from Project Construction

Construction Emissions

The CalEEMod model and EMFAC2021 emissions provided total annual PM_{10} exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from all construction stages as 0.07 tons (132 pounds). The on-road emissions are a result of haul truck travel during grading activities, worker travel, and vendor deliveries during construction. A trip length of one mile was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.11 tons (212 pounds) for the overall construction period.

Dispersion Modeling

The U.S. EPA AERMOD dispersion model was used to predict concentrations of DPM and $PM_{2.5}$ concentrations at sensitive receptors in the vicinity of the project construction area. The AERMOD dispersion model is a BAAQMD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.[13] Emission sources for the construction site were grouped into two categories: exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions.

Construction Sources

Combustion equipment DPM exhaust emissions were modeled as a series of point sources with a nine-foot release height (construction equipment exhaust stack height) placed at 23 feet (7 meter) intervals throughout the construction site. This resulted in 373 individual point sources being used to represent mobile equipment DPM exhaust emissions in the respective construction area, with DPM emissions occurring throughout the project construction site. In addition, the following stack parameters were used: a vertical release, a stack diameter of 2.5 inches, an exhaust temperature of 918˚F, and an exit velocity of 309 feet per second. Since these are point sources plume rise is

[13] Bay Area Air Quality Management District (BAAQMD), 2012, *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0.* May.

calculated by the AERMOD dispersion model. Emissions from vehicle travel on- and off-site were also distributed among the point sources throughout the site. The locations of the point sources used for the modeling are identified in Figure 1.

For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of 7 feet (2 meters) was used for the area source. Fugitive dust emissions at construction sites come from a variety of sources, including truck and equipment travel, grading activities, truck loading (with loaders) and unloading (rear or bottom dumping), loaders and excavators moving and transferring soil and other materials, etc. All of these activities result in fugitive dust emissions at various heights at the point(s) of generation. Once generated, the dust plume will tend to rise as it moves downwind across the site and exit the site at a higher elevation than when it was generated. For all these reasons, a 7-foot release height was used as the average release height across the construction site. Emissions from the construction equipment and on-road vehicle travel were distributed throughout the modeled area sources.

AERMOD Inputs and Meteorological Data

The modeling used a five-year data set (2013 - 2017) of hourly meteorological data prepared by Lakes Environmental for modeling in the City of Petaluma for use with the AERMOD. Construction emissions were modeled as occurring daily between 8:00 a.m. to 5:00 p.m., when the majority of construction activity is expected to occur. Annual DPM and $PM_{2.5}$ concentrations from construction activities during the 2023-2024 period were calculated using the model. DPM and $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors. Receptor heights of 5 feet (1.5 meters) and 15 feet (4.5 meters) were used to represent the breathing height on the first and second floor of nearby single and multi-family residences.[14] A receptor height of 5 feet (1.5 meter) was used to represent the breathing height of children at the high schools.

Summary of Construction Community Risk Impacts

The maximum increased cancer risks were calculated using the modeled TAC concentrations combined with the Office of Environmental Health Hazard Assessment (OEHHA) guidance for age sensitivity factors and exposure parameters as recommended by BAAQMD (see *Attachment 1)*. Non-cancer health hazards and maximum $PM_{2.5}$ concentrations were also calculated and identified. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. Infant, child, and adult exposures were assumed to occur at all residences during the entire construction period. The child (ages 2 through 16 years old) cancer risk parameters were used to calculate the increased cancer risk for the high school students.

The maximum modeled annual $PM_{2.5}$ concentration was calculated based on combined exhaust and fugitive concentrations. The maximum computed HI value was based on the ratio of the maximum DPM concentration modeled and the chronic inhalation refence exposure level of 5 $\mu g/m^3$.

[14] Bay Area Air Quality Management District, 2012, Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0. May. Web: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en

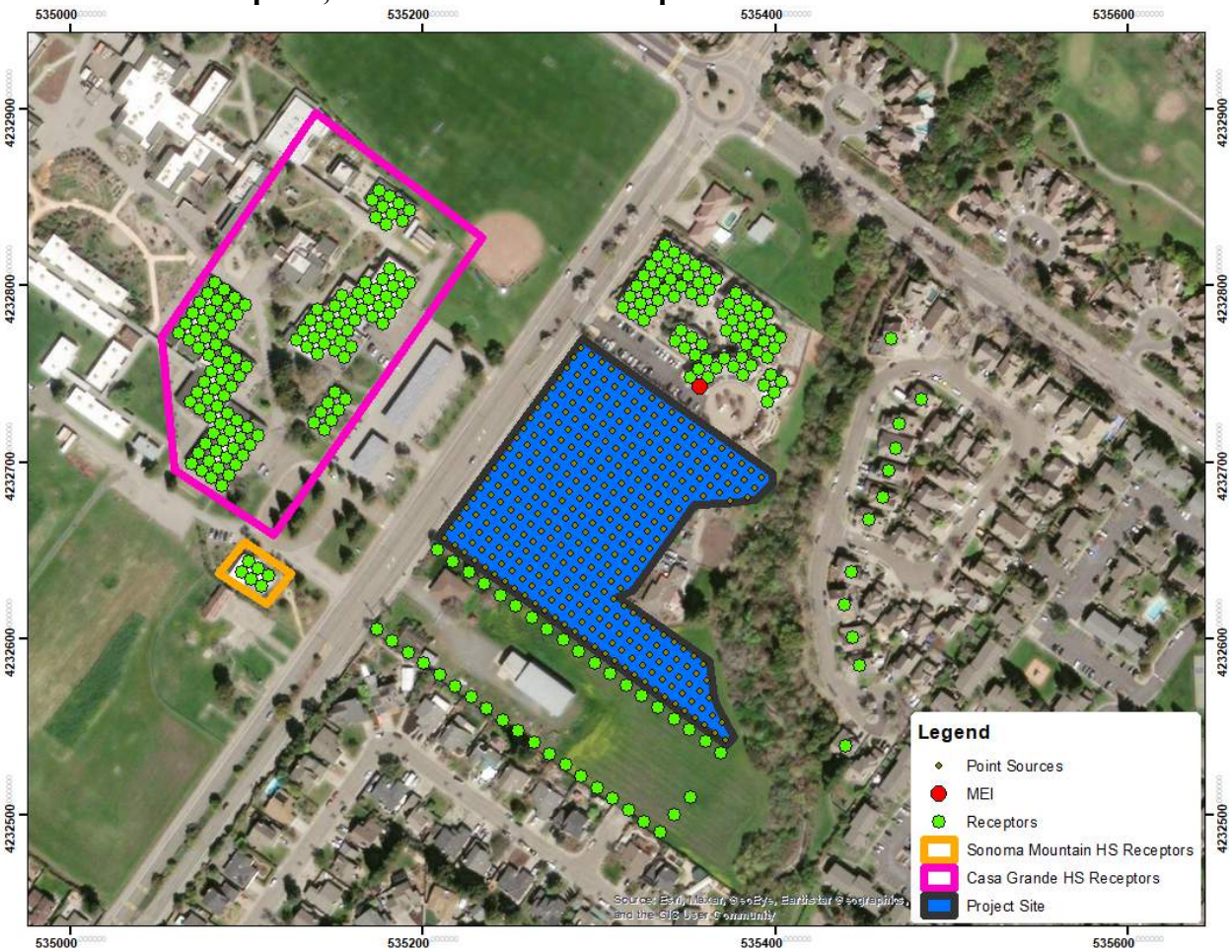
The maximum-modeled annual DPM and $PM_{2.5}$ concentrations, which includes both the DPM and fugitive $PM_{2.5}$ concentrations, were identified at nearby sensitive receptors (as shown in Figure 1) to find the maximally exposed individuals (MEI). Results of this assessment indicated that the construction residential MEI was located at the adjacent multi-family home north of the construction project site. Table 6 summarizes the maximum cancer risks, $PM_{2.5}$ concentrations, and health hazard indexes for project related construction activities affecting the construction MEI. *Attachment 4* to this report includes the emission calculations used for the construction area source modeling and the cancer risk calculations.

Additionally, modeling was conducted to predict the cancer risks, non-cancer health hazards, and maximum $PM_{2.5}$ concentrations associated with construction activities at the nearby high schools. The maximum increased cancer risks were adjusted using child exposure parameters. The uncontrolled cancer risk, $PM_{2.5}$ concentration, and HI at the nearby school would not exceed their respective BAAQMD single-source significance thresholds, as shown in Table 6.

Table 6. Construction Risk Impacts at the Off-site MEI

Source		Cancer Risk (per million)	Annual $PM_{2.5}$ ($\mu g/m^3$)	Hazard Index
Project Impact				
Project Construction	Unmitigated	5.97 (infant)	0.19	0.01
	BAAQMD Single-Source Threshold	***10***	***0.3***	***1.0***
Exceed Threshold?	Unmitigated	*No*	*No*	*No*
Most Impacted High School – Casa Grande High School				
Project Construction	Unmitigated	0.58 (child)	0.03	<0.01
	BAAQMD Single-Source Threshold	***10***	***0.3***	***1.0***
Exceed Threshold?	Unmitigated	*No*	*No*	*No*

Figure 1. Locations of Project Construction Site, DPM Point Sources, Off-Site Sensitive Receptors, and Maximum TAC Impact



Cumulative Community Risks of all TAC Sources at the Offsite Project MEI

Community health risk assessments typically look at all substantial sources of TACs that can affect sensitive receptors that are located within 1,000 feet of a project site (i.e., influence area). These sources include rail lines, highways, busy surface streets, and stationary sources identified by BAAQMD.

A review of the project area and based on provided traffic information indicated that no roadways within the influence area would have traffic exceeding 10,000 vehicles per day. A review of BAAQMD's stationary source geographic information systems (GIS) map tool identified no stationary sources with the potential to affect the project site and MEI. Figure 2 shows the project area included within the influence area and the location of the MEI. Details of the modeling and community risk calculations are included in *Attachment 5.*

Figure 2. Project Site and Nearby TAC and $PM_{2.5}$ Sources

BAAQMD Permitted Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using BAAQMD's *Permitted Stationary Sources 2018* GIS website.[15] This mapping tool identifies the location of nearby stationary sources and their estimated risk and hazard impacts. No sources within the project's 1,000-foot influence area were identified using this tool.

Summary of Cumulative Health Risk Impact at Construction MEI

Table 7 reports both the project and cumulative community risk impacts at the sensitive receptors most affected by construction (i.e. the MEI). The project would not have an exceedance with respect to community risk caused by project construction activities, since the maximum unmitigated cancer risk and annual $PM_{2.5}$ concentration do not exceed the BAAQMD single-source thresholds.

[15] BAAQMD, Web: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

Table 7. Impacts from Combined Sources at Project MEI

Source		Cancer Risk (per million)	Annual $PM_{2.5}$ ($\mu g/m^3$)	Hazard Index
Project Impacts				
Project Construction	Unmitigated	5.97 (infant)	0.19	0.01
	BAAQMD Single-Source Threshold	***10***	***0.3***	***1.0***
Exceed Threshold?	Unmitigated	*No*	*No*	*No*
	BAAQMD Cumulative Source Threshold	***100***	***0.8***	***10.0***
Exceed Threshold?	Unmitigated	*No*	*No*	*No*

On-Site Community Health Risk Impacts – New Project Residents

A health risk assessment would have been completed to assess the impact existing TAC sources would have on the new proposed sensitive receptors (residents) that that project would introduce. However, there are no existing TAC sources (i.e., roadways with over 10,000 daily vehicles or BAAQMD stationary sources) within 1,000 feet of the project site. Therefore, an on-site community health risk impact was not conducted.

GREENHOUSE GAS EMISSIONS

Setting

Gases that trap heat in the atmosphere, GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO_2) and water vapor but there are also several others, most importantly methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These are released into the earth's atmosphere through a variety of natural processes and human activities. Sources of GHGs are generally as follows:

- CO_2, CH_4, and N_2O are byproducts of fossil fuel combustion.
- N_2O is associated with agricultural operations such as fertilization of crops.
- CH_4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO_2 equivalents (CO_2e).

An expanding body of scientific research supports the theory that global climate change is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California are adversely affected by the global warming trend. Increased precipitation and sea level rise will increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Recent Regulatory Actions for GHG Emissions

Executive Order S-3-05 – California GHG Reduction Targets

Executive Order (EO) S-3-05 was signed by Governor Arnold Schwarzenegger in 2005 to set GHG emission reduction targets for California. The three targets established by this EO are as follows: (1) reduce California's GHG emissions to 2000 levels by 2010, (2) reduce California's GHG emissions to 1990 levels by 2020, and (3) reduce California's GHG emissions by 80 percent below 1990 levels by 2050.

Assembly Bill 32 – California Global Warming Solutions Act (2006)

Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, codified the State's GHG emissions target by directing CARB to reduce the State's global warming emissions to 1990 levels by 2020. AB 32 was signed and passed into law by Governor Schwarzenegger on September 27, 2006. Since that time, the CARB, CEC, California Public Utilities Commission (CPUC), and Building Standards Commission have all been developing regulations that will help meet the goals of AB 32 and Executive Order S-3-05, which has a target of reducing GHG emissions 80 percent below 1990 levels.

A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State's main strategies to reduce GHGs from business-as-usual emissions projected in 2020 back down to 1990 levels. Business-as-usual (BAU) is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

As directed by AB 32, CARB has also approved a statewide GHG emissions limit. On December 6, 2007, CARB staff resolved an amount of 427 million metric tons (MMT) of CO_2e as the total statewide GHG 1990 emissions level and 2020 emissions limit. The limit is a cumulative statewide limit, not a sector- or facility-specific limit. CARB updated the future 2020 BAU annual emissions forecast, in light of the economic downturn, to 545 MMT of CO_2e. Two GHG emissions reduction measures currently enacted that were not previously included in the 2008 Scoping Plan baseline inventory were included, further reducing the baseline inventory to 507 MMT of CO_2e. Thus, an estimated reduction of 80 MMT of CO_2e is necessary to reduce statewide emissions to meet the AB 32 target by 2020.

Executive Order B-30-15 & Senate Bill 32 GHG Reduction Targets – 2030 GHG Reduction Target

In April 2015, Governor Brown signed EO B-30-15, which extended the goals of AB 32, setting a greenhouse gas emissions target at 40 percent of 1990 levels by 2030. On September 8, 2016, Governor Brown signed Senate Bill (SB) 32, which legislatively established the GHG reduction target of 40 percent of 1990 levels by 2030. In November 2017, CARB issued *California's 2017 Climate Change Scoping Plan*.[16] While the State is on track to exceed the AB 32 scoping plan 2020 targets, this plan is an update to reflect the enacted SB 32 reduction target.

SB 32 was passed in 2016, which codified a 2030 GHG emissions reduction target of 40 percent below 1990 levels. CARB is currently working on a second update to the Scoping Plan to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32. The proposed Scoping Plan Update was published on January 20, 2017 as directed by SB 32 companion legislation AB 197. The mid-term 2030 target is considered critical by CARB on the path to obtaining an even

[16] California Air Resource Board, 2017. *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Targets.* November. Web: https://ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/scoping_plan_2017.pdf

deeper GHG emissions target of 80 percent below 1990 levels by 2050, as directed in Executive Order S-3-05. The Scoping Plan outlines the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure, providing a blueprint to continue driving down GHG emissions and obtain the statewide goals.

The new Scoping Plan establishes a strategy that will reduce GHG emissions in California to meet the 2030 target (note that the AB 32 Scoping Plan only addressed 2020 targets and a long-term goal). Key features of this plan are:

- Cap and Trade program places a firm limit on 80 percent of the State's emissions;
- Achieving a 50-percent Renewable Portfolio Standard by 2030 (currently at about 29 percent statewide);
- Increase energy efficiency in existing buildings;
- Develop fuels with an 18-percent reduction in carbon intensity;
- Develop more high-density, transit-oriented housing;
- Develop walkable and bikeable communities;
- Greatly increase the number of electric vehicles on the road and reduce oil demand in half;
- Increase zero-emissions transit so that 100 percent of new buses are zero emissions;
- Reduce freight-related emissions by transitioning to zero emissions where feasible and near-zero emissions with renewable fuels everywhere else; and
- Reduce "super pollutants" by reducing methane and hydrofluorocarbons or HFCs by 40 percent.

In the updated Scoping Plan, CARB recommends statewide targets of no more than 6 metric tons (MT) CO_2e per capita (statewide) by 2030 and no more than 2 metric tons CO_2e per capita by 2050. The statewide per capita targets account for all emissions sectors in the State, statewide population forecasts, and the statewide reductions necessary to achieve the 2030 statewide target under SB 32 and the longer-term State emissions reduction goal of 80 percent below 1990 levels by 2050.

Executive Order B-55-18 – Carbon Neutrality

In 2018, a new statewide goal was established to achieve carbon neutrality as soon as possible, but no later than 2045, and to maintain net negative emissions thereafter. CARB and other relevant state agencies are tasked with establishing sequestration targets and create policies/programs that would meet this goal.

Senate Bill 375 – California's Regional Transportation and Land Use Planning Efforts (2008)

California enacted legislation (SB 375) to expand the efforts of AB 32 by controlling indirect GHG emissions caused by urban sprawl. SB 375 provides incentives for local governments and applicants to implement new conscientiously planned growth patterns. This includes incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The legislation also allows applicants to bypass certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Development of more alternative transportation options that would reduce vehicle trips and miles traveled, along with

traffic congestion, would be encouraged. SB 375 enhances CARB's ability to reach the AB 32 goals by directing the agency in developing regional GHG emission reduction targets to be achieved from the transportation sector for 2020 and 2035. CARB works with the metropolitan planning organizations (e.g. Association of Bay Area Governments [ABAG] and Metropolitan Transportation Commission [MTC]) to align their regional transportation, housing, and land use plans to reduce vehicle miles traveled and demonstrate the region's ability to attain its GHG reduction targets. A similar process is used to reduce transportation emissions of ozone precursor pollutants in the Bay Area.

Senate Bill 350 - Renewable Portfolio Standards

In September 2015, the California Legislature passed SB 350, which increases the states Renewables Portfolio Standard (RPS) for content of electrical generation from the 33 percent target for 2020 to a 50 percent renewables target by 2030.

Senate Bill 100 – Current Renewable Portfolio Standards

In September 2018, SB 100 was signed by Governor Brown to revise California's RPS program goals, furthering California's focus on using renewable energy and carbon-free power sources for its energy needs. The bill would require all California utilities to supply a specific percentage of their retail sales from renewable resources by certain target years. By December 31, 2024, 44 percent of the retails sales would need to be from renewable energy sources, by December 31, 2026 the target would be 40 percent, by December 31, 2017 the target would be 52 percent, and by December 31, 2030 the target would be 60 percent. By December 31, 2045, all California utilities would be required to supply retail electricity that is 100 percent carbon-free and sourced from eligible renewable energy resource to all California end-use customers.

California Building Standards Code – Title 24 Part 11 & Part 6

The California Green Building Standards Code (CALGreen Code) is part of the California Building Standards Code under Title 24, Part 11.[17] The CALGreen Code encourages sustainable construction standards that involve planning/design, energy efficiency, water efficiency resource efficiency, and environmental quality. These green building standard codes are mandatory statewide and are applicable to residential and non-residential developments. The most recent CALGreen Code (2019 California Building Standard Code) was effective as of January 1, 2020.

The California Building Energy Efficiency Standards (California Energy Code) is under Title 24, Part 6 and is overseen by the California Energy Commission (CEC). This code includes design requirements to conserve energy in new residential and non-residential developments, while being cost effective for homeowners. This Energy Code is enforced and verified by cities during the planning and building permit process. The current energy efficiency standards (2019 Energy Code) replaced the 2016 Energy Code as of January 1,2020. Under the 2019 standards, single-family homes are predicted to be 53 percent more efficient than homes built under the 2016 standard due more stringent energy-efficiency standards and mandatory installation of solar photovoltaic

[17] See: https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen#:~:text=CALGreen%20is%20the%20first%2Din,to%201990%20levels%20by%202020.

systems. For nonresidential developments, it is predicted that these buildings will use 30 percent less energy due to lightening upgrades.[18]

Federal and Statewide GHG Emissions

The U.S. EPA reported that in 2018, total gross nationwide GHG emissions were 6,676.6 million metric tons (MMT) carbon dioxide equivalent (CO_2e).[19] These emissions were lower than peak levels of 7,416 MMT that were emitted in 2007. CARB updates the statewide GHG emission inventory on an annual basis where the latest inventory includes 2000 through 2017 emissions.[20] In 2017, GHG emissions from statewide emitting activities were 424 MMT. The 2017 emissions have decreased by 14 percent since peak levels in 2004 and are 7 MMT below the 1990 emissions level and the State's 2020 GHG limit. Per capita GHG emissions in California have dropped from a 2001 peak of 14.1 MT per person to 10.7 MT per person in 2017. The most recent Bay Area emission inventory was computed for the year 2011.[21] The Bay Area GHG emission were 87 MMT. As a point of comparison, statewide emissions were about 444 MMT in 2011

City of Petaluma General Plan 2025

The City of Petaluma General Plan 2025 includes policies and programs to reduce exposure of the City's sensitive population to exposure of air pollution, TACs, and GHG emissions. The following policies and programs are applicable to the proposed project:

4-P-15 Improve air quality by reducing emissions from stationary point sources of air pollution (e.g. equipment at commercial and industrial facilities) and stationary area sources (e.g. wood-burning fireplaces & gas powered lawn mowers) which cumulatively emit large quantities of emissions.

D. Continue to work with the Bay Area Air Quality Management District to achieve emissions reductions for non-attainment pollutants; including carbon monoxide, ozone, and PM10, by implementation of air pollution control measures as required by State and federal statutes. The BAAQMD's CEQA Guidelines should be used as the foundation for the City's review of air quality impacts under CEQA.

E. Continue to use Petaluma's development review process and the CEQA regulations to evaluate and mitigate the local and cumulative effects of new development on air quality.

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[18] See: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf
[19] United States Environmental Protection Agency, 2020. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018*. April. Web: https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf
[20] CARB. 2019. *2019 Edition, California Greenhouse Gas Emission Inventory: 2000 – 2017*. Web: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf
[21] BAAQMD. 2015. *Bay Area Emissions Inventory Summary Report: Greenhouse Gases Base Year 2011*. January. Web: http://www.baaqmd.gov/~/media/files/planning-and-research/emission-inventory/by2011_ghgsummary.pdf accessed Nov. 26, 2019.

F. Continue to require development projects to abide by the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines. These measures would reduce exhaust and particulate emissions from construction and grading activities.

D. Reduce emissions from residential and commercial uses by requiring the following:
- Use of high efficiency heating and other appliances, such as cooking equipment, refrigerators, and furnaces, and low NOx water heaters in new and existing residential units;
- Compliance with or exceed requirements of CCR Title 24 for new residential and commercial buildings;
- Incorporation of passive solar building design and landscaping conducive to passive solar energy use for both residential and commercial uses, i.e., building orientation in a south to southeast direction, encourage planting of deciduous trees on west sides of structures, landscaping with drought resistant species, and use of groundcovers rather than pavement to reduce heat reflection;
- Encourage the use of battery-powered, electric, or other similar equipment that does not impact local air quality for nonresidential maintenance activities;
- Provide natural gas hookups to fireplaces or require residential use of EPA-certified wood stoves, pellet stoves, or fireplace inserts. Current building code standards generally ban the installation of open-hearth, wood burning fireplaces and wood stoves in new construction. It does, however, allow for the use of low-polluting wood stoves and inserts in fireplaces approved by the federal Environmental Protection Agency, as well as fireplaces fueled by natural gas.

4-P-24 Comply with AB 32 and its governing regulations to the full extent of the City's jurisdictional authority.

4-P-25 To the full extent of the City's jurisdictional authority, implement any additional adopted State legislative or regulatory standards, policies and practices designed to reduce greenhouse gas emissions, as those measures are developed.

4-P-26 Implement all measures identified in the municipal Climate Action Plan to meet the municipal target set in Resolution 2005-118 (20% below 2000 levels by 2010).

4-P-30 Continue to monitor new technology and innovative sustainable design practices for applicability to ensure future development minimizes or eliminates the use of fossil fuel and GHG-emitting energy consumption.

<u>City of Petaluma Greenhouse Gas Emissions Reduction Action Plan</u>

The City of Petaluma's Greenhouse Gas Emissions Reduction Action Plan addresses emissions from municipal government activities and sources per Resolution 2002-117. The purpose of the plan is to identify and prioritize programs, projects, and procedural policies that will help the City government achieve the municipal GHG emission goals of Resolution 2005-118 by more than 20 percent below 2000 levels by 2015. The plan does not apply to land development projects.

The Sonoma County Regional Climate Action Plan, developed in 2016, includes 2020 GHG emission reduction measures for Petaluma.[22] This plan is an advisory document that the City uses to assist in achieving reduction of GHG emissions. Development projects within the City of Petaluma are encouraged to comply with the intent of the Climate Action Plan and realize GHG reductions through voluntary application of reduction measures. The reduction measures are categorized by goals for State and Regional Measures and then by Local Measures. Under a Business as Usual scenario, emissions in Petaluma would be 542,970 metric tons (MT) in 2020. State measures (e.g., vehicle reduction, cap and trade, renewable portfolios) would reduce these emissions by 119,660 MT. Regional measures are anticipated to reduce emissions by another 28,200 MT and Local Measures would reduce emissions by 18,490 MT. Under this plan, Petaluma's GHG emissions would be reduced to 376,620 MT in 2020. These emissions would be 31 percent below business as usual projection and below estimated 1990 emission of 387,020 MT.

Petaluma Climate Action Framework

Adopted on August 5, 2019, the City of Petaluma's Climate Action Framework outlines the principles that guide the City's ongoing response to and discussion about the climate crisis. Based on four sections, the framework will guide the City as it works to avoid catastrophic climate change and adapt to its expected impacts. The Framework is the foundation for engagement and further input, but none of the actions proposed commit the City to a specific action nor does anything in the Framework amend any existing City legislation or regulation.

The following goals and action items from the City of Petaluma's Climate Action Framework are applicable to this project:

Mitigation and Sequestration Goals

- Develop a Climate Action Plan outlining the actions the City will take to achieve its climate goals.
- Eliminate emissions from the building sector through zero-emissions new construction (emissions embedded in materials and those emitted during construction and operation), building retrofits, appliance replacements, and use of renewable generated clean electricity.
- Reduce consumption emissions to the level necessary to meet our overall climate goals.

Mitigation and Sequestration Action Items

- Mandate all-electric new construction to eliminate fossil fuel use in new buildings.
- Require all new construction, additions, and major rehab projects to use low-embodied carbon materials, starting with concrete.

[22] Sonoma County Regional Climate Protection Authority. 2016. *Climate Action 2020 and Beyond*. July.

BAAQMD GHG Significance Thresholds

The BAAQMD's CEQA Air Quality Guidelines do not use quantified thresholds for projects that are in a jurisdiction with a qualified GHG reductions plan (i.e., a Climate Action Plan). The plan has to address emissions associated with the period that the project would operate (e.g., beyond year 2020). For quantified emissions, the guidelines recommended a GHG threshold of 1,100 metric tons or 4.6 metric tons (MT) per capita. These thresholds were developed based on meeting the 2020 GHG targets set in the scoping plan that addressed AB 32. Development of the project would occur beyond 2020, so a threshold that addresses a future target is appropriate.

Although BAAQMD has not published a quantified threshold for 2030 yet, this assessment uses a bright-line threshold of 660 MT CO_{2e}/year based on the GHG reduction goals of EO B-30-15. The 2030 bright-line threshold is a 40 percent reduction of the 2020 1,100 MT CO_{2e}/year threshold. Evidence published by the State indicates the AB 32 goal of reducing statewide GHG emissions to 1990 levels was met prior to 2020. Current State plans are to further reduce emissions to 40% below 1990 levels by 2030. Assuming statewide emissions are at 1990 levels or lower in 2020, it would be logical to reduce the BAAQMD-recommended threshold for meeting the AB 32 threshold by 40% to develop a threshold for 2030.

Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

GHG emissions associated with development of the proposed project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust and worker and vendor trips. There would also be long-term operational emissions associated with vehicular traffic within the project vicinity, energy and water usage, and solid waste disposal. Emissions for the proposed project are discussed below and were analyzed using the methodology recommended in the BAAQMD CEQA Air Quality Guidelines and the City's Climate Action Plan.

CalEEMod Modeling

CalEEMod was used to predict GHG emissions from operation of the site assuming full build-out of the project. The project land use types and size and other project-specific information were input to the model, as described above within the operational period emissions. Note that existing emissions from the one single-family home on the site were not considered in this analysis. CalEEMod output is included in *Attachment 2*.

Service Population Emissions

The project service population is based on the number of residents. Based on the U.S. Census rate for Petaluma of 2.65 persons per household, the service population for this project is expected to be 156 residents.[23]

[23] US Census: https://www.census.gov/quickfacts/petalumacitycalifornia

Construction GHG Emissions

GHG emissions associated with construction were computed at 360 MT of CO_2e for the total construction period. These are the emissions from on-site operation of construction equipment, vendor and hauling truck trips, and worker trips. Neither the City nor BAAQMD have an adopted threshold of significance for construction-related GHG emissions, though BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable.

Operational GHG Emissions

The CalEEMod model was used to estimate daily emissions associated with operation of the fully-developed site under the proposed project. As shown in Table 8, net annual GHG emissions resulting from operation of the proposed project are predicted to be 497 metric tons (MT) of CO_2e in 2025 and 450 MT of CO_2e in 2030. The service population emission for the year 2025 and 2030 are predicted to be 3.2 and 2.9 MT/CO_{2e}/year/service population, respectively.

To be considered an exceedance, the project must exceed both the GHG significance threshold in metric tons per year and the service population significance threshold in the future year of 2030. The project would not exceed the annual emissions bright-line threshold of 660 MT CO_2e/year in 2030. Therefore, the project would not be in exceedance for GHG emissions.

Table 8. Annual Project GHG Emissions (CO_2e) in Metric Tons

Source Category	Proposed Project in 2025	Proposed Project in 2030
Area	0.73	0.73
Energy Consumption	21.61	21.61
Mobile	443.58	396.63
Solid Waste Generation	26.67	26.67
Water Usage	3.98	3.98
Project Total	496.58	449.63
Significance Threshold		***660 MT CO_2e/year***
Service Population Emissions (MT CO_{2e}/year/service population	3.18	**2.88**
Significance Threshold		***2.8 in 2030***
Exceeds both thresholds?		*No*

Supporting Documentation

Attachment 1 is the methodology used to compute community risk impacts, including the methods to compute lifetime cancer risk from exposure to project emissions.

Attachment 2 includes the CalEEMod output for project construction emissions. Also included are any modeling assumptions.

Attachment 3 includes the EMFAC2021 emissions modeling. The input files for these calculations are voluminous and are available upon request in digital format.

Attachment 4 is the construction health risk assessment. This includes the summary of the dispersion modeling and the cancer risk calculations for construction. AERMOD dispersion modeling files for this assessment, which are quite voluminous, are available upon request and would be provided in digital format

Attachment 5 includes the cumulative community risk calculations, modeling results, and health risk calculations from sources affecting the construction MEI and project site receptors.

Attachment 1: Health Risk Calculation Methodology

A health risk assessment (HRA) for exposure to Toxic Air Contaminates (TACs) requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and California Air Resources Board (CARB) develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[24] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by State law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods.[25] This HRA used the 2015 OEHHA risk assessment guidelines and CARB guidance. The BAAQMD has adopted recommended procedures for applying the newest OEHHA guidelines as part of Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.[26] Exposure parameters from the OEHHA guidelines and the recent BAAQMD HRA Guidelines were used in this evaluation.

Cancer Risk

Potential increased cancer risk from inhalation of TACs is calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency and duration of exposure. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day) or liters per kilogram of body weight per 8-hour period for the case of worker or school child exposures. As recommended by the BAAQMD for residential exposures, 95th percentile breathing rates are used for the third trimester and infant exposures, and 80th percentile breathing rates for child and adult exposures. For children at schools and daycare facilities, BAAQMD recommends using the 95th percentile 8-hour breathing rates. Additionally, CARB and the BAAQMD recommend the use of a residential exposure duration of

[24] OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
[25] CARB, 2015. *Risk Management Guidance for Stationary Sources of Air Toxics*. July 23.
[26] BAAQMD, 2016. *BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*. December 2016.

30 years for sources with long-term emissions (e.g., roadways). For workers, assumed to be adults, a 25-year exposure period is recommended by the BAAQMD. For school children a 9-year exposure period is recommended by the BAAQMD.

Under previous OEHHA and BAAQMD HRA guidance, residential receptors are assumed to be at their home 24 hours a day, or 100 percent of the time. In the 2015 Risk Assessment Guidance, OEHHA includes adjustments to exposure duration to account for the fraction of time at home (FAH), which can be less than 100 percent of the time, based on updated population and activity statistics. The FAH factors are age-specific and are: 0.85 for third trimester of pregnancy to less than 2 years old, 0.72 for ages 2 to less than 16 years, and 0.73 for ages 16 to 70 years. Use of the FAH factors is allowed by the BAAQMD if there are no schools in the project vicinity have a cancer risk of one in a million or greater assuming 100 percent exposure (FAH = 1.0).

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = $CPF \times Inhalation\ Dose \times ASF \times ED/AT \times FAH \times 10^6$

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = $C_{air} \times DBR^* \times A \times (EF/365) \times 10^{-6}$

Where:

C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
8HrBR = 8-hour breathing rate (L/kg body weight-8 hours)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

The health risk parameters used in this evaluation are summarized as follows:

Parameter	***Exposure Type →***	**Infant**		**Child**	**Adult**
	Age Range →	**3rd Trimester**	**0<2**	**2 < 16**	**16 - 30**
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day) 80th Percentile Rate		273	758	572	261
Daily Breathing Rate (L/kg-day) 95th Percentile Rate		361	1,090	745	335
8-hour Breathing Rate (L/kg-8 hours) 95th Percentile Rate		-	1,200	520	240
Inhalation Absorption Factor		1	1	1	1
Averaging Time (years)		70	70	70	70
Exposure Duration (years)		0.25	2	14	14*
Exposure Frequency (days/year)		350	350	350	350*
Age Sensitivity Factor		10	10	3	1
Fraction of Time at Home (FAH)		0.85-1.0	0.85-1.0	0.72-1.0	0.73*
* An 8-hour breathing rate (8HrBR) is used for worker and school child exposures.					

Non-Cancer Hazards

Non-cancer health risk is usually determined by comparing the predicted level of exposure to a chemical to the level of exposure that is not expected to cause any adverse effects (reference exposure level), even to the most susceptible people. Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for residential projects located near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is diesel particulate matter (DPM). For DPM, the chronic inhalation REL is 5 micrograms per cubic meter ($\mu g/m^3$).

Annual $PM_{2.5}$ Concentrations

While not a TAC, fine particulate matter ($PM_{2.5}$) has been identified by the BAAQMD as a pollutant with potential non-cancer health effects that should be included when evaluating potential community health impacts under the California Environmental Quality Act (CEQA). The thresholds of significance for $PM_{2.5}$ (project level and cumulative) are in terms of an increase in the annual average concentration. When considering $PM_{2.5}$ impacts, the contribution from all sources of $PM_{2.5}$ emissions should be included. For projects with potential impacts from nearby local roadways, the $PM_{2.5}$ impacts should include those from vehicle exhaust emissions, $PM_{2.5}$ generated from vehicle tire and brake wear, and fugitive emissions from re-suspended dust on the roads.

Attachment 2: CalEEMod Modeling Inputs and Outputs

Air Quality/Noise Construction Information Data Request

Project Name: **Creekwood SB330 - Petaluma**

Complete ALL Portions in Yellow

See Equipment Type TAB for type, horsepower and load factor

Project Size 59 **Dwelling Units** 4.5 **total project acres disturbed**

_____ **s.f. residential**

_____ **s.f. retail**

_____ **s.f. office/commercial**

0.75 **acre paved roadways**

_____ **s.f. parking garage** _____ **spaces**

_____ **s.f. parking lot** _____ **spaces**

Construction Hours **am to** **pm**

Pile Driving? Y/N?

Project include on-site GENERATOR OR FIRE PUMP during project OPERATION? Y/N? ____

IF YES (if BOTH separate values) -->

Kilowatts/Horsepower: _____

Fuel Type: _____

Location in project (Plans Desired if Available):

DO NOT MULTIPLY EQUIPMENT HOURS/DAY BY THE QUANTITY OF EQUIPMENT

Quantity	Description	HP	Load Factor	Hours/day	Total Work Days	Avg. Hours per day	HP Annual Hours	Comments
	Demolition	**Start Date:**	**1/1/2023**	**Total phase:**	**10**			**Overall Import/Export Volumes**
		End Date:	**1/13/2023**					
1	Concrete/Industrial Saws	81	0.73	8		0	0	**Demolition Volume**
1	Excavators	158	0.38	8		0	0	Square footage of buildings to be demolished
1	Rubber-Tired Dozers	247	0.4	8		0	0	(*or* total tons to be hauled)
	Tractors/Loaders/Backhoes	97	0.37			0	0	**_2200_** square feet *or*
	Other Equipment?							**_?_** Hauling volume (tons)
								Any pavement demolished and hauled? **_?_ tons**
	Site Preparation	**Start Date:**	**1/14/2023**	**Total phase:**	**10**			
		End Date:	**1/27/2023**					
3	Graders	187	0.41	8		0	0	
4	Rubber Tired Dozers	247	0.4	8		0	0	
1	Tractors/Loaders/Backhoes	97	0.37	8		0	0	
	Other Equipment?							
	Grading / Excavation	**Start Date:**	**1/28/2023**	**Total phase:**	**20**			
		End Date:	**2/24/2023**					**Soil Hauling Volume**
2	Excavators	158	0.38	8		0	0	Export volume = **_?_** cubic yards?
1	Graders	187	0.41	8		0	0	Import volume = **_?_** cubic yards?
1	Rubber Tired Dozers	247	0.4	8		0	0	
2	Scrapers	367	0.48	8		0	0	
2	Tractors/Loaders/Backhoes	97	0.37	8		0	0	
	Other Equipment?							
	Trenching/Foundation	**Start Date:**	**2/10/2023**	**Total phase:**	**59**			
		End Date:	**5/3/2023**					
1	Tractor/Loader/Backhoe	97	0.37	3		0	0	
1	Excavators	158	0.38	3		0	0	
	Other Equipment?							
	Building - Exterior	**Start Date:**	**3/25/2023**	**Total phase:**	**300**			**Cement Trucks? _?_ Total Round-Trips**
		End Date:	**5/17/2024**					
0	Cranes	231	0.29			0	0	Electric? (Y/N) ___ Otherwise assumed diesel
1	Forklifts	89	0.2	4		0	0	Liquid Propane (LPG)? (Y/N) ___ Otherwise Assumed diesel
0	Generator Sets	84	0.74			0	0	Or temporary line power? (Y/N) ___
0	Tractors/Loaders/Backhoes	97	0.37			0	0	
0	Welders	46	0.45			0	0	
	Other Equipment?							
Building - Interior/Architectural Coating		**Start Date:**	**6/15/2024**	**Total phase:**	**20**			
		End Date:	**7/12/2024**					
1	Air Compressors	78	0.48	6		0	0	
0	Aerial Lift	62	0.31			0	0	
	Other Equipment?							
	Paving	**Start Date:**	**5/18/2024**	**Total phase:**	**20**			
		Start Date:	**6/14/2024**					
1	Cement and Mortar Mixers	9	0.56	8		0	0	
2	Pavers	130	0.42	8		0	0	**Asphalt? ___ cubic yards or ____ round trips?**
2	Paving Equipment	132	0.36	8		0	0	
1	Rollers	80	0.38	8		0	0	
	Tractors/Loaders/Backhoes	97	0.37			0	0	
	Other Equipment?							
	Additional Phases	**Start Date:**		**Total phase:**				
		Start Date:						
						#DIV/0!	0	
						#DIV/0!	0	
						#DIV/0!	0	
						#DIV/0!	0	
						#DIV/0!	0	

Equipment types listed in "Equipment Types" worksheet tab.

Equipment listed in this sheet is to provide an example of inputs

Complete one sheet for each project component

It is assumed that water trucks would be used during grading

Add or subtract phases and equipment, as appropriate

Modify horsepower or load factor, as appropriate

Construction Criteria Air Pollutants						
Unmitigated	ROG	NOX	PM10 Exhaust	PM2.5 Exhaust	**CO2e**	
Year	Tons				MT	
Construction Equipment						
2023	0.11	1.11	0.05	0.05	176.31	
2024	0.65	0.31	0.01	0.01	60.49	
EMFAC						
2023	0.02	0.09	0.01	0.00	80.84	
2024	0.01	0.05	0.00	0.00	42.25	
Total Construction Emissions by Year						
2023	0.13	1.20	0.06	0.05	257.15	
2024	0.66	0.35	0.02	0.01	102.74	
	Total Construction Emissions					
Tons	0.79	1.55	0.07	0.06	359.89	
Pounds/Workdays	*Average Daily Emissions*				Workdays	
2023	0.98	9.19	0.43	0.38		**261**
2024	9.46	5.10	0.26	0.21		**139**
Threshold - lbs/day	**54.0**	**54.0**	**82.0**	**54.0**		
	Total Construction Emissions					
Pounds	10.44	14.29	0.69	0.59	0.00	
Average	3.93	7.77	0.37	0.32	0.00	400.00
Threshold - lbs/day	**54.0**	**54.0**	**82.0**	**54.0**		

Operational Criteria Air Pollutants						
Unmitigated	ROG	NOX	Total PM10	Total PM2.5		
Year	Tons					
Total	0.83	0.35	0.40	0.11		
	Existing Use Emissions					
Total	0.00	0.00	0.00	0.00		
	Net Annual Operational Emissions					
Tons/year	0.83	0.35	0.40	0.11		
Threshold - Tons/year	**10.0**	**10.0**	**15.0**	**10.0**		
	Average Daily Emissions					
Pounds Per Day	4.55	1.92	2.19	0.58		
Threshold - lbs/day	**54.0**	**54.0**	**82.0**	**54.0**		

Category	**CO2e**			
	Project	Existing	Project 2030	Existing
Area	0.73	0.00	0.73	0.00
Energy	21.61	0.00	21.61	0.00
Mobile	443.58	0.00	396.63	0.00
Waste	26.67	0.00	26.67	0.00
Water	3.98	0.00	3.98	0.00
TOTAL	496.58	0.00	449.63	0.00
Net GHG Emissions		496.58		449.63
Service Population	156.00			
Per Capita Emissions		3.18		2.88

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Creekwood Subdivision, Petaluma

Sonoma-San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.75	Acre	0.00	32,670.00	0
Condo/Townhouse	24.00	Dwelling Unit	0.00	35,160.00	69
Single Family Housing	35.00	Dwelling Unit	4.50	51,275.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2025
Utility Company	Sonoma Clean Power				
CO2 Intensity (lb/MWhr)	119.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Draft Project Description. Assume 15% of site paved Avg 1465sf/unit. Acreage based on provided site plan.

Construction Phase - added trenching and included estimated phase days

Off-road Equipment - Applicant provided construction equipment list and schedule

Off-road Equipment - Applicant provided construction equipment list and schedule

Off-road Equipment - Applicant provided construction equipment list and schedule

Off-road Equipment - Applicant provided construction equipment list and schedule

Off-road Equipment - Applicant provided construction equipment list and schedule

Off-road Equipment - Applicant provided construction equipment list and schedule

Off-road Equipment - Applicant provided construction equipment list and schedule

Date: 1/21/2022 10:27 AM

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

Trips and VMT - All trips entered into EMFAC2021

Demolition - Estimated from GoogleEarth

Grading - Model defaults

Vehicle Trips - default

Woodstoves - No Hearth

Energy Use - all electric with solar generation and battery storage

Water And Wastewater - WTP treatment

Construction Off-road Equipment Mitigation - BMPs and Tier 4i

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Vehicle Emission Factors - Emission factors from EMFAC2021

Fleet Mix - Fleet mix from EMFAC2021

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00

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tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
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tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	230.00	300.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	5.00	10.00
tblEnergyUse	NT24NG	3,155.00	0.00
tblEnergyUse	NT24NG	3,155.00	0.00
tblEnergyUse	T24NG	14,104.62	0.00
tblEnergyUse	T24NG	23,474.54	0.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00

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tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	3.60	0.00
tblFireplaces	NumberGas	8.75	0.00
tblFireplaces	NumberNoFireplace	0.96	0.00
tblFireplaces	NumberNoFireplace	2.80	0.00
tblFireplaces	NumberWood	4.08	0.00
tblFireplaces	NumberWood	15.05	0.00
tblFleetMix	HHD	6.6260e-003	7.9150e-003
tblFleetMix	HHD	6.6260e-003	7.9150e-003
tblFleetMix	HHD	6.6260e-003	7.9150e-003
tblFleetMix	LDA	0.55	0.47
tblFleetMix	LDA	0.55	0.47
tblFleetMix	LDA	0.55	0.47
tblFleetMix	LDT1	0.06	0.05
tblFleetMix	LDT1	0.06	0.05
tblFleetMix	LDT1	0.06	0.05
tblFleetMix	LDT2	0.17	0.21
tblFleetMix	LDT2	0.17	0.21
tblFleetMix	LDT2	0.17	0.21
tblFleetMix	LHD1	0.03	0.05
tblFleetMix	LHD1	0.03	0.05
tblFleetMix	LHD1	0.03	0.05
tblFleetMix	LHD2	8.6190e-003	0.01
tblFleetMix	LHD2	8.6190e-003	0.01
tblFleetMix	LHD2	8.6190e-003	0.01
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03

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tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.12	0.15
tblFleetMix	MDV	0.12	0.15
tblFleetMix	MDV	0.12	0.15
tblFleetMix	MH	4.1400e-003	4.8620e-003
tblFleetMix	MH	4.1400e-003	4.8620e-003
tblFleetMix	MH	4.1400e-003	4.8620e-003
tblFleetMix	MHD	0.01	0.02
tblFleetMix	MHD	0.01	0.02
tblFleetMix	MHD	0.01	0.02
tblFleetMix	OBUS	1.0950e-003	1.0160e-003
tblFleetMix	OBUS	1.0950e-003	1.0160e-003
tblFleetMix	OBUS	1.0950e-003	1.0160e-003
tblFleetMix	SBUS	1.5400e-003	1.4800e-003
tblFleetMix	SBUS	1.5400e-003	1.4800e-003
tblFleetMix	SBUS	1.5400e-003	1.4800e-003
tblFleetMix	UBUS	2.9300e-004	4.2200e-004
tblFleetMix	UBUS	2.9300e-004	4.2200e-004
tblFleetMix	UBUS	2.9300e-004	4.2200e-004
tblLandUse	LandUseSquareFeet	24,000.00	35,160.00
tblLandUse	LandUseSquareFeet	63,000.00	51,275.00
tblLandUse	LotAcreage	0.75	0.00
tblLandUse	LotAcreage	1.50	0.00
tblLandUse	LotAcreage	11.36	4.50
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	10.00	0.00
tblTripsAndVMT	VendorTripNumber	12.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00
tblTripsAndVMT	WorkerTripNumber	44.00	0.00
tblTripsAndVMT	WorkerTripNumber	15.00	0.00
tblTripsAndVMT	WorkerTripNumber	9.00	0.00
tblVehicleEF	HHD	0.02	0.18
tblVehicleEF	HHD	0.04	0.06
tblVehicleEF	HHD	5.37	4.64
tblVehicleEF	HHD	0.44	0.57
tblVehicleEF	HHD	0.01	1.3190e-003
tblVehicleEF	HHD	889.96	749.81
tblVehicleEF	HHD	1,418.69	1,659.43
tblVehicleEF	HHD	0.15	0.04

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tblVehicleEF	HHD	0.14	0.12
tblVehicleEF	HHD	0.22	0.26
tblVehicleEF	HHD	1.8000e-005	2.1000e-005
tblVehicleEF	HHD	4.78	3.89
tblVehicleEF	HHD	2.81	2.08
tblVehicleEF	HHD	2.81	2.78
tblVehicleEF	HHD	2.8640e-003	2.8410e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	2.7400e-003	2.7130e-003
tblVehicleEF	HHD	0.02	0.03
tblVehicleEF	HHD	8.4860e-003	8.4740e-003
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	2.0000e-006	1.0000e-006
tblVehicleEF	HHD	8.0000e-006	3.6000e-004
tblVehicleEF	HHD	4.2000e-004	1.0200e-004
tblVehicleEF	HHD	0.37	0.30
tblVehicleEF	HHD	4.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	2.5600e-004	9.3500e-004
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	8.3010e-003	6.5990e-003
tblVehicleEF	HHD	0.01	0.02
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	8.0000e-006	3.6000e-004
tblVehicleEF	HHD	4.2000e-004	1.0200e-004
tblVehicleEF	HHD	0.42	0.50
tblVehicleEF	HHD	4.0000e-006	0.00

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tblVehicleEF	HHD	0.08	0.09
tblVehicleEF	HHD	2.5600e-004	9.3500e-004
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	LDA	1.9810e-003	2.3030e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.56	0.71
tblVehicleEF	LDA	2.14	3.14
tblVehicleEF	LDA	243.84	249.42
tblVehicleEF	LDA	50.92	65.40
tblVehicleEF	LDA	4.3200e-003	4.6290e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.17	0.25
tblVehicleEF	LDA	0.04	8.3980e-003
tblVehicleEF	LDA	1.4700e-003	1.2770e-003
tblVehicleEF	LDA	1.7150e-003	1.9640e-003
tblVehicleEF	LDA	0.02	2.9390e-003
tblVehicleEF	LDA	1.3560e-003	1.1770e-003
tblVehicleEF	LDA	1.5770e-003	1.8060e-003
tblVehicleEF	LDA	0.04	0.32
tblVehicleEF	LDA	0.10	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	7.6830e-003	9.0850e-003
tblVehicleEF	LDA	0.03	0.24
tblVehicleEF	LDA	0.20	0.32
tblVehicleEF	LDA	2.3400e-003	2.4650e-003
tblVehicleEF	LDA	4.8900e-004	6.4700e-004
tblVehicleEF	LDA	0.04	0.32
tblVehicleEF	LDA	0.10	0.09

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tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.03	0.24
tblVehicleEF	LDA	0.22	0.35
tblVehicleEF	LDT1	5.3460e-003	8.3860e-003
tblVehicleEF	LDT1	0.07	0.13
tblVehicleEF	LDT1	1.12	1.83
tblVehicleEF	LDT1	2.46	7.01
tblVehicleEF	LDT1	299.78	330.70
tblVehicleEF	LDT1	64.18	91.18
tblVehicleEF	LDT1	7.5950e-003	0.01
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.10	0.18
tblVehicleEF	LDT1	0.27	0.48
tblVehicleEF	LDT1	0.04	0.01
tblVehicleEF	LDT1	2.0010e-003	2.3370e-003
tblVehicleEF	LDT1	2.4010e-003	3.4730e-003
tblVehicleEF	LDT1	0.02	3.7750e-003
tblVehicleEF	LDT1	1.8420e-003	2.1530e-003
tblVehicleEF	LDT1	2.2080e-003	3.1930e-003
tblVehicleEF	LDT1	0.11	0.84
tblVehicleEF	LDT1	0.24	0.23
tblVehicleEF	LDT1	0.09	0.00
tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.13	0.68
tblVehicleEF	LDT1	0.38	0.71
tblVehicleEF	LDT1	2.8780e-003	3.2690e-003
tblVehicleEF	LDT1	6.1600e-004	9.0100e-004
tblVehicleEF	LDT1	0.11	0.84

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tblVehicleEF	LDT1	0.24	0.23
tblVehicleEF	LDT1	0.09	0.00
tblVehicleEF	LDT1	0.03	0.06
tblVehicleEF	LDT1	0.13	0.68
tblVehicleEF	LDT1	0.41	0.78
tblVehicleEF	LDT2	3.5280e-003	3.1090e-003
tblVehicleEF	LDT2	0.07	0.09
tblVehicleEF	LDT2	0.82	0.89
tblVehicleEF	LDT2	2.80	3.97
tblVehicleEF	LDT2	314.82	337.47
tblVehicleEF	LDT2	67.58	87.72
tblVehicleEF	LDT2	6.3450e-003	6.5390e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.08
tblVehicleEF	LDT2	0.27	0.35
tblVehicleEF	LDT2	0.04	0.01
tblVehicleEF	LDT2	1.5110e-003	1.4050e-003
tblVehicleEF	LDT2	1.7840e-003	2.1650e-003
tblVehicleEF	LDT2	0.02	3.5750e-003
tblVehicleEF	LDT2	1.3910e-003	1.2930e-003
tblVehicleEF	LDT2	1.6400e-003	1.9910e-003
tblVehicleEF	LDT2	0.07	0.34
tblVehicleEF	LDT2	0.15	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.08	0.26
tblVehicleEF	LDT2	0.32	0.41
tblVehicleEF	LDT2	3.0220e-003	3.3360e-003
tblVehicleEF	LDT2	6.4900e-004	8.6700e-004

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tblVehicleEF	LDT2	0.07	0.34
tblVehicleEF	LDT2	0.15	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.08	0.26
tblVehicleEF	LDT2	0.35	0.45
tblVehicleEF	LHD1	4.0030e-003	4.3360e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.16	0.17
tblVehicleEF	LHD1	1.12	1.08
tblVehicleEF	LHD1	0.93	1.70
tblVehicleEF	LHD1	9.51	9.32
tblVehicleEF	LHD1	751.80	765.78
tblVehicleEF	LHD1	9.25	14.01
tblVehicleEF	LHD1	9.7400e-004	8.9200e-004
tblVehicleEF	LHD1	0.06	0.06
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.09	0.08
tblVehicleEF	LHD1	1.53	1.30
tblVehicleEF	LHD1	0.26	0.35
tblVehicleEF	LHD1	1.1400e-003	1.0260e-003
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.9820e-003
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	2.4400e-004	2.2600e-004
tblVehicleEF	LHD1	1.0900e-003	9.8100e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5560e-003	2.4960e-003

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tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	2.2400e-004	2.0700e-004
tblVehicleEF	LHD1	2.0910e-003	0.12
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.0320e-003	0.00
tblVehicleEF	LHD1	0.14	0.14
tblVehicleEF	LHD1	0.33	0.18
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	9.2000e-005	9.0000e-005
tblVehicleEF	LHD1	7.3020e-003	7.4400e-003
tblVehicleEF	LHD1	9.2000e-005	1.3900e-004
tblVehicleEF	LHD1	2.0910e-003	0.12
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	1.0320e-003	0.00
tblVehicleEF	LHD1	0.17	0.17
tblVehicleEF	LHD1	0.33	0.18
tblVehicleEF	LHD1	0.08	0.11
tblVehicleEF	LHD2	2.8120e-003	2.8680e-003
tblVehicleEF	LHD2	7.6000e-003	7.7940e-003
tblVehicleEF	LHD2	7.6030e-003	0.01
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.75	0.62
tblVehicleEF	LHD2	0.52	1.03
tblVehicleEF	LHD2	14.77	14.48
tblVehicleEF	LHD2	761.89	834.49
tblVehicleEF	LHD2	6.68	8.49
tblVehicleEF	LHD2	1.9280e-003	1.8640e-003

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tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.12	0.11
tblVehicleEF	LHD2	1.29	1.15
tblVehicleEF	LHD2	0.17	0.21
tblVehicleEF	LHD2	1.5310e-003	1.4830e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.0500e-004	8.1000e-005
tblVehicleEF	LHD2	1.4640e-003	1.4190e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7280e-003	2.7030e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.6000e-005	7.4000e-005
tblVehicleEF	LHD2	8.7700e-004	0.05
tblVehicleEF	LHD2	0.04	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.8300e-004	0.00
tblVehicleEF	LHD2	0.13	0.14
tblVehicleEF	LHD2	0.10	0.08
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	1.4100e-004	1.3800e-004
tblVehicleEF	LHD2	7.3400e-003	8.0260e-003
tblVehicleEF	LHD2	6.6000e-005	8.4000e-005
tblVehicleEF	LHD2	8.7700e-004	0.05
tblVehicleEF	LHD2	0.04	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.8300e-004	0.00

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tblVehicleEF	LHD2	0.15	0.16
tblVehicleEF	LHD2	0.10	0.08
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	MCY	0.36	0.20
tblVehicleEF	MCY	0.27	0.22
tblVehicleEF	MCY	21.08	15.53
tblVehicleEF	MCY	9.22	8.73
tblVehicleEF	MCY	217.51	191.53
tblVehicleEF	MCY	63.10	55.31
tblVehicleEF	MCY	0.07	0.04
tblVehicleEF	MCY	0.02	9.7420e-003
tblVehicleEF	MCY	1.19	0.67
tblVehicleEF	MCY	0.28	0.17
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.1620e-003	1.9980e-003
tblVehicleEF	MCY	3.1630e-003	3.6830e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	2.0240e-003	1.8730e-003
tblVehicleEF	MCY	2.9820e-003	3.4720e-003
tblVehicleEF	MCY	0.91	4.93
tblVehicleEF	MCY	0.87	3.55
tblVehicleEF	MCY	0.48	0.00
tblVehicleEF	MCY	2.47	1.34
tblVehicleEF	MCY	0.76	3.93
tblVehicleEF	MCY	2.06	1.65
tblVehicleEF	MCY	2.1520e-003	1.8930e-003
tblVehicleEF	MCY	6.2400e-004	5.4700e-004
tblVehicleEF	MCY	0.91	0.15
tblVehicleEF	MCY	0.87	3.55

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tblVehicleEF	MCY	0.48	0.00
tblVehicleEF	MCY	3.03	1.59
tblVehicleEF	MCY	0.76	3.93
tblVehicleEF	MCY	2.24	1.79
tblVehicleEF	MDV	4.0540e-003	4.1150e-003
tblVehicleEF	MDV	0.08	0.11
tblVehicleEF	MDV	0.86	1.03
tblVehicleEF	MDV	3.18	4.43
tblVehicleEF	MDV	387.55	411.31
tblVehicleEF	MDV	82.60	106.15
tblVehicleEF	MDV	8.4830e-003	9.3420e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.08	0.11
tblVehicleEF	MDV	0.33	0.47
tblVehicleEF	MDV	0.04	0.01
tblVehicleEF	MDV	1.5770e-003	1.5240e-003
tblVehicleEF	MDV	1.8660e-003	2.2760e-003
tblVehicleEF	MDV	0.02	3.6630e-003
tblVehicleEF	MDV	1.4550e-003	1.4070e-003
tblVehicleEF	MDV	1.7160e-003	2.0920e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.18	0.12
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.09	0.35
tblVehicleEF	MDV	0.40	0.57
tblVehicleEF	MDV	3.7190e-003	4.0630e-003
tblVehicleEF	MDV	7.9300e-004	1.0490e-003
tblVehicleEF	MDV	0.08	0.45

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tblVehicleEF	MDV	0.18	0.12
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.09	0.35
tblVehicleEF	MDV	0.44	0.62
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	1.25	1.28
tblVehicleEF	MH	2.00	2.29
tblVehicleEF	MH	1,505.95	1,629.64
tblVehicleEF	MH	17.37	20.52
tblVehicleEF	MH	0.07	0.08
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	1.85	1.98
tblVehicleEF	MH	0.24	0.29
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.04	0.05
tblVehicleEF	MH	2.4500e-004	2.7800e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.3210e-003	3.3670e-003
tblVehicleEF	MH	0.04	0.04
tblVehicleEF	MH	2.2500e-004	2.5600e-004
tblVehicleEF	MH	0.68	33.40
tblVehicleEF	MH	0.06	8.56
tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.02	0.21
tblVehicleEF	MH	0.09	0.11

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tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.7200e-004	2.0300e-004
tblVehicleEF	MH	0.68	33.40
tblVehicleEF	MH	0.06	8.56
tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.11	0.12
tblVehicleEF	MH	0.02	0.21
tblVehicleEF	MH	0.10	0.12
tblVehicleEF	MHD	2.3490e-003	0.01
tblVehicleEF	MHD	1.5330e-003	7.6690e-003
tblVehicleEF	MHD	6.4340e-003	7.9530e-003
tblVehicleEF	MHD	0.33	0.67
tblVehicleEF	MHD	0.22	0.31
tblVehicleEF	MHD	0.80	0.98
tblVehicleEF	MHD	68.68	162.65
tblVehicleEF	MHD	1,026.30	1,199.03
tblVehicleEF	MHD	6.19	7.78
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.14	0.16
tblVehicleEF	MHD	4.5760e-003	5.2830e-003
tblVehicleEF	MHD	0.39	0.87
tblVehicleEF	MHD	1.57	0.97
tblVehicleEF	MHD	1.85	1.47
tblVehicleEF	MHD	2.9900e-004	1.8000e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.8810e-003	0.01
tblVehicleEF	MHD	8.2000e-005	1.0400e-004
tblVehicleEF	MHD	2.8600e-004	1.7220e-003
tblVehicleEF	MHD	0.06	0.02

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tblVehicleEF	MHD	7.5360e-003	0.01
tblVehicleEF	MHD	7.5000e-005	9.5000e-005
tblVehicleEF	MHD	3.2600e-004	0.02
tblVehicleEF	MHD	0.02	5.9960e-003
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	1.6800e-004	0.00
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.04	0.04
tblVehicleEF	MHD	6.5100e-004	1.5200e-003
tblVehicleEF	MHD	9.7500e-003	0.01
tblVehicleEF	MHD	6.1000e-005	7.7000e-005
tblVehicleEF	MHD	3.2600e-004	0.02
tblVehicleEF	MHD	0.02	5.9960e-003
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	1.6800e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.04	0.05
tblVehicleEF	OBUS	7.1450e-003	8.1750e-003
tblVehicleEF	OBUS	4.5070e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.65	0.60
tblVehicleEF	OBUS	0.54	0.72
tblVehicleEF	OBUS	2.11	2.62
tblVehicleEF	OBUS	102.51	91.65
tblVehicleEF	OBUS	1,312.38	1,497.93
tblVehicleEF	OBUS	15.81	19.59
tblVehicleEF	OBUS	0.01	0.01

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tblVehicleEF	OBUS	0.13	0.15
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.43	0.37
tblVehicleEF	OBUS	1.51	1.15
tblVehicleEF	OBUS	1.10	0.87
tblVehicleEF	OBUS	1.4200e-004	4.7600e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	7.9840e-003	0.02
tblVehicleEF	OBUS	1.7600e-004	2.0800e-004
tblVehicleEF	OBUS	1.3600e-004	4.5600e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	7.6260e-003	0.02
tblVehicleEF	OBUS	1.6100e-004	1.9100e-004
tblVehicleEF	OBUS	1.4060e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.05
tblVehicleEF	OBUS	6.0600e-004	0.00
tblVehicleEF	OBUS	0.03	0.07
tblVehicleEF	OBUS	0.07	0.10
tblVehicleEF	OBUS	0.10	0.12
tblVehicleEF	OBUS	9.7300e-004	8.7000e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	1.5600e-004	1.9400e-004
tblVehicleEF	OBUS	1.4060e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.06
tblVehicleEF	OBUS	6.0600e-004	0.00
tblVehicleEF	OBUS	0.04	0.09
tblVehicleEF	OBUS	0.07	0.10

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tblVehicleEF	OBUS	0.11	0.14
tblVehicleEF	SBUS	0.03	0.09
tblVehicleEF	SBUS	4.2340e-003	0.20
tblVehicleEF	SBUS	2.7040e-003	2.4920e-003
tblVehicleEF	SBUS	1.59	1.15
tblVehicleEF	SBUS	0.32	0.90
tblVehicleEF	SBUS	0.39	0.34
tblVehicleEF	SBUS	334.60	181.28
tblVehicleEF	SBUS	1,065.38	1,078.71
tblVehicleEF	SBUS	2.29	2.12
tblVehicleEF	SBUS	0.05	0.03
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	2.7540e-003	2.6940e-003
tblVehicleEF	SBUS	3.11	1.35
tblVehicleEF	SBUS	4.09	2.50
tblVehicleEF	SBUS	1.05	0.45
tblVehicleEF	SBUS	2.5480e-003	1.1120e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.01
tblVehicleEF	SBUS	2.9000e-005	2.3000e-005
tblVehicleEF	SBUS	2.4370e-003	1.0620e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.8200e-003	2.7530e-003
tblVehicleEF	SBUS	0.03	0.01
tblVehicleEF	SBUS	2.7000e-005	2.1000e-005
tblVehicleEF	SBUS	2.5400e-004	0.01
tblVehicleEF	SBUS	2.6100e-003	4.0560e-003
tblVehicleEF	SBUS	0.15	0.11

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tblVehicleEF	SBUS	1.2000e-004	0.00
tblVehicleEF	SBUS	0.07	0.05
tblVehicleEF	SBUS	5.8280e-003	7.7970e-003
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	3.1750e-003	1.5660e-003
tblVehicleEF	SBUS	0.01	9.6580e-003
tblVehicleEF	SBUS	2.3000e-005	2.1000e-005
tblVehicleEF	SBUS	2.5400e-004	0.01
tblVehicleEF	SBUS	2.6100e-003	4.0560e-003
tblVehicleEF	SBUS	0.22	0.23
tblVehicleEF	SBUS	1.2000e-004	0.00
tblVehicleEF	SBUS	0.08	0.25
tblVehicleEF	SBUS	5.8280e-003	7.7970e-003
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	UBUS	2.29	0.60
tblVehicleEF	UBUS	0.01	0.02
tblVehicleEF	UBUS	17.52	8.81
tblVehicleEF	UBUS	0.84	2.66
tblVehicleEF	UBUS	1,702.90	1,251.03
tblVehicleEF	UBUS	8.29	20.64
tblVehicleEF	UBUS	0.28	0.17
tblVehicleEF	UBUS	6.6330e-003	0.02
tblVehicleEF	UBUS	0.64	0.29
tblVehicleEF	UBUS	0.08	0.20
tblVehicleEF	UBUS	0.08	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.6580e-003	3.1740e-003
tblVehicleEF	UBUS	8.5000e-005	1.3100e-004
tblVehicleEF	UBUS	0.03	0.04

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tblVehicleEF	UBUS	7.7720e-003	6.3890e-003
tblVehicleEF	UBUS	4.4500e-003	3.0240e-003
tblVehicleEF	UBUS	7.9000e-005	1.2100e-004
tblVehicleEF	UBUS	1.9200e-004	0.04
tblVehicleEF	UBUS	2.5600e-003	0.01
tblVehicleEF	UBUS	1.0800e-004	0.00
tblVehicleEF	UBUS	0.03	0.04
tblVehicleEF	UBUS	5.7800e-004	0.03
tblVehicleEF	UBUS	0.05	0.09
tblVehicleEF	UBUS	9.4990e-003	7.5470e-003
tblVehicleEF	UBUS	8.2000e-005	2.0400e-004
tblVehicleEF	UBUS	1.9200e-004	0.04
tblVehicleEF	UBUS	2.5600e-003	0.01
tblVehicleEF	UBUS	1.0800e-004	0.00
tblVehicleEF	UBUS	2.33	0.64
tblVehicleEF	UBUS	5.7800e-004	0.03
tblVehicleEF	UBUS	0.05	0.10
tblWater	AerobicPercent	87.46	100.00
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	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	0.48	0.00
tblWoodstoves	NumberCatalytic	1.40	0.00
tblWoodstoves	NumberNoncatalytic	0.48	0.00

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tblWoodstoves	NumberNoncatalytic	1.40	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveDayYear	21.06	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00
tblWoodstoves	WoodstoveWoodMass	956.80	0.00

2.0 Emissions Summary

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	0.1081	1.1067	1.1330	1.9900e-003	0.2321	0.0505	0.2826	0.1049	0.0465	0.1514	0.0000	174.9128	174.9128	0.0558	0.0000	176.3086
2024	0.6473	0.3080	0.4709	6.9000e-004	0.0000	0.0146	0.0146	0.0000	0.0135	0.0135	0.0000	60.0205	60.0205	0.0186	0.0000	60.4863
Maximum	**0.6473**	**1.1067**	**1.1330**	**1.9900e-003**	**0.2321**	**0.0505**	**0.2826**	**0.1049**	**0.0465**	**0.1514**	**0.0000**	**174.9128**	**174.9128**	**0.0558**	**0.0000**	**176.3086**

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					

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2023	0.0379	0.7337	1.3259	1.9900e-003	0.1045	3.2400e-003	0.1077	0.0472	3.2400e-003	0.0505	0.0000	174.9126	174.9126	0.0558	0.0000	176.3084
2024	0.6286	0.2941	0.5079	6.9000e-004	0.0000	1.1000e-003	1.1000e-003	0.0000	1.1000e-003	1.1000e-003	0.0000	60.0205	60.0205	0.0186	0.0000	60.4862
Maximum	**0.6286**	**0.7337**	**1.3259**	**1.9900e-003**	**0.1045**	**3.2400e-003**	**0.1077**	**0.0472**	**3.2400e-003**	**0.0505**	**0.0000**	**174.9126**	**174.9126**	**0.0558**	**0.0000**	**176.3084**

	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	N20	CO2e
Percent Reduction	**11.77**	**27.35**	**-14.34**	**0.00**	**55.00**	**93.33**	**63.40**	**55.00**	**92.77**	**68.74**	**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)
1	**1-1-2023**	**3-31-2023**	0.7118	0.3538
2	**4-1-2023**	**6-30-2023**	0.1763	0.1496
3	**7-1-2023**	**9-30-2023**	0.1630	0.1344
4	**10-1-2023**	**12-31-2023**	0.1630	0.1344
5	**1-1-2024**	**3-31-2024**	0.1517	0.1330
6	**4-1-2024**	**6-30-2024**	0.5306	0.5183
7	**7-1-2024**	**9-30-2024**	0.2697	0.2685
		Highest	0.7118	0.5183

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	0.4144	5.0400e-003	0.4377	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.9000e-004	0.0000	0.7327

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Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
Mobile	0.4164	0.3454	2.4169	4.7000e-003	0.3931	4.9900e-003	0.3981	0.0986	4.7000e-003	0.1033	0.0000	435.6423	435.6423	0.0272	0.0253	443.8514
Waste						0.0000	0.0000		0.0000	0.0000	10.7666	0.0000	10.7666	0.6363	0.0000	26.6739
Water						0.0000	0.0000		0.0000	0.0000	1.3600	1.5936	2.9537	5.1200e-003	3.0100e-003	3.9789
Total	**0.8307**	**0.3505**	**2.8546**	**4.7200e-003**	**0.3931**	**7.4200e-003**	**0.4005**	**0.0986**	**7.1300e-003**	**0.1057**	**12.1267**	**459.2047**	**471.3314**	**0.6752**	**0.0290**	**496.8474**

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	0.4144	5.0400e-003	0.4377	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.9000e-004	0.0000	0.7327
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
Mobile	0.4164	0.3454	2.4169	4.7000e-003	0.3931	4.9900e-003	0.3981	0.0986	4.7000e-003	0.1033	0.0000	435.6423	435.6423	0.0272	0.0253	443.8514
Waste						0.0000	0.0000		0.0000	0.0000	10.7666	0.0000	10.7666	0.6363	0.0000	26.6739
Water						0.0000	0.0000		0.0000	0.0000	1.0880	1.3391	2.4271	4.1100e-003	2.4100e-003	3.2483
Total	**0.8307**	**0.3505**	**2.8546**	**4.7200e-003**	**0.3931**	**7.4200e-003**	**0.4005**	**0.0986**	**7.1300e-003**	**0.1057**	**11.8547**	**458.9502**	**470.8048**	**0.6742**	**0.0284**	**496.1169**

	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	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.24**	**0.06**	**0.11**	**0.15**	**2.07**	**0.15**

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3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2023	1/13/2023	5	10	
2	Site Preparation	Site Preparation	1/14/2023	1/27/2023	5	10	
3	Grading	Grading	1/28/2023	2/24/2023	5	20	
4	Underground	Trenching	2/10/2023	5/3/2023	5	59	
5	Building Construction	Building Construction	3/25/2023	5/17/2024	5	300	
6	Paving	Paving	5/18/2024	6/14/2024	5	20	
7	Architectural Coating	Architectural Coating	6/15/2024	7/12/2024	5	20	

Acres of Grading (Site Preparation Phase): 35

Acres of Grading (Grading Phase): 60

Acres of Paving: 0

Residential Indoor: 175,031; Residential Outdoor: 58,344; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 1,960

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Graders	3	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	4	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41

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Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Underground	Excavators	1	3.00	158	0.38
Underground	Tractors/Loaders/Backhoes	1	3.00	97	0.37
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	1	4.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Aerial Lifts	0	6.00	63	0.31
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	3	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Underground	2	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2023

Unmitigated Construction On-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					
Fugitive Dust					1.0800e-003	0.0000	1.0800e-003	1.6000e-004	0.0000	1.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0400e-003	0.0563	0.0501	1.0000e-004		2.6300e-003	2.6300e-003		2.4700e-003	2.4700e-003	0.0000	8.7079	8.7079	2.0800e-003	0.0000	8.7599
Total	**6.0400e-003**	**0.0563**	**0.0501**	**1.0000e-004**	**1.0800e-003**	**2.6300e-003**	**3.7100e-003**	**1.6000e-004**	**2.4700e-003**	**2.6300e-003**	**0.0000**	**8.7079**	**8.7079**	**2.0800e-003**	**0.0000**	**8.7599**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-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					
Fugitive Dust					4.9000e-004	0.0000	4.9000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.5900e-003	0.0338	0.0615	1.0000e-004		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004	0.0000	8.7079	8.7079	2.0800e-003	0.0000	8.7599
Total	**1.5900e-003**	**0.0338**	**0.0615**	**1.0000e-004**	**4.9000e-004**	**1.5000e-004**	**6.4000e-004**	**7.0000e-005**	**1.5000e-004**	**2.2000e-004**	**0.0000**	**8.7079**	**8.7079**	**2.0800e-003**	**0.0000**	**8.7599**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Site Preparation - 2023

Unmitigated Construction On-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					
Fugitive Dust					0.1390	0.0000	0.1390	0.0682	0.0000	0.0682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0202	0.2200	0.0987	2.9000e-004		9.0600e-003	9.0600e-003		8.3300e-003	8.3300e-003	0.0000	25.0934	25.0934	8.1200e-003	0.0000	25.2963
Total	**0.0202**	**0.2200**	**0.0987**	**2.9000e-004**	**0.1390**	**9.0600e-003**	**0.1481**	**0.0682**	**8.3300e-003**	**0.0765**	**0.0000**	**25.0934**	**25.0934**	**8.1200e-003**	**0.0000**	**25.2963**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-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					
Fugitive Dust					0.0626	0.0000	0.0626	0.0307	0.0000	0.0307	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7600e-003	0.0779	0.1551	2.9000e-004		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004	0.0000	25.0934	25.0934	8.1200e-003	0.0000	25.2963
Total	**4.7600e-003**	**0.0779**	**0.1551**	**2.9000e-004**	**0.0626**	**4.7000e-004**	**0.0630**	**0.0307**	**4.7000e-004**	**0.0312**	**0.0000**	**25.0934**	**25.0934**	**8.1200e-003**	**0.0000**	**25.2963**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Grading - 2023

Unmitigated Construction On-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					
Fugitive Dust					0.0920	0.0000	0.0920	0.0365	0.0000	0.0365	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0332	0.3452	0.2805	6.2000e-004		0.0142	0.0142		0.0131	0.0131	0.0000	54.5352	54.5352	0.0176	0.0000	54.9762
Total	**0.0332**	**0.3452**	**0.2805**	**6.2000e-004**	**0.0920**	**0.0142**	**0.1063**	**0.0365**	**0.0131**	**0.0497**	**0.0000**	**54.5352**	**54.5352**	**0.0176**	**0.0000**	**54.9762**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-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					
Fugitive Dust					0.0414	0.0000	0.0414	0.0164	0.0000	0.0164	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0101	0.1927	0.3672	6.2000e-004		1.0200e-003	1.0200e-003		1.0200e-003	1.0200e-003	0.0000	54.5351	54.5351	0.0176	0.0000	54.9761
Total	**0.0101**	**0.1927**	**0.3672**	**6.2000e-004**	**0.0414**	**1.0200e-003**	**0.0424**	**0.0164**	**1.0200e-003**	**0.0175**	**0.0000**	**54.5351**	**54.5351**	**0.0176**	**0.0000**	**54.9761**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Underground - 2023

Unmitigated Construction On-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					
Off-Road	3.7600e-003	0.0341	0.0607	9.0000e-005		1.6800e-003	1.6800e-003		1.5400e-003	1.5400e-003	0.0000	8.0455	8.0455	2.6000e-003	0.0000	8.1105
Total	**3.7600e-003**	**0.0341**	**0.0607**	**9.0000e-005**		**1.6800e-003**	**1.6800e-003**		**1.5400e-003**	**1.5400e-003**	**0.0000**	**8.0455**	**8.0455**	**2.6000e-003**	**0.0000**	**8.1105**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-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					
Off-Road	1.4700e-003	0.0402	0.0693	9.0000e-005		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004	0.0000	8.0455	8.0455	2.6000e-003	0.0000	8.1105
Total	**1.4700e-003**	**0.0402**	**0.0693**	**9.0000e-005**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**	**0.0000**	**8.0455**	**8.0455**	**2.6000e-003**	**0.0000**	**8.1105**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

3.6 Building Construction - 2023

Unmitigated Construction On-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					
Off-Road	0.0449	0.4511	0.6430	8.9000e-004		0.0229	0.0229		0.0210	0.0210	0.0000	78.5308	78.5308	0.0254	0.0000	79.1657
Total	**0.0449**	**0.4511**	**0.6430**	**8.9000e-004**		**0.0229**	**0.0229**		**0.0210**	**0.0210**	**0.0000**	**78.5308**	**78.5308**	**0.0254**	**0.0000**	**79.1657**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Mitigated Construction On-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					
Off-Road	0.0200	0.3892	0.6729	8.9000e-004		1.4500e-003	1.4500e-003		1.4500e-003	1.4500e-003	0.0000	78.5307	78.5307	0.0254	0.0000	79.1657
Total	**0.0200**	**0.3892**	**0.6729**	**8.9000e-004**		**1.4500e-003**	**1.4500e-003**		**1.4500e-003**	**1.4500e-003**	**0.0000**	**78.5307**	**78.5307**	**0.0254**	**0.0000**	**79.1657**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Building Construction - 2024

Unmitigated Construction On-Site

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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					
Off-Road	0.0213	0.2122	0.3219	4.5000e-004		0.0100	0.0100		9.2000e-003	9.2000e-003	0.0000	39.2880	39.2880	0.0127	0.0000	39.6057
Total	**0.0213**	**0.2122**	**0.3219**	**4.5000e-004**		**0.0100**	**0.0100**		**9.2000e-003**	**9.2000e-003**	**0.0000**	**39.2880**	**39.2880**	**0.0127**	**0.0000**	**39.6057**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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					
Off-Road	0.0100	0.1946	0.3364	4.5000e-004		7.3000e-004	7.3000e-004		7.3000e-004	7.3000e-004	0.0000	39.2880	39.2880	0.0127	0.0000	39.6057
Total	**0.0100**	**0.1946**	**0.3364**	**4.5000e-004**		**7.3000e-004**	**7.3000e-004**		**7.3000e-004**	**7.3000e-004**	**0.0000**	**39.2880**	**39.2880**	**0.0127**	**0.0000**	**39.6057**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.7 Paving - 2024

Unmitigated Construction On-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

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

Category	tons/yr										MT/yr					
Off-Road	9.0100e-003	0.0837	0.1308	2.1000e-004		4.0200e-003	4.0200e-003		3.7100e-003	3.7100e-003	0.0000	18.1792	18.1792	5.7800e-003	0.0000	18.3237
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.0100e-003**	**0.0837**	**0.1308**	**2.1000e-004**		**4.0200e-003**	**4.0200e-003**		**3.7100e-003**	**3.7100e-003**	**0.0000**	**18.1792**	**18.1792**	**5.7800e-003**	**0.0000**	**18.3237**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-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

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

Category	tons/yr										MT/yr					
Off-Road	2.7500e-003	0.0889	0.1531	2.1000e-004		3.3000e-004	3.3000e-004		3.3000e-004	3.3000e-004	0.0000	18.1792	18.1792	5.7800e-003	0.0000	18.3237
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.7500e-003**	**0.0889**	**0.1531**	**2.1000e-004**		**3.3000e-004**	**3.3000e-004**		**3.3000e-004**	**3.3000e-004**	**0.0000**	**18.1792**	**18.1792**	**5.7800e-003**	**0.0000**	**18.3237**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.8 Architectural Coating - 2024

Unmitigated Construction On-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

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

Category	tons/yr										MT/yr					
Archit. Coating	0.6153					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0122	0.0181	3.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5569
Total	**0.6171**	**0.0122**	**0.0181**	**3.0000e-005**		**6.1000e-004**	**6.1000e-004**		**6.1000e-004**	**6.1000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5569**

Unmitigated 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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-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

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

Category	tons/yr										MT/yr					
Archit. Coating	0.6153					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4000e-004	0.0106	0.0183	3.0000e-005		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5568
Total	**0.6158**	**0.0106**	**0.0183**	**3.0000e-005**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5568**

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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	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**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**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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	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	0.4164	0.3454	2.4169	4.7000e-003	0.3931	4.9900e-003	0.3981	0.0986	4.7000e-003	0.1033	0.0000	435.6423	435.6423	0.0272	0.0253	443.8514
Unmitigated	0.4164	0.3454	2.4169	4.7000e-003	0.3931	4.9900e-003	0.3981	0.0986	4.7000e-003	0.1033	0.0000	435.6423	435.6423	0.0272	0.0253	443.8514

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	175.68	195.36	150.72	404,010	404,010
Other Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	330.40	333.90	299.25	753,971	753,971
Total	506.08	529.26	449.97	1,157,981	1,157,981

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	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
Condo/Townhouse	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
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
Condo/Townhouse	0.467361	0.051994	0.211970	0.145720	0.047541	0.012328	0.017909	0.007915	0.001016	0.000422	0.029481	0.001480	0.004862
Other Asphalt Surfaces	0.467361	0.051994	0.211970	0.145720	0.047541	0.012328	0.017909	0.007915	0.001016	0.000422	0.029481	0.001480	0.004862

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Single Family Housing	0.467361	0.051994	0.211970	0.145720	0.047541	0.012328	0.017909	0.007915	0.001016	0.000422	0.029481	0.001480	0.004862

5.0 Energy Detail

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	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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					

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Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	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**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	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**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

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Land Use	kWh/yr	MT/yr			
Condo/Townhouse	116363	6.3327	1.7400e-003	2.1000e-004	6.4392
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	274163	14.9205	4.1000e-003	5.0000e-004	15.1713
Total		**21.2532**	**5.8400e-003**	**7.1000e-004**	**21.6105**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	116363	6.3327	1.7400e-003	2.1000e-004	6.4392
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	274163	14.9205	4.1000e-003	5.0000e-004	15.1713
Total		**21.2532**	**5.8400e-003**	**7.1000e-004**	**21.6105**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

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	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	0.4144	5.0400e-003	0.4377	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.9000e-004	0.0000	0.7327
Unmitigated	0.4144	5.0400e-003	0.4377	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.9000e-004	0.0000	0.7327

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	0.0615					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3397					0.0000	0.0000		0.0000	0.0000	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		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0131	5.0400e-003	0.4377	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.9000e-004	0.0000	0.7327
Total	**0.4144**	**5.0400e-003**	**0.4377**	**2.0000e-005**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**0.7156**	**0.7156**	**6.9000e-004**	**0.0000**	**0.7327**

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

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	0.0615					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3397					0.0000	0.0000		0.0000	0.0000	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		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0131	5.0400e-003	0.4377	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.9000e-004	0.0000	0.7327
Total	**0.4144**	**5.0400e-003**	**0.4377**	**2.0000e-005**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**0.7156**	**0.7156**	**6.9000e-004**	**0.0000**	**0.7327**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e

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Category	MT/yr			
Mitigated	2.4271	4.1100e-003	2.4100e-003	3.2483
Unmitigated	2.9537	5.1200e-003	3.0100e-003	3.9789

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	1.5637 / 0.985809	1.2015	2.0800e-003	1.2200e-003	1.6185
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	2.28039 / 1.43764	1.7522	3.0400e-003	1.7900e-003	2.3603
Total		**2.9537**	**5.1200e-003**	**3.0100e-003**	**3.9789**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			

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Condo/Townhouse	1.25096 / 0.925674	0.9873	1.6700e-003	9.8000e-004	1.3214
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.82431 / 1.34994	1.4398	2.4400e-003	1.4300e-003	1.9270
Total		**2.4271**	**4.1100e-003**	**2.4100e-003**	**3.2483**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.7666	0.6363	0.0000	26.6739
Unmitigated	10.7666	0.6363	0.0000	26.6739

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e

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Land Use	tons	MT/yr			
Condo/Townhouse	11.04	2.2410	0.1324	0.0000	5.5520
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	42	8.5256	0.5039	0.0000	21.1219
Total		**10.7666**	**0.6363**	**0.0000**	**26.6739**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	11.04	2.2410	0.1324	0.0000	5.5520
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	42	8.5256	0.5039	0.0000	21.1219
Total		**10.7666**	**0.6363**	**0.0000**	**26.6739**

9.0 Operational Offroad

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.75	Acre	0.00	32,670.00	0
Condo/Townhouse	24.00	Dwelling Unit	0.00	35,160.00	69
Single Family Housing	35.00	Dwelling Unit	4.50	51,275.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2030
Utility Company	Sonoma Clean Power				
CO2 Intensity (lb/MWhr)	119.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Draft Project Description. Assume 15% of site paved Avg 1465sf/unit. Acreage based on provided site plan.

Construction Phase - added trenching and included estimated phase days

Off-road Equipment - Applicant provided construction equipment list and schedule

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Trips and VMT - All trips entered into EMFAC2021

Demolition - Estimated from GoogleEarth

Grading - Model defaults

Vehicle Trips - default

Woodstoves - No Hearth

Energy Use - all electric with solar generation and battery storage

Water And Wastewater - WTP treatment

Construction Off-road Equipment Mitigation - BMPs and Tier 4i

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Vehicle Emission Factors - Emission factors from EMFAC2021

Fleet Mix - Fleet mix from EMFAC2021

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00

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tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	230.00	300.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	5.00	10.00
tblEnergyUse	NT24NG	3,155.00	0.00
tblEnergyUse	NT24NG	3,155.00	0.00
tblEnergyUse	T24NG	14,104.62	0.00
tblEnergyUse	T24NG	23,474.54	0.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00

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tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	3.60	0.00
tblFireplaces	NumberGas	8.75	0.00
tblFireplaces	NumberNoFireplace	0.96	0.00
tblFireplaces	NumberNoFireplace	2.80	0.00
tblFireplaces	NumberWood	4.08	0.00
tblFireplaces	NumberWood	15.05	0.00
tblFleetMix	HHD	6.6660e-003	8.7314e-003
tblFleetMix	HHD	6.6660e-003	8.7314e-003
tblFleetMix	HHD	6.6660e-003	8.7314e-003
tblFleetMix	LDA	0.58	0.49
tblFleetMix	LDA	0.58	0.49
tblFleetMix	LDA	0.58	0.49
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT2	0.16	0.22
tblFleetMix	LDT2	0.16	0.22
tblFleetMix	LDT2	0.16	0.22
tblFleetMix	LHD1	0.03	0.04
tblFleetMix	LHD1	0.03	0.04
tblFleetMix	LHD1	0.03	0.04
tblFleetMix	LHD2	7.4690e-003	0.01
tblFleetMix	LHD2	7.4690e-003	0.01
tblFleetMix	LHD2	7.4690e-003	0.01
tblFleetMix	MCY	0.03	0.03
tblFleetMix	MCY	0.03	0.03

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

tblFleetMix	MCY	0.03	0.03
tblFleetMix	MDV	0.11	0.14
tblFleetMix	MDV	0.11	0.14
tblFleetMix	MDV	0.11	0.14
tblFleetMix	MH	3.2790e-003	3.8194e-003
tblFleetMix	MH	3.2790e-003	3.8194e-003
tblFleetMix	MH	3.2790e-003	3.8194e-003
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	1.0800e-003	9.8714e-004
tblFleetMix	OBUS	1.0800e-003	9.8714e-004
tblFleetMix	OBUS	1.0800e-003	9.8714e-004
tblFleetMix	SBUS	1.4780e-003	1.5469e-003
tblFleetMix	SBUS	1.4780e-003	1.5469e-003
tblFleetMix	SBUS	1.4780e-003	1.5469e-003
tblFleetMix	UBUS	2.7300e-004	4.2841e-004
tblFleetMix	UBUS	2.7300e-004	4.2841e-004
tblFleetMix	UBUS	2.7300e-004	4.2841e-004
tblLandUse	LandUseSquareFeet	24,000.00	35,160.00
tblLandUse	LandUseSquareFeet	63,000.00	51,275.00
tblLandUse	LotAcreage	0.75	0.00
tblLandUse	LotAcreage	1.50	0.00
tblLandUse	LotAcreage	11.36	4.50
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	10.00	0.00
tblTripsAndVMT	VendorTripNumber	12.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	20.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00
tblTripsAndVMT	WorkerTripNumber	44.00	0.00
tblTripsAndVMT	WorkerTripNumber	15.00	0.00
tblTripsAndVMT	WorkerTripNumber	9.00	0.00
tblVehicleEF	HHD	0.02	0.16
tblVehicleEF	HHD	0.05	0.05
tblVehicleEF	HHD	0.00	3.8254e-008
tblVehicleEF	HHD	5.32	4.50
tblVehicleEF	HHD	0.44	0.50
tblVehicleEF	HHD	8.8140e-003	1.0176e-003
tblVehicleEF	HHD	799.72	667.01
tblVehicleEF	HHD	1,274.41	1,456.96

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tblVehicleEF	HHD	0.10	0.01
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	0.20	0.23
tblVehicleEF	HHD	0.00	1.2222e-007
tblVehicleEF	HHD	4.53	3.58
tblVehicleEF	HHD	2.56	1.63
tblVehicleEF	HHD	2.87	2.64
tblVehicleEF	HHD	2.1180e-003	1.9491e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	1.0000e-006	1.7483e-007
tblVehicleEF	HHD	2.0270e-003	1.8595e-003
tblVehicleEF	HHD	0.02	0.03
tblVehicleEF	HHD	8.4640e-003	8.4789e-003
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	1.0000e-006	1.6075e-007
tblVehicleEF	HHD	3.0000e-006	5.3123e-005
tblVehicleEF	HHD	1.6400e-004	1.4601e-005
tblVehicleEF	HHD	0.36	0.28
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	8.7000e-005	1.3373e-004
tblVehicleEF	HHD	2.0000e-006	2.0719e-007
tblVehicleEF	HHD	7.4340e-003	5.8092e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.0000e-006	1.2046e-007
tblVehicleEF	HHD	3.0000e-006	5.3123e-005
tblVehicleEF	HHD	1.6400e-004	1.4601e-005

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tblVehicleEF	HHD	0.41	0.47
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.08	0.07
tblVehicleEF	HHD	8.7000e-005	1.3373e-004
tblVehicleEF	HHD	2.0000e-006	2.2684e-007
tblVehicleEF	LDA	1.2000e-003	1.4857e-003
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.44	0.54
tblVehicleEF	LDA	1.82	2.36
tblVehicleEF	LDA	221.97	223.71
tblVehicleEF	LDA	46.14	58.17
tblVehicleEF	LDA	3.5250e-003	3.5720e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.14	0.20
tblVehicleEF	LDA	0.04	8.2561e-003
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	1.0760e-003	9.3048e-004
tblVehicleEF	LDA	1.3650e-003	1.5720e-003
tblVehicleEF	LDA	0.02	2.8896e-003
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	9.9100e-004	8.5632e-004
tblVehicleEF	LDA	1.2550e-003	1.4454e-003
tblVehicleEF	LDA	0.03	0.27
tblVehicleEF	LDA	0.07	0.07
tblVehicleEF	LDA	0.02	0.00
tblVehicleEF	LDA	4.2650e-003	5.3607e-003
tblVehicleEF	LDA	0.03	0.20
tblVehicleEF	LDA	0.13	0.23

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tblVehicleEF	LDA	2.0530e-003	2.2114e-003
tblVehicleEF	LDA	4.2700e-004	5.7503e-004
tblVehicleEF	LDA	0.03	0.27
tblVehicleEF	LDA	0.07	0.07
tblVehicleEF	LDA	0.02	0.00
tblVehicleEF	LDA	6.1890e-003	7.8090e-003
tblVehicleEF	LDA	0.03	0.20
tblVehicleEF	LDA	0.15	0.25
tblVehicleEF	LDT1	2.6560e-003	5.0384e-003
tblVehicleEF	LDT1	0.05	0.10
tblVehicleEF	LDT1	0.69	1.23
tblVehicleEF	LDT1	2.02	4.98
tblVehicleEF	LDT1	271.84	305.46
tblVehicleEF	LDT1	57.89	82.23
tblVehicleEF	LDT1	4.8290e-003	8.0628e-003
tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.05	0.10
tblVehicleEF	LDT1	0.19	0.36
tblVehicleEF	LDT1	0.04	0.01
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	1.3010e-003	1.6084e-003
tblVehicleEF	LDT1	1.7030e-003	2.6358e-003
tblVehicleEF	LDT1	0.02	3.7397e-003
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	1.1960e-003	1.4789e-003
tblVehicleEF	LDT1	1.5660e-003	2.4235e-003
tblVehicleEF	LDT1	0.07	0.71
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.06	0.00

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tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.09	0.54
tblVehicleEF	LDT1	0.22	0.50
tblVehicleEF	LDT1	2.5140e-003	3.0198e-003
tblVehicleEF	LDT1	5.3500e-004	8.1288e-004
tblVehicleEF	LDT1	0.07	0.71
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.06	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.09	0.54
tblVehicleEF	LDT1	0.25	0.55
tblVehicleEF	LDT2	2.1940e-003	2.1915e-003
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.62	0.71
tblVehicleEF	LDT2	2.44	3.13
tblVehicleEF	LDT2	278.26	307.92
tblVehicleEF	LDT2	59.60	79.30
tblVehicleEF	LDT2	4.6490e-003	5.0580e-003
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.04	0.05
tblVehicleEF	LDT2	0.20	0.28
tblVehicleEF	LDT2	0.04	0.01
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.1660e-003	1.0890e-003
tblVehicleEF	LDT2	1.4450e-003	1.7718e-003
tblVehicleEF	LDT2	0.02	3.5567e-003
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.0730e-003	1.0020e-003
tblVehicleEF	LDT2	1.3290e-003	1.6291e-003

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tblVehicleEF	LDT2	0.06	0.31
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.05	0.00
tblVehicleEF	LDT2	8.7250e-003	8.3290e-003
tblVehicleEF	LDT2	0.07	0.23
tblVehicleEF	LDT2	0.22	0.31
tblVehicleEF	LDT2	2.5730e-003	3.0436e-003
tblVehicleEF	LDT2	5.5100e-004	7.8400e-004
tblVehicleEF	LDT2	0.06	0.31
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.05	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.07	0.23
tblVehicleEF	LDT2	0.24	0.34
tblVehicleEF	LHD1	3.7420e-003	4.0019e-003
tblVehicleEF	LHD1	7.9950e-003	7.5020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.16	0.17
tblVehicleEF	LHD1	0.79	0.78
tblVehicleEF	LHD1	0.86	1.72
tblVehicleEF	LHD1	9.02	8.78
tblVehicleEF	LHD1	706.55	705.59
tblVehicleEF	LHD1	8.92	13.80
tblVehicleEF	LHD1	9.1700e-004	8.2570e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	0.95	0.87
tblVehicleEF	LHD1	0.22	0.32

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tblVehicleEF	LHD1	1.1020e-003	9.4806e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8072e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2300e-004	1.7489e-004
tblVehicleEF	LHD1	1.0540e-003	9.0704e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5420e-003	2.4518e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0500e-004	1.6080e-004
tblVehicleEF	LHD1	1.8450e-003	0.11
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	9.4800e-004	0.00
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	0.36	0.16
tblVehicleEF	LHD1	0.05	0.08
tblVehicleEF	LHD1	8.7000e-005	8.4879e-005
tblVehicleEF	LHD1	6.8670e-003	6.8572e-003
tblVehicleEF	LHD1	8.8000e-005	1.3647e-004
tblVehicleEF	LHD1	1.8450e-003	0.11
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	9.4800e-004	0.00
tblVehicleEF	LHD1	0.13	0.12
tblVehicleEF	LHD1	0.36	0.16
tblVehicleEF	LHD1	0.06	0.09
tblVehicleEF	LHD2	2.5350e-003	2.5988e-003
tblVehicleEF	LHD2	6.3230e-003	6.0211e-003

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tblVehicleEF	LHD2	5.7120e-003	9.2616e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.63	0.50
tblVehicleEF	LHD2	0.46	0.99
tblVehicleEF	LHD2	14.12	14.23
tblVehicleEF	LHD2	710.65	775.46
tblVehicleEF	LHD2	6.14	7.99
tblVehicleEF	LHD2	1.8570e-003	1.8460e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.10	0.11
tblVehicleEF	LHD2	0.86	0.89
tblVehicleEF	LHD2	0.14	0.19
tblVehicleEF	LHD2	1.5620e-003	1.5204e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.2000e-005	5.5265e-005
tblVehicleEF	LHD2	1.4950e-003	1.4547e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7310e-003	2.6814e-003
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	8.5000e-005	5.0814e-005
tblVehicleEF	LHD2	7.2900e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.3600e-004	0.00
tblVehicleEF	LHD2	0.12	0.11
tblVehicleEF	LHD2	0.08	0.07

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

tblVehicleEF	LHD2	0.03	0.04
tblVehicleEF	LHD2	1.3500e-004	1.3604e-004
tblVehicleEF	LHD2	6.8450e-003	7.4534e-003
tblVehicleEF	LHD2	6.1000e-005	7.8963e-005
tblVehicleEF	LHD2	7.2900e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.3600e-004	0.00
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.08	0.07
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	MCY	0.35	0.17
tblVehicleEF	MCY	0.26	0.19
tblVehicleEF	MCY	19.65	13.63
tblVehicleEF	MCY	9.37	8.60
tblVehicleEF	MCY	216.84	188.90
tblVehicleEF	MCY	61.60	50.69
tblVehicleEF	MCY	0.07	0.04
tblVehicleEF	MCY	0.02	8.3204e-003
tblVehicleEF	MCY	1.18	0.60
tblVehicleEF	MCY	0.27	0.14
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2560e-003	2.0090e-003
tblVehicleEF	MCY	2.8450e-003	3.3552e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	2.1060e-003	1.8782e-003
tblVehicleEF	MCY	2.6700e-003	3.1503e-003
tblVehicleEF	MCY	0.88	4.99

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tblVehicleEF	MCY	0.79	3.56
tblVehicleEF	MCY	0.45	0.00
tblVehicleEF	MCY	2.37	1.14
tblVehicleEF	MCY	0.60	3.99
tblVehicleEF	MCY	2.00	1.45
tblVehicleEF	MCY	2.1460e-003	1.8675e-003
tblVehicleEF	MCY	6.1000e-004	5.0113e-004
tblVehicleEF	MCY	0.88	0.13
tblVehicleEF	MCY	0.79	3.56
tblVehicleEF	MCY	0.45	0.00
tblVehicleEF	MCY	2.95	1.37
tblVehicleEF	MCY	0.60	3.99
tblVehicleEF	MCY	2.17	1.58
tblVehicleEF	MDV	2.3680e-003	2.6232e-003
tblVehicleEF	MDV	0.05	0.08
tblVehicleEF	MDV	0.63	0.77
tblVehicleEF	MDV	2.59	3.42
tblVehicleEF	MDV	340.38	372.69
tblVehicleEF	MDV	72.41	95.79
tblVehicleEF	MDV	6.1680e-003	6.5793e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.05	0.06
tblVehicleEF	MDV	0.23	0.34
tblVehicleEF	MDV	0.04	0.01
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	1.1840e-003	1.1417e-003
tblVehicleEF	MDV	1.4920e-003	1.8440e-003
tblVehicleEF	MDV	0.02	3.6152e-003
tblVehicleEF	MDV	2.0000e-003	2.0000e-003

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tblVehicleEF	MDV	1.0920e-003	1.0529e-003
tblVehicleEF	MDV	1.3720e-003	1.6955e-003
tblVehicleEF	MDV	0.07	0.40
tblVehicleEF	MDV	0.15	0.10
tblVehicleEF	MDV	0.07	0.00
tblVehicleEF	MDV	9.7310e-003	0.01
tblVehicleEF	MDV	0.08	0.30
tblVehicleEF	MDV	0.26	0.40
tblVehicleEF	MDV	3.1500e-003	3.6817e-003
tblVehicleEF	MDV	6.7000e-004	9.4701e-004
tblVehicleEF	MDV	0.07	0.40
tblVehicleEF	MDV	0.15	0.10
tblVehicleEF	MDV	0.07	0.00
tblVehicleEF	MDV	0.01	0.02
tblVehicleEF	MDV	0.08	0.30
tblVehicleEF	MDV	0.29	0.43
tblVehicleEF	MH	6.5260e-003	7.6380e-003
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	0.46	0.52
tblVehicleEF	MH	1.64	1.85
tblVehicleEF	MH	1,387.36	1,603.71
tblVehicleEF	MH	15.21	18.39
tblVehicleEF	MH	0.06	0.08
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.56	1.83
tblVehicleEF	MH	0.24	0.30
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.04

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

tblVehicleEF	MH	1.9100e-004	2.0824e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.3360e-003	3.3960e-003
tblVehicleEF	MH	0.03	0.04
tblVehicleEF	MH	1.7600e-004	1.9146e-004
tblVehicleEF	MH	0.45	25.26
tblVehicleEF	MH	0.04	6.00
tblVehicleEF	MH	0.18	0.00
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	9.4360e-003	0.15
tblVehicleEF	MH	0.08	0.09
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.5100e-004	1.8178e-004
tblVehicleEF	MH	0.45	25.26
tblVehicleEF	MH	0.04	6.00
tblVehicleEF	MH	0.18	0.00
tblVehicleEF	MH	0.07	0.09
tblVehicleEF	MH	9.4360e-003	0.15
tblVehicleEF	MH	0.08	0.10
tblVehicleEF	MHD	2.2510e-003	0.01
tblVehicleEF	MHD	9.3200e-004	7.5480e-003
tblVehicleEF	MHD	5.1670e-003	5.6670e-003
tblVehicleEF	MHD	0.33	0.63
tblVehicleEF	MHD	0.15	0.15
tblVehicleEF	MHD	0.58	0.64
tblVehicleEF	MHD	63.79	151.67
tblVehicleEF	MHD	948.94	1,064.95
tblVehicleEF	MHD	5.12	5.75
tblVehicleEF	MHD	9.5220e-003	0.02

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tblVehicleEF	MHD	0.13	0.14
tblVehicleEF	MHD	4.3630e-003	3.9186e-003
tblVehicleEF	MHD	0.34	0.77
tblVehicleEF	MHD	1.53	0.62
tblVehicleEF	MHD	1.88	1.32
tblVehicleEF	MHD	1.5400e-004	6.5218e-004
tblVehicleEF	MHD	0.13	0.04
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6150e-003	5.5092e-003
tblVehicleEF	MHD	6.5000e-005	6.9522e-005
tblVehicleEF	MHD	1.4700e-004	6.2348e-004
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	7.2820e-003	5.2653e-003
tblVehicleEF	MHD	6.0000e-005	6.3923e-005
tblVehicleEF	MHD	2.1800e-004	0.02
tblVehicleEF	MHD	0.01	3.5595e-003
tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	1.2500e-004	0.00
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	6.0400e-004	1.4075e-003
tblVehicleEF	MHD	9.0150e-003	0.01
tblVehicleEF	MHD	5.1000e-005	5.6852e-005
tblVehicleEF	MHD	2.1800e-004	0.02
tblVehicleEF	MHD	0.01	3.5595e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	1.2500e-004	0.00

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

tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	OBUS	6.8350e-003	7.8957e-003
tblVehicleEF	OBUS	2.7460e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.72	0.67
tblVehicleEF	OBUS	0.35	0.49
tblVehicleEF	OBUS	1.76	2.16
tblVehicleEF	OBUS	110.91	102.09
tblVehicleEF	OBUS	1,190.08	1,369.24
tblVehicleEF	OBUS	13.53	16.41
tblVehicleEF	OBUS	0.02	0.01
tblVehicleEF	OBUS	0.13	0.15
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	0.50	0.37
tblVehicleEF	OBUS	1.54	1.03
tblVehicleEF	OBUS	1.21	0.88
tblVehicleEF	OBUS	1.6700e-004	3.9196e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.4550e-003	0.02
tblVehicleEF	OBUS	1.6400e-004	1.8768e-004
tblVehicleEF	OBUS	1.6000e-004	3.7493e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	8.0770e-003	0.02
tblVehicleEF	OBUS	1.5100e-004	1.7256e-004
tblVehicleEF	OBUS	1.3560e-003	0.10

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tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.05
tblVehicleEF	OBUS	6.0100e-004	0.00
tblVehicleEF	OBUS	0.02	0.05
tblVehicleEF	OBUS	0.07	0.11
tblVehicleEF	OBUS	0.08	0.11
tblVehicleEF	OBUS	1.0520e-003	9.6663e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	1.3400e-004	1.6224e-004
tblVehicleEF	OBUS	1.3560e-003	0.10
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	6.0100e-004	0.00
tblVehicleEF	OBUS	0.03	0.07
tblVehicleEF	OBUS	0.07	0.11
tblVehicleEF	OBUS	0.09	0.12
tblVehicleEF	SBUS	0.04	0.09
tblVehicleEF	SBUS	3.7660e-003	0.18
tblVehicleEF	SBUS	3.2710e-003	2.6836e-003
tblVehicleEF	SBUS	1.84	1.19
tblVehicleEF	SBUS	0.30	0.82
tblVehicleEF	SBUS	0.46	0.35
tblVehicleEF	SBUS	325.82	172.93
tblVehicleEF	SBUS	1,016.49	1,011.56
tblVehicleEF	SBUS	2.64	2.14
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	3.4900e-003	3.0388e-003
tblVehicleEF	SBUS	2.68	1.13

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

tblVehicleEF	SBUS	3.29	1.75
tblVehicleEF	SBUS	1.25	0.47
tblVehicleEF	SBUS	1.8010e-003	7.4860e-004
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	3.6000e-005	2.4071e-005
tblVehicleEF	SBUS	1.7230e-003	7.1423e-004
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7960e-003	2.7361e-003
tblVehicleEF	SBUS	0.02	9.8802e-003
tblVehicleEF	SBUS	3.3000e-005	2.2132e-005
tblVehicleEF	SBUS	4.1400e-004	0.02
tblVehicleEF	SBUS	4.2990e-003	5.6152e-003
tblVehicleEF	SBUS	0.18	0.11
tblVehicleEF	SBUS	2.0100e-004	0.00
tblVehicleEF	SBUS	0.06	0.04
tblVehicleEF	SBUS	9.3040e-003	0.02
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	3.0940e-003	1.4801e-003
tblVehicleEF	SBUS	9.6770e-003	9.0480e-003
tblVehicleEF	SBUS	2.6000e-005	2.1189e-005
tblVehicleEF	SBUS	4.1400e-004	0.02
tblVehicleEF	SBUS	4.2990e-003	5.6152e-003
tblVehicleEF	SBUS	0.25	0.23
tblVehicleEF	SBUS	2.0100e-004	0.00
tblVehicleEF	SBUS	0.07	0.23
tblVehicleEF	SBUS	9.3040e-003	0.02
tblVehicleEF	SBUS	0.02	0.02

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

tblVehicleEF	UBUS	1.71	0.64
tblVehicleEF	UBUS	0.01	0.02
tblVehicleEF	UBUS	12.99	7.76
tblVehicleEF	UBUS	0.84	2.45
tblVehicleEF	UBUS	1,646.36	1,027.95
tblVehicleEF	UBUS	7.79	19.10
tblVehicleEF	UBUS	0.27	0.13
tblVehicleEF	UBUS	6.8450e-003	0.02
tblVehicleEF	UBUS	0.67	0.20
tblVehicleEF	UBUS	0.08	0.17
tblVehicleEF	UBUS	0.08	0.13
tblVehicleEF	UBUS	0.03	0.04
tblVehicleEF	UBUS	4.8850e-003	3.3910e-003
tblVehicleEF	UBUS	8.8000e-005	1.2892e-004
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	7.7720e-003	0.01
tblVehicleEF	UBUS	4.6670e-003	3.2314e-003
tblVehicleEF	UBUS	8.1000e-005	1.1854e-004
tblVehicleEF	UBUS	2.4900e-004	0.03
tblVehicleEF	UBUS	3.6220e-003	9.4369e-003
tblVehicleEF	UBUS	1.4800e-004	0.00
tblVehicleEF	UBUS	0.03	0.04
tblVehicleEF	UBUS	8.6800e-004	0.03
tblVehicleEF	UBUS	0.05	0.08
tblVehicleEF	UBUS	0.01	7.6069e-003
tblVehicleEF	UBUS	7.7000e-005	1.8885e-004
tblVehicleEF	UBUS	2.4900e-004	0.03
tblVehicleEF	UBUS	3.6220e-003	9.4369e-003
tblVehicleEF	UBUS	1.4800e-004	0.00

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

tblVehicleEF	UBUS	1.75	0.69
tblVehicleEF	UBUS	8.6800e-004	0.03
tblVehicleEF	UBUS	0.05	0.09
tblWater	AerobicPercent	87.46	100.00
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	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	0.48	0.00
tblWoodstoves	NumberCatalytic	1.40	0.00
tblWoodstoves	NumberNoncatalytic	0.48	0.00
tblWoodstoves	NumberNoncatalytic	1.40	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveDayYear	21.06	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00
tblWoodstoves	WoodstoveWoodMass	956.80	0.00

2.0 Emissions Summary

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

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

Category	tons/yr										MT/yr					
Area	0.4143	5.0400e-003	0.4369	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.8000e-004	0.0000	0.7327
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
Mobile	0.3254	0.2411	1.8558	4.2100e-003	0.3921	3.6100e-003	0.3957	0.0982	3.4000e-003	0.1016	0.0000	389.7689	389.7689	0.0208	0.0213	396.6306
Waste						0.0000	0.0000		0.0000	0.0000	10.7666	0.0000	10.7666	0.6363	0.0000	26.6739
Water						0.0000	0.0000		0.0000	0.0000	1.3600	1.5936	2.9537	5.1200e-003	3.0100e-003	3.9789
Total	**0.7397**	**0.2462**	**2.2927**	**4.2300e-003**	**0.3921**	**6.0400e-003**	**0.3981**	**0.0982**	**5.8300e-003**	**0.1040**	**12.1267**	**413.3313**	**425.4580**	**0.6687**	**0.0250**	**449.6265**

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	0.4143	5.0400e-003	0.4369	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.8000e-004	0.0000	0.7327
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
Mobile	0.3254	0.2411	1.8558	4.2100e-003	0.3921	3.6100e-003	0.3957	0.0982	3.4000e-003	0.1016	0.0000	389.7689	389.7689	0.0208	0.0213	396.6306
Waste						0.0000	0.0000		0.0000	0.0000	10.7666	0.0000	10.7666	0.6363	0.0000	26.6739
Water						0.0000	0.0000		0.0000	0.0000	1.0880	1.3391	2.4271	4.1100e-003	2.4100e-003	3.2483
Total	**0.7397**	**0.2462**	**2.2927**	**4.2300e-003**	**0.3921**	**6.0400e-003**	**0.3981**	**0.0982**	**5.8300e-003**	**0.1040**	**11.8547**	**413.0767**	**424.9314**	**0.6677**	**0.0244**	**448.8960**

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.24**	**0.06**	**0.12**	**0.15**	**2.40**	**0.16**

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	0.3254	0.2411	1.8558	4.2100e-003	0.3921	3.6100e-003	0.3957	0.0982	3.4000e-003	0.1016	0.0000	389.7689	389.7689	0.0208	0.0213	396.6306
Unmitigated	0.3254	0.2411	1.8558	4.2100e-003	0.3921	3.6100e-003	0.3957	0.0982	3.4000e-003	0.1016	0.0000	389.7689	389.7689	0.0208	0.0213	396.6306

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	175.68	195.36	150.72	404,010	404,010
Other Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	330.40	333.90	299.25	753,971	753,971
Total	506.08	529.26	449.97	1,157,981	1,157,981

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	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
Condo/Townhouse	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse	0.491083	0.041177	0.215613	0.139447	0.040042	0.010980	0.019187	0.008731	0.000987	0.000428	0.026958	0.001547	0.003819
Other Asphalt Surfaces	0.491083	0.041177	0.215613	0.139447	0.040042	0.010980	0.019187	0.008731	0.000987	0.000428	0.026958	0.001547	0.003819
Single Family Housing	0.491083	0.041177	0.215613	0.139447	0.040042	0.010980	0.019187	0.008731	0.000987	0.000428	0.026958	0.001547	0.003819

5.0 Energy Detail

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	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	21.2532	21.2532	5.8500e-003	7.1000e-004	21.6105
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

	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					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	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**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	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**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	116363	6.3327	1.7400e-003	2.1000e-004	6.4392
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	274163	14.9205	4.1000e-003	5.0000e-004	15.1713
Total		**21.2532**	**5.8400e-003**	**7.1000e-004**	**21.6105**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	116363	6.3327	1.7400e-003	2.1000e-004	6.4392
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	274163	14.9205	4.1000e-003	5.0000e-004	15.1713
Total		**21.2532**	**5.8400e-003**	**7.1000e-004**	**21.6105**

6.0 Area Detail

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

6.1 Mitigation Measures Area

No Hearths Installed

	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	0.4143	5.0400e-003	0.4369	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.8000e-004	0.0000	0.7327
Unmitigated	0.4143	5.0400e-003	0.4369	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.8000e-004	0.0000	0.7327

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	0.0615					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3397					0.0000	0.0000		0.0000	0.0000	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		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0131	5.0400e-003	0.4369	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.8000e-004	0.0000	0.7327
Total	**0.4143**	**5.0400e-003**	**0.4369**	**2.0000e-005**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**0.7156**	**0.7156**	**6.8000e-004**	**0.0000**	**0.7327**

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

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	0.0615					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3397					0.0000	0.0000		0.0000	0.0000	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		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0131	5.0400e-003	0.4369	2.0000e-005		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	0.7156	0.7156	6.8000e-004	0.0000	0.7327
Total	**0.4143**	**5.0400e-003**	**0.4369**	**2.0000e-005**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**0.7156**	**0.7156**	**6.8000e-004**	**0.0000**	**0.7327**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, 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	2.4271	4.1100e-003	2.4100e-003	3.2483
Unmitigated	2.9537	5.1200e-003	3.0100e-003	3.9789

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	1.5637 / 0.985809	1.2015	2.0800e-003	1.2200e-003	1.6185
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	2.28039 / 1.43764	1.7522	3.0400e-003	1.7900e-003	2.3603
Total		**2.9537**	**5.1200e-003**	**3.0100e-003**	**3.9789**

Mitigated

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

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	1.25096 / 0.925674	0.9873	1.6700e-003	9.8000e-004	1.3214
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.82431 / 1.34994	1.4398	2.4400e-003	1.4300e-003	1.9270
Total		**2.4271**	**4.1100e-003**	**2.4100e-003**	**3.2483**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.7666	0.6363	0.0000	26.6739
Unmitigated	10.7666	0.6363	0.0000	26.6739

8.2 Waste by Land Use

Date: 1/21/2022 10:33 AM

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

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	11.04	2.2410	0.1324	0.0000	5.5520
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	42	8.5256	0.5039	0.0000	21.1219
Total		**10.7666**	**0.6363**	**0.0000**	**26.6739**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	11.04	2.2410	0.1324	0.0000	5.5520
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	42	8.5256	0.5039	0.0000	21.1219
Total		**10.7666**	**0.6363**	**0.0000**	**26.6739**

Creekwood Subdivision, Petaluma - Sonoma-San Francisco County, Annual

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

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Attachment 3: EMFAC2021 Calculations

Summary of Construction Traffic Emissions (EMFAC2021)

Pollutants YEAR	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	NBio- CO2	CH4	N2O	CO2e
	Tons										*Metric Tons*			
Criteria Pollutants														
2023	0.0204	0.0920	0.2185	0.0008	0.0435	0.0060	0.0495	0.0066	0.0025	0.0090	78.3087	0.0032	0.0082	80.8415
2024	0.0102	0.0466	0.1081	0.0004	0.0231	0.0031	0.0263	0.0035	0.0013	0.0048	40.9355	0.0016	0.0043	42.2541
Toxic Air Contaminants (1.0 Mile Trip Length)														
2023	0.0173	0.0268	0.0779	0.0001	0.0041	0.0006	0.0047	0.0006	0.0003	0.0009	9.6712	0.0015	0.0014	10.1137
2024	0.0087	0.0139	0.0389	0.0001	0.0022	0.0003	0.0025	0.0003	0.0001	0.0005	5.0556	0.0007	0.0007	5.2852

CalEEMod Construction Inputs

Phase	CalEEMod WORKER TRIPS	CalEEMod VENDOR TRIPS	Total Worker Trips	Total Vendor Trips	CalEEMod HAULING TRIPS	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class	*Worker VMT*	*Vendor VMT*	*Hauling VMT*
Demolition	8	0	80	0	10	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	864	0	200
Site Preparation	20	0	200	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	2160	0	0
Grading	20	0	400	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	4320	0	0
Trenching/Foundation	5	0	295	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	3186	0	0
Paving	18	0	360	0	77	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	3888	0	1540
Building Construction	44	12	13200	3600	768	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	142560	26280	15360
Architectural Coating	9	0	180	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT	1944	0	0

Number of Days Per Year					
2023	1/1/23	12/31/23	365	261	
2024	1/1/24	7/12/24	194	139	
			559	**400**	***Total Workdays***

Phase	Start Date	End Date	Days/Week	Workdays
Demolition	1/1/2023	1/13/2023	5	10
Site Preparation	1/14/2023	1/27/2023	5	10
Grading	1/28/2023	2/24/2023	5	20
Trenching/Foundation	2/10/2023	5/3/2023	5	59
Paving	5/18/2024	6/14/2024	5	20
Building Construction	3/25/2023	5/17/2024	5	300
Architectural Coating	6/15/2024	7/12/2024	5	20

Source: EMFAC2021 (v1.0.1) Emission Rates
Region Type: County
Region: Sonoma
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

Region	Calendar Y	Vehicle Cat	Model Yea	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RU	PM2.5_IDL	PM2.5_STR	PM2.5_PM	PM2.5_RUN	PM10_IDLE	PM10_STR	PM10_PM	PM10_RUN	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTS	ROG_RUNL	ROG_DIUR	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_HOTS	TOG_RUNL	TOG_DIUR	NH3_RUNEX	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNE	SOx_IDLEX	SOx_STREX
Sonoma	2023	HHDT	Aggregate	Aggregate	Gasoline	2.141088	64.14979	64.14979	0	42.83888	19.37457	0	1.966145	0.006267	0	0.002171	0.005	0.038744	0.006816	0	0.002361	0.02	0.110698	2630.84	0	50.44989	0.651889	0	5.88E-05	0.433617	0	0.035297	4.293194	0	0.000319	0.142497	1.30458	9.983974	6.264619	0	0.000349	0.142497	1.30458	9.983974	0.039278	149.6621	0	1.065876	0.026009	0	0.000499
Sonoma	2023	HHDT	Aggregate	Aggregate	Diesel	2320.139	228314.9	228314.9	0	27466	2.330147	48.96902	2.835808	0.024797	0.038402	0	0.008449	0.027656	0.025918	0.040118	0	0.033796	0.079018	1728.768	9030.512	0	0.001018	0.173775	0	0	0.272368	1.422761	0	0.021921	3.741321	0	0	0	0.024955	4.259209	0	0	0	0	0.210182	0.107523	53.12134	0	0.01637	0.085514	0
Sonoma	2023	HHDT	Aggregate	Aggregate	Electricity	1.429585	82.30065	0	82.30065	19.6434	0	0	0	0	0	0	0	0.008514	0.012976	0	0	0.034058	0.037075	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	HHDT	Aggregate	Aggregate	Natural Ga	161.9892	10833.92	10833.92	0	1287.202	0.903632	11.15328	0	0.002247	0.019616	0	0.009	0.048901	0.002444	0.021334	0	0.036	0.139717	1391.284	9052.592	0	1.426623	29.29621	0	0.283622	1.84543	0	0.047284	0.467016	0	0	0	0	1.486622	29.95411	0	0	0	0	0.839097	10.20041	65.66352	0	0	0	0
Sonoma	2023	LDA	Aggregate	Aggregate	Gasoline	140201.8	5262439	5262439	0	644521.6	0.059295	0	0.298414	0.001297	0	0.002079	0.002	0.003109	0.00141	0	0.002261	0.008	0.008884	283.822	0	73.43119	0.003214	0	0.084911	0.005776	0	0.035708	0.01303	0	0.403668	0.1081	0.288581	1.706309	0.919006	0	0.441964	0.1081	0.288581	1.706309	0.033404	0.905729	0	3.899936	0.002806	0	0.000726
Sonoma	2023	LDA	Aggregate	Aggregate	Diesel	988.5041	29470.85	29470.85	0	4150.248	0.348209	0	0	0.023129	0	0	0.002	0.003165	0.024174	0	0	0.008	0.009044	243.1248	0	0	0.001765	0	0	0.038304	0	0	0.037998	0	0	0	0	0	0.043258	0	0	0	0	0	0.0031	0.418295	0	0	0.002304	0	0
Sonoma	2023	LDA	Aggregate	Aggregate	Electricity	7093.829	326993.1	0	326993.1	35219.64	0	0	0	0	0	0	0.002	0.00153	0	0	0	0.008	0.004373	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	LDA	Aggregate	Aggregate	Plug-in Hyb	3231.76	148549.2	75529.18	73020.03	13363.33	0.003518	0	0.117555	0.000668	0	0.002106	0.002	0.001446	0.000727	0	0.00229	0.008	0.004132	145.3185	0	66.59465	0.000478	0	0.043969	0.000638	0	0.021285	0.001512	0	0.178903	0.041374	0.036838	0.442702	0.002207	0	0.195877	0.041374	0.036838	0.442702	0.019437	0.226042	0	1.393491	0.001437	0	0.000658
Sonoma	2023	LDT1	Aggregate	Aggregate	Gasoline	19002.79	581600.4	581600.4	0	81413.11	0.214532	0	0.531559	0.002328	0	0.003594	0.002	0.00378	0.002531	0	0.003908	0.008	0.0108	340.723	0	95.13331	0.01025	0	0.149079	0.014183	0	0.045489	0.04733	0	0.819082	0.248036	0.75551	3.91471	0.069041	0	0.896789	0.248036	0.75551	3.91471	0.03709	2.144812	0	8.002679	0.003368	0	0.00094
Sonoma	2023	LDT1	Aggregate	Aggregate	Diesel	22.87057	279.8337	279.8337	0	65.83652	1.639477	0	0	0.246551	0	0	0.002	0.004257	0.257699	0	0	0.008	0.012163	422.4502	0	0	0.014401	0	0	0.066557	0	0	0.310042	0	0	0	0	0	0.352962	0	0	0	0	0	0.0031	1.629464	0	0	0.004003	0	0
Sonoma	2023	LDT1	Aggregate	Aggregate	Electricity	32.19966	1244.43	0	1244.43	151.0795	0	0	0	0	0	0	0.002	0.001539	0	0	0	0.008	0.004398	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	LDT1	Aggregate	Aggregate	Plug-in Hyb	8.801713	439.4297	202.9572	236.4725	36.39509	0.003195	0	0.117545	0.000407	0	0.001429	0.002	0.001449	0.000443	0	0.001554	0.008	0.00414	132.016	0	72.57405	0.000433	0	0.0439	0.000577	0	0.021227	0.001374	0	0.178878	0.024509	0.021944	0.281269	0.002005	0	0.195848	0.024509	0.021944	0.281269	0.019398	0.205393	0	1.393244	0.001305	0	0.000717
Sonoma	2023	LDT2	Aggregate	Aggregate	Gasoline	68762.84	2538989	2538989	0	318047.7	0.096569	0	0.409699	0.001367	0	0.002108	0.002	0.003602	0.001486	0	0.002292	0.008	0.01029	354.3607	0	92.63473	0.003763	0	0.098861	0.007416	0	0.041318	0.015538	0	0.477377	0.10059	0.27602	1.65078	0.02267	0	0.522667	0.10059	0.27602	1.65078	0.034848	1.027786	0	4.510024	0.003503	0	0.000916
Sonoma	2023	LDT2	Aggregate	Aggregate	Diesel	299.0973	11473.63	11473.63	0	1402.417	0.073359	0	0	0.00763	0	0	0.002	0.003599	0.007975	0	0	0.008	0.010284	327.8415	0	0	0.000819	0	0	0.051652	0	0	0.017643	0	0	0	0	0	0.020085	0	0	0	0	0	0.0031	0.162792	0	0	0.003106	0	0
Sonoma	2023	LDT2	Aggregate	Aggregate	Electricity	217.5584	8209.676	0	8209.676	1114.714	0	0	0	0	0	0	0.002	0.001525	0	0	0	0.008	0.004356	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	LDT2	Aggregate	Aggregate	Plug-in Hyb	348.4227	16752.69	8071.665	8681.024	1440.728	0.003333	0	0.117544	0.000531	0	0.001783	0.002	0.001447	0.000577	0	0.001939	0.008	0.004135	137.7195	0	79.13986	0.000452	0	0.043923	0.000603	0	0.021249	0.001433	0	0.178875	0.026108	0.024613	0.312324	0.002091	0	0.195846	0.026108	0.024613	0.312324	0.020177	0.214274	0	1.393223	0.001361	0	0.000782
Sonoma	2023	LHDT1	Aggregate	Aggregate	Gasoline	8377.036	299542.4	299542.4	0	124805.4	0.290217	0.038975	0.680294	0.001966	0	0.000433	0.002	0.0273	0.002138	0	0.000471	0.008	0.078	922.5457	121.7775	25.99916	0.014115	0.118106	0.038158	0.01561	0.003014	0.051683	0.072464	0.44597	0.195168	0.062801	0.35795	3.617907	0.105739	0.650758	0.213684	0.062801	0.35795	3.617907	0.044827	1.65865	3.738799	3.108324	0.00912	0.001204	0.000257
Sonoma	2023	LHDT1	Aggregate	Aggregate	Diesel	8519.397	304773.3	304773.3	0	107163.3	2.646871	2.32973	0	0.052217	0.027122	0	0.003	0.0273	0.054578	0.028349	0	0.012	0.078	643.1304	137.3153	0	0.011147	0.005098	0	0.101325	0.021634	0	0.239984	0.10976	0	0	0	0	0.273206	0.124954	0	0	0	0	0.138237	0.723708	0.909745	0	0.006094	0.001301	0
Sonoma	2023	LHDT2	Aggregate	Aggregate	Gasoline	1284.776	48628.54	48628.54	0	19141.24	0.177759	0.037957	0.652357	0.001412	0	0.000254	0.002	0.03185	0.001536	0	0.000276	0.008	0.091	1004.818	139.3689	25.76474	0.007195	0.119472	0.03399	0.010641	0.003132	0.052198	0.034284	0.435228	0.166581	0.04334	0.23012	2.436474	0.050027	0.635084	0.182386	0.04334	0.23012	2.436474	0.044965	0.996769	3.762493	3.095596	0.009934	0.001378	0.000255
Sonoma	2023	LHDT2	Aggregate	Aggregate	Diesel	2964.586	114169.6	114169.6	0	3729.076	1.725429	2.226171	0	0.041495	0.026706	0	0.003	0.03185	0.043371	0.027913	0	0.012	0.091	782.5806	217.0069	0	0.008967	0.005098	0	0.123296	0.03419	0	0.193063	0.10976	0	0	0	0	0.21979	0.124954	0	0	0	0	0.168066	0.530448	0.909745	0	0.007415	0.002056	0
Sonoma	2023	MCY	Aggregate	Aggregate	Gasoline	10151.85	54897.63	54897.63	0	20303.69	0.699628	0	0.182585	0.001897	0	0.003789	0.001	0.0042	0.00202	0	0.004011	0.004	0.012	192.7474	0	57.26244	0.206325	0	0.225191	0.045236	0	0.010361	1.43511	0	1.727266	3.55027	3.890255	4.853921	1.68944	0	1.876677	3.55027	3.890255	4.853921	0.008471	16.43081	0	8.789149	0.001906	0	0.000566
Sonoma	2023	MDV	Aggregate	Aggregate	Gasoline	47948.72	1673482	1673482	0	217256.9	0.146165	0	0.569656	0.001421	0	0.002384	0.002	0.003705	0.001545	0	0.002592	0.008	0.010586	432.743	0	114.2267	0.005398	0	0.131552	0.009998	0	0.047794	0.023869	0	0.694406	0.128056	0.374318	2.15406	0.034768	0	0.760277	0.128056	0.374318	2.15406	0.03436	1.266239	0	5.271119	0.004278	0	0.001129
Sonoma	2023	MDV	Aggregate	Aggregate	Diesel	1034.813	39273.07	39273.07	0	4829.975	0.087411	0	0	0.007538	0	0	0.002	0.003676	0.007879	0	0	0.008	0.010502	425.3579	0	0	0.000712	0	0	0.067015	0	0	0.015336	0	0	0	0	0	0.017459	0	0	0	0	0	0.0031	0.244654	0	0	0.00403	0	0
Sonoma	2023	MDV	Aggregate	Aggregate	Electricity	227.351	8624.233	0	8624.233	1167.1	0	0	0	0	0	0	0.002	0.001524	0	0	0	0.008	0.004354	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	MDV	Aggregate	Aggregate	Plug-in Hyb	240.1999	11159.57	5611.933	5547.638	993.2267	0.003479	0	0.117551	0.000715	0	0.002305	0.002	0.001447	0.000778	0	0.002507	0.008	0.004134	143.7327	0	99.28385	0.000473	0	0.043974	0.000631	0	0.021292	0.001496	0	0.178895	0.030696	0.029376	0.365444	0.002182	0	0.195868	0.030696	0.029376	0.365444	0.021121	0.223594	0	1.393412	0.001421	0	0.000982
Sonoma	2023	MH	Aggregate	Aggregate	Gasoline	1193.561	10262.58	10262.58	0	119.4039	0.562263	0	0.422772	0.001857	0	0.000431	0.003	0.015758	0.002019	0	0.000469	0.012	0.045024	1949.172	0	32.08554	0.020216	0	0.039334	0.031846	0	0.042449	0.091863	0	0.170596	14.20297	0.335756	5.277113	0.134046	0	0.186781	14.20297	0.335756	5.277113	0.04472	2.316872	0	3.747105	0.01927	0	0.000317
Sonoma	2023	MH	Aggregate	Aggregate	Diesel	585.8022	5566.106	5566.106	0	58.58022	4.708088	0	0	0.123218	0	0	0.004	0.01568	0.128789	0	0	0.016	0.044799	1080.322	0	0	0.006393	0	0	0.170205	0	0	0.137635	0	0	0	0	0	0.156688	0	0	0	0	0	0.130942	0.470191	0	0	0.010237	0	0
Sonoma	2023	MHDT	Aggregate	Aggregate	Gasoline	672.6531	33092.13	33092.13	0	13458.44	0.647929	0.087754	0.452484	0.001526	0	0.000646	0.003	0.015757	0.00166	0	0.000703	0.012	0.045021	1815.986	538.9668	47.76696	0.021621	0.25248	0.04965	0.02935	0.006946	0.031624	0.111045	1.008612	0.28464	0.04186	0.352633	3.356943	0.162036	1.471764	0.311645	0.04186	0.352633	3.356943	0.044896	2.372906	15.27703	6.335091	0.017953	0.005328	0.000472
Sonoma	2023	MHDT	Aggregate	Aggregate	Diesel	5073.931	223350.4	223350.4	0	59664.4	1.21362	13.05844	1.686033	0.014847	0.036157	0	0.003	0.015841	0.015518	0.037791	0	0.012	0.04526	1140.088	2263.282	0	0.001472	0.012563	0	0.179621	0.356581	0	0.031686	0.270484	0	0	0	0	0.036072	0.307925	0	0	0	0	0.211459	0.119351	7.657894	0	0.010796	0.021432	0
Sonoma	2023	MHDT	Aggregate	Aggregate	Electricity	1.942294	44.56289	0	44.56289	23.07529	0	0	0	0	0	0	0.003	0.007924	0	0	0	0.012	0.022639	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	MHDT	Aggregate	Aggregate	Natural Ga	30.61999	1584.177	1584.177	0	322.9517	0.142518	6.002312	0	0.001057	0.015993	0	0.003	0.01589	0.00115	0.017394	0	0.012	0.045401	965.0919	4864.204	0	0.688581	16.2618	0	0.19674	0.9916	0	0.009838	0.232349	0	0	0	0	0.702748	16.59636	0	0	0	0	1.06	2.908672	30.41557	0	0	0	0
Sonoma	2023	OBUS	Aggregate	Aggregate	Gasoline	175.9246	8189.992	8189.992	0	3519.9	0.671387	0.864853	0.41813	0.001042	0	0.000331	0.003	0.015684	0.001133	0	0.00036	0.012	0.044811	1786.995	381.2393	32.36634	0.017847	0.19334	0.037738	0.029526	0.005207	0.030312	0.088806	0.743141	0.204225	0.035481	0.164054	2.930525	0.129585	1.084389	0.223601	0.035481	0.164054	2.930525	0.044927	1.983247	5.755825	4.368305	0.017666	0.003769	0.00032
Sonoma	2023	OBUS	Aggregate	Aggregate	Diesel	166.0528	12485.04	12485.04	0	1898.862	1.563977	11.45315	1.605992	0.031889	0.015795	0	0.003	0.019487	0.033341	0.016509	0	0.012	0.055678	1380.127	2402.406	0	0.00303	0.036946	0	0.21744	0.3785	0	0.065244	0.795442	0	0	0	0	0.074275	0.90555	0	0	0	0	0.213853	0.208233	12.38702	0	0.013069	0.022749	0
Sonoma	2023	OBUS	Aggregate	Aggregate	Natural Ga	1.006981	68.10798	68.10798	0	8.962128	0.212165	1.545028	0	0.000959	0.003718	0	0.003	0.016148	0.001043	0.004043	0	0.012	0.046137	1037.042	1216.052	0	0.77819	4.330901	0	0.211408	0.2479	0	0.011119	0.06188	0	0	0	0	0.7942	4.420002	0	0	0	0	1.06	3.223057	6.943588	0	0	0	0
Sonoma	2023	SBUS	Aggregate	Aggregate	Gasoline	58.98136	3054.818	3054.818	0	235.9254	0.213389	0.926353	0.705531	0.000798	0	0.000537	0.002	0.015721	0.000868	0	0.000584	0.008	0.044917	812.6628	2598.494	56.07477	0.004134	2.505189	0.064799	0.016251	0.09044	0.06867	0.019032	10.63893	0.355997	0.090213	0.158514	1.104106	0.027771	15.5243	0.389772	0.090213	0.158514	1.104106	0.045	0.450305	82.22516	9.118099	0.008034	0.025689	0.000554
Sonoma	2023	SBUS	Aggregate	Aggregate	Diesel	392.462	9102.481	9102.481	0	5682.849	3.772994	22.20889	0.448307	0.019663	0.018404	0	0.003	0.015721	0.020552	0.019237	0	0.012	0.044917	1174.814	2276.374	0	0.002898	0.008166	0	0.185092	0.358644	0	0.062389	0.175804	0	0	0	0	0.071025	0.20014	0	0	0	0	0.139923	0.185909	4.491344	0	0.011125	0.021556	0
Sonoma	2023	SBUS	Aggregate	Aggregate	Electricity	0.088846	1.032148	0	1.032148	1.286494	0	0	0	0	0	0	0.003	0.00786	0	0	0	0.012	0.022459	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	SBUS	Aggregate	Aggregate	Natural Ga	26.87638	687.8114	687.8114	0	389.17	0.653469	5.324535	0	0.003378	0.010078	0	0.003	0.015721	0.003674	0.010961	0	0.012	0.044917	1276.873	3943.681	0	3.668975	15.91893	0	0.260299	0.803945	0	0.052422	0.22745	0	0	0	0	0.744458	16.24643	0	0	0	0	1.06	12.7422	17.86217	0	0	0	0
Sonoma	2023	UBUS	Aggregate	Aggregate	Gasoline	49.01023	3621.417	3621.417	0	196.0409	0.089606	0	0.615787	0.001012	0	0.000315	0.002	0.033765	0.001101	0	0.000343	0.009	0.159152	0.096472	1192.443	0	59.36216	0.00254	0	0.070823	0.009238	0	0.075307	0.00772	0	0.279322	0.04654	0.100799	0.524579	0.011265	0	0.305822	0.04654	0.100799	0.524579	0.045	0.502829	0	7.460654	0.011789	0	0.000587
Sonoma	2023	UBUS	Aggregate	Aggregate	Diesel	43.37245	3876.507	3876.507	0	173.4898	0.352774	0	0	0.006411	0	0	0.002	0.007664	0.0385	0.006701	0	0	0.030656	0.11	1164.167	0	0.002998	0	0	0.183413	0	0	0.064545	0	0	0	0	0	0.07348	0	0	0	0	0	0.22	0.072564	0	0	0.011031	0	0
Sonoma	2023	UBUS	Aggregate	Aggregate	Electricity	1.009351	26.88826	0	26.88826	4.037406	0	0	0	0	0	0	0.003	0.01925	0	0	0	0.012	0.055	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2023	UBUS	Aggregate	Aggregate	Natural Ga	45.47028	5664.459	5664.459	0	181.8811	0.443098	0	0	0.000154	0	0	0.008125	0.0385	0.000161	0	0	0.0325	0.11	1473.841	0	0	1.366821	0	0	0.300452	0	0	0.019529	0	0	0	0	0	1.394941	0	0	0	0	0	0.97	22.74258	0	0	0	0	0

Source: EMFAC2021 (v1.0.1) Emission Rates
Region Type: County
Region: Sonoma
Calendar Year: 2024
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

Region	Calendar Y	Vehicle Cat	Model Yea	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	NOx_RUNE	NOx_IDLEX	NOx_STREX	PM2.5_RU	PM2.5_IDL	PM2.5_STR	PM2.5_PM	PM2.5_PM	PM10_RUN	PM10_IDLE	PM10_STR	PM10_PM	PM10_PM	CO2_RUNE	CO2_IDLEX	CO2_STREX	CH4_RUNE	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTS	ROG_RUNL	ROG_DIUR	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_HOTS	TOG_RUNL	TOG_DIUR	NH3_RUNEX	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNE	SOx_IDLEX	SOx_STREX
Sonoma	2024	HHDT	Aggregate	Aggregate	Gasoline	1.608224	54.77772	54.77772	0	32.17734	17.0318	0	1.710583	0.00528	0	0.002014	0.005	0.037656	0.005742	0	0.00219	0.02	0.107587	2518.174	0	50.60987	0.536698	0	6.64E-05	0.391695	0	0.0312	3.477915	0	0.00036	0.136397	1.24959	9.587823	5.074965	0	0.000395	0.136397	1.24959	9.587823	0.040424	121.4007	0	1.308573	0.024895	0	0.0005
Sonoma	2024	HHDT	Aggregate	Aggregate	Diesel	2371.664	230054.8	2300054.8	0	28188.22	2.242603	48.56909	2.892769	0.02449	0.035161	0	0.008449	0.027536	0.025598	0.03675	0	0.033795	0.078674	1708.226	8911.709	0	0.000977	0.17379	0	0	0.269132	1.404043	0	0.021032	3.741653	0	0	0	0	0.023943	4.259587	0	0	0	0	0.211174	0.102628	53.40066	0	0.016176	0.084389	0
Sonoma	2024	HHDT	Aggregate	Aggregate	Electricity	6.196545	584.9342	0	584.9342	72.70847	0	0	0	0	0	0	0.008418	0.01408	0	0	0	0.033671	0.040229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	HHDT	Aggregate	Aggregate	Natural Ga	171.2577	11229.14	11229.14	0	1352.875	0.825217	10.83035	0	0.002141	0.019848	0	0.009	0.049647	0.002329	0.021587	0	0.036	0.141848	1380.874	9009.978	0	1.351381	28.38005	0	0.2815	1.836743	0	0.042918	0.447167	0	0	0	0	1.406082	29.0114	0	0	0	0	0.831267	9.982727	65.61282	0	0	0	0
Sonoma	2024	LDA	Aggregate	Aggregate	Gasoline	140284	5304989	5304989	0	645118	0.052317	0	0.281941	0.00125	0	0.001998	0.002	0.003109	0.00136	0	0.002173	0.008	0.008882	279.0788	0	71.87062	0.002854	0	0.079694	0.005349	0	0.034745	0.011333	0	0.37521	0.102801	0.275207	1.638256	0.016537	0	0.408618	0.102801	0.275207	1.638256	0.034296	0.839731	0	3.645336	0.002759	0	0.000711
Sonoma	2024	LDA	Aggregate	Aggregate	Diesel	922.4281	27127.11	27127.11	0	3848.774	0.316542	0	0	0.021217	0	0	0.002	0.003175	0.022176	0	0	0.008	0.009071	241.4597	0	0	0.001636	0	0	0.038042	0	0	0.035217	0	0	0	0	0	0	0.040093	0	0	0	0	0	0.0031	0.405291	0	0	0.002288	0	0
Sonoma	2024	LDA	Aggregate	Aggregate	Electricity	8159.075	387247	0	387247	40349.51	0	0	0	0	0	0	0.002	0.001531	0	0	0	0.008	0.004375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	LDA	Aggregate	Aggregate	Plug-in Hyb	3637.796	166766	82861.11	83904.92	15042.29	0.003438	0	0.117553	0.000623	0	0.002012	0.002	0.001449	0.000677	0	0.002188	0.008	0.00414	142.0154	0	65.86801	0.000466	0	0.043832	0.00062	0	0.022161	0.001478	0	0.1789	0.041577	0.038208	0.444471	0.002156	0	0.195873	0.041577	0.038208	0.444471	0.019278	0.220923	0	1.393458	0.001404	0	0.000651
Sonoma	2024	LDT1	Aggregate	Aggregate	Gasoline	18023.11	552905.4	552905.4	0	7708.14	0.194865	0	0.505278	0.002188	0	0.003388	0.002	0.003784	0.00238	0	0.003684	0.008	0.010811	336.55	0	93.30549	0.009293	0	0.140804	0.013106	0	0.04434	0.042673	0	0.766864	0.238553	0.71921	3.773489	0.062259	0	0.839618	0.238553	0.71921	3.773489	0.037068	1.981456	0	7.499655	0.003327	0	0.000922
Sonoma	2024	LDT1	Aggregate	Aggregate	Diesel	20.60225	244.6154	244.6154	0	58.14214	1.636843	0	0	0.246171	0	0	0.002	0.004256	0.257302	0	0	0.008	0.012159	422.3585	0	0	0.014377	0	0	0.066543	0	0	0.309523	0	0	0	0	0	0	0.352372	0	0	0	0	0	0.0031	1.627624	0	0	0.004002	0	0
Sonoma	2024	LDT1	Aggregate	Aggregate	Electricity	35.63983	1465.823	0	1465.823	168.144	0	0	0	0	0	0	0.002	0.001538	0	0	0	0.008	0.004393	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	LDT1	Aggregate	Aggregate	Plug-in Hyb	13.64134	678.1406	303.6026	374.538	56.40696	0.003097	0	0.117545	0.000385	0	0.001393	0.002	0.001453	0.000419	0	0.001515	0.008	0.00415	127.9709	0	71.52982	0.000418	0	0.043712	0.000555	0	0.021056	0.001332	0	0.178878	0.023998	0.021067	0.274527	0.001943	0	0.195849	0.023998	0.021067	0.274527	0.018803	0.199115	0	1.393249	0.001265	0	0.000707
Sonoma	2024	LDT2	Aggregate	Aggregate	Gasoline	68818.2	2551279	2551279	0	318009.1	0.086324	0	0.382873	0.001326	0	0.002056	0.002	0.003605	0.001442	0	0.002236	0.008	0.010299	347.9168	0	90.66289	0.00344	0	0.093686	0.006881	0	0.039889	0.014017	0	0.447511	0.097176	0.269155	1.619053	0.020454	0	0.489968	0.097176	0.269155	1.619053	0.035633	0.96156	0	4.255963	0.00344	0	0.000896
Sonoma	2024	LDT2	Aggregate	Aggregate	Diesel	298.8811	11433.07	11433.07	0	1399.326	0.063065	0	0	0.006168	0	0	0.002	0.003617	0.006447	0	0	0.008	0.010335	323.6061	0	0	0.000722	0	0	0.050984	0	0	0.015549	0	0	0	0	0	0	0.017701	0	0	0	0	0	0.0031	0.1571	0	0	0.003066	0	0
Sonoma	2024	LDT2	Aggregate	Aggregate	Electricity	315.211	11817.29	0	11817.29	1608.99	0	0	0	0	0	0	0.002	0.001526	0	0	0	0.008	0.004359	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	LDT2	Aggregate	Aggregate	Plug-in Hyb	431.6497	20544.47	9645.648	10898.83	1784.872	0.003248	0	0.117545	0.000491	0	0.001693	0.002	0.001451	0.000535	0	0.001841	0.008	0.004145	134.2042	0	78.26704	0.000439	0	0.043732	0.000583	0	0.021074	0.001396	0	0.178878	0.025853	0.023854	0.303829	0.002038	0	0.195849	0.025853	0.023854	0.303829	0.019674	0.20882	0	1.393248	0.001327	0	0.000774
Sonoma	2024	LHDT1	Aggregate	Aggregate	Gasoline	8082.811	289644	289644	0	120421.8	0.268988	0.038318	0.670281	0.0019	0	0.000411	0.002	0.0273	0.002066	0	0.000447	0.008	0.078	909.4114	121.0914	26.04851	0.013118	0.116649	0.037152	0.014465	0.002997	0.051346	0.067245	0.438523	0.189505	0.060996	0.351825	3.572821	0.098123	0.639891	0.207484	0.060996	0.351825	3.572821	0.044853	1.587332	3.741131	3.136721	0.00899	0.001197	0.000258
Sonoma	2024	LHDT1	Aggregate	Aggregate	Diesel	8213.836	290995.1	290995.1	0	103319.7	2.513428	2.291347	0	0.050901	0.026946	0	0.003	0.0273	0.053202	0.028165	0	0.012	0.078	642.3917	136.6595	0	0.010859	0.005098	0	0.101209	0.021531	0	0.233791	0.10976	0	0	0	0	0.266156	0.124954	0	0	0	0	0.142603	0.702644	0.909745	0	0.006087	0.001295	0
Sonoma	2024	LHDT1	Aggregate	Aggregate	Electricity	14.0715	1093.441	0	1093.441	196.57	0	0	0	0	0	0	0.002	0.01365	0	0	0	0.008	0.039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	LHDT2	Aggregate	Aggregate	Gasoline	1245.302	46513.27	46513.27	0	18553.14	0.165586	0.037406	0.644856	0.001371	0	0.000237	0.002	0.03185	0.001491	0	0.000258	0.008	0.091	996.3305	138.8077	25.63666	0.006534	0.117957	0.033234	0.009994	0.0031	0.051677	0.030855	0.428984	0.162329	0.042294	0.226336	2.421357	0.045024	0.625973	0.177729	0.042294	0.226336	2.421357	0.044972	0.944855	3.764715	3.083285	0.00985	0.001372	0.000253
Sonoma	2024	LHDT2	Aggregate	Aggregate	Diesel	2917.809	110729.5	110729.5	0	36702.36	1.647269	2.182286	0	0.040887	0.02672	0	0.003	0.03185	0.042736	0.027928	0	0.012	0.091	779.3962	215.8985	0	0.008786	0.005098	0	0.122794	0.034015	0	0.189148	0.10976	0	0	0	0	0.215332	0.124954	0	0	0	0	0.171008	0.52097	0.909745	0	0.007385	0.002046	0
Sonoma	2024	LHDT2	Aggregate	Aggregate	Electricity	3.642145	268.1505	0	268.1505	48.21097	0	0	0	0	0	0	0.002	0.015925	0	0	0	0.008	0.0455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	MCY	Aggregate	Aggregate	Gasoline	9945.696	53457.73	53457.73	0	19891.39	0.683414	0	0.176824	0.00187	0	0.003524	0.001	0.0042	0.001993	0	0.003735	0.004	0.012	192.1219	0	56.25802	0.200724	0	0.220225	0.044539	0	0.010054	1.386222	0	1.685032	3.55202	3.910604	4.895034	1.636862	0	1.830926	3.55202	3.910604	4.895034	0.008524	15.97023	0	8.756079	0.001899	0	0.000556
Sonoma	2024	MDV	Aggregate	Aggregate	Gasoline	47129.64	1652297	1652297	0	213400.9	0.127353	0	0.526478	0.00135	0	0.002241	0.002	0.003705	0.001468	0	0.002437	0.008	0.010587	425.4376	0	111.8727	0.004758	0	0.122775	0.00905	0	0.045764	0.020663	0	0.639832	0.123934	0.368907	2.13872	0.030136	0	0.700533	0.123934	0.368907	2.13872	0.035029	1.146297	0	4.88379	0.004206	0	0.001106
Sonoma	2024	MDV	Aggregate	Aggregate	Diesel	1017.345	37734.35	37734.35	0	4706.261	0.08223	0	0	0.007415	0	0	0.002	0.003719	0.00775	0	0	0.008	0.010625	422.7238	0	0	0.000703	0	0	0.0666	0	0	0.015129	0	0	0	0	0	0	0.017223	0	0	0	0	0	0.0031	0.246667	0	0	0.004006	0	0
Sonoma	2024	MDV	Aggregate	Aggregate	Electricity	336.2868	12653.18	0	12653.18	1718.806	0	0	0	0	0	0	0.002	0.001525	0	0	0	0.008	0.004358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	MDV	Aggregate	Aggregate	Plug-in Hyb	291.6522	13545.32	6577.775	6967.549	1205.982	0.00336	0	0.117551	0.000633	0	0.002113	0.002	0.00145	0.000689	0	0.002299	0.008	0.004144	138.8017	0	97.65693	0.000454	0	0.043786	0.000604	0	0.021121	0.001444	0	0.178893	0.031669	0.028155	0.349107	0.002108	0	0.195865	0.031669	0.028155	0.349107	0.020396	0.215941	0	1.393391	0.001372	0	0.000965
Sonoma	2024	MH	Aggregate	Aggregate	Gasoline	1113.896	9613.321	9613.321	0	111.4342	0.520865	0	0.432494	0.001775	0	0.000413	0.003	0.015758	0.00193	0	0.000449	0.012	0.045024	1948.651	0	31.90724	0.018343	0	0.038978	0.030171	0	0.043939	0.082191	0	0.167009	13.74302	0.328438	5.243128	0.119934	0	0.182854	13.74302	0.328438	5.243128	0.044787	2.017338	0	3.642321	0.019264	0	0.000315
Sonoma	2024	MH	Aggregate	Aggregate	Diesel	577.6919	5397.988	5397.988	0	57.76819	4.643384	0	0	0.120736	0	0	0.004	0.01568	0.126195	0	0	0.016	0.044799	1080.422	0	0	0.006366	0	0	0.170221	0	0	0.137067	0	0	0	0	0	0	0.156041	0	0	0	0	0	0.113498	0.467439	0	0	0.010238	0	0
Sonoma	2024	MHDT	Aggregate	Aggregate	Gasoline	646.6174	31951.97	31951.97	0	12937.52	0.5641	0.087987	0.440036	0.00147	0	0.000602	0.003	0.015757	0.001599	0	0.000655	0.012	0.045021	1801.526	535.9975	47.13884	0.018277	0.255712	0.048607	0.026263	0.007123	0.031656	0.092782	1.011968	0.275753	0.038456	0.321996	3.121864	0.135387	1.476662	0.301915	0.038456	0.321996	3.121864	0.044953	1.967229	15.31105	6.098532	0.01781	0.005299	0.000466
Sonoma	2024	MHDT	Aggregate	Aggregate	Diesel	5140.295	224256.9	224256.9	0	60492.94	1.135698	12.70178	1.702469	0.013059	0.030055	0	0.003	0.015841	0.01365	0.031414	0	0.012	0.04526	1136.212	2250.187	0	0.0013	0.011775	0	0.179011	0.354518	0	0.027997	0.253516	0	0	0	0	0.031872	0.288608	0	0	0	0	0.212621	0.110056	7.617781	0	0.010759	0.021308	0
Sonoma	2024	MHDT	Aggregate	Aggregate	Electricity	12.12558	648.3102	0	648.3102	149.1578	0	0	0	0	0	0	0.003	0.00792	0	0	0	0.012	0.022628	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	MHDT	Aggregate	Aggregate	Natural Ga	33.03412	1667.859	1667.859	0	347.4564	0.134524	5.994809	0	0.001102	0.016523	0	0.003	0.015896	0.001199	0.01797	0	0.012	0.045419	960.9456	4884.12	0	0.696297	16.04141	0	0.195895	0.99566	0	0.009949	0.2292	0	0	0	0	0.710622	16.37144	0	0	0	0	1.06	2.910031	31.59913	0	0	0	0
Sonoma	2024	OBUS	Aggregate	Aggregate	Gasoline	167.1966	7628.652	7628.652	0	3345.27	0.628615	0.064919	0.422292	0.001038	0	0.000317	0.003	0.015684	0.001129	0	0.000345	0.012	0.044811	1775.12	379.8341	32.19998	0.016157	0.193774	0.037707	0.02786	0.005233	0.030598	0.079758	0.744136	0.204104	0.035195	0.166816	3.022436	0.116382	1.085842	0.223469	0.035195	0.166816	3.022436	0.044974	1.772212	5.761782	4.323706	0.017549	0.003755	0.000318
Sonoma	2024	OBUS	Aggregate	Aggregate	Diesel	169.8632	12489.36	12489.36	0	1943.154	1.530294	11.39189	1.611163	0.030802	0.014417	0	0.003	0.019498	0.032195	0.015069	0	0.012	0.055707	1371.362	2385.042	0	0.002915	0.036798	0	0.216059	0.375764	0	0.062758	0.792256	0	0	0	0	0.071445	0.901923	0	0	0	0	0.214082	0.2015	12.39254	0	0.012986	0.022585	0
Sonoma	2024	OBUS	Aggregate	Aggregate	Electricity	0.21605	19.19194	0	19.19194	4.322737	0	0	0	0	0	0	0.003	0.007843	0	0	0	0.012	0.022408	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	OBUS	Aggregate	Aggregate	Natural Ga	1.146219	76.54844	76.54844	0	10.20135	0.186674	1.534396	0	0.00108	0.003971	0	0.003	0.016148	0.001175	0.004319	0	0.012	0.046137	1020.927	1214.117	0	0.79212	4.199637	0	0.208123	0.247506	0	0.011318	0.060005	0	0	0	0	0.808416	4.286038	0	0	0	0	1.06	3.260585	7.515352	0	0	0	0
Sonoma	2024	SBUS	Aggregate	Aggregate	Gasoline	60.18335	3134.506	3134.506	0	240.7334	0.217513	0.926391	0.727682	0.000805	0	0.000542	0.002	0.015721	0.000875	0	0.00059	0.008	0.044917	810.244	2591.316	55.88573	0.004015	2.507274	0.065376	0.016502	0.089878	0.070254	0.018449	10.63948	0.358983	0.090708	0.160025	1.111555	0.026921	15.5251	0.393041	0.090708	0.160025	1.111555	0.045	0.438725	82.22848	9.068189	0.00801	0.025618	0.000552
Sonoma	2024	SBUS	Aggregate	Aggregate	Diesel	395.7844	9082.046	9082.046	0	5730.958	3.624019	21.80504	0.461047	0.018976	0.017428	0	0.003	0.015721	0.019834	0.018216	0	0.012	0.044917	1170.823	2267.537	0	0.002859	0.008127	0	0.184464	0.357251	0	0.061545	0.174971	0	0	0	0	0.070065	0.199191	0	0	0	0	0.143132	0.184331	4.569413	0	0.011087	0.021472	0
Sonoma	2024	SBUS	Aggregate	Aggregate	Electricity	0.874713	25.42456	0	25.42456	11.42416	0	0	0	0	0	0	0.002	0.00786	0	0	0	0.011032	0.022459	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	SBUS	Aggregate	Aggregate	Natural Ga	27.30406	690.0046	690.0046	0	395.3628	0.644021	5.318822	0	0.003378	0.010214	0	0.003	0.015721	0.003674	0.011109	0	0.012	0.044917	1272.607	3948.877	0	3.643017	15.84838	0	0.259429	0.805004	0	0.052052	0.226442	0	0	0	0	3.717966	16.17444	0	0	0	0	1.06	12.62004	18.16945	0	0	0	0
Sonoma	2024	UBUS	Aggregate	Aggregate	Gasoline	49.15534	3632.14	3632.14	0	196.6214	0.093381	0	0.588913	0.001111	0	0.000335	0.002	0.033765	0.001209	0	0.000364	0.009152	0.096472	1168.196	0	58.98479	0.002397	0	0.068502	0.009393	0	0.071842	0.007256	0	0.269888	0.043207	0.102047	0.498698	0.010587	0	0.295493	0.043207	0.102047	0.498698	0.045	0.507024	0	7.501409	0.011549	0	0.000583
Sonoma	2024	UBUS	Aggregate	Aggregate	Diesel	47.15633	4260.635	4260.635	0	188.6253	0.358846	0	0	0.006522	0	0	0.007779	0.0385	0.006816	0	0	0.031118	0.11	1172.051	0	0	0.003037	0	0	0.184657	0	0	0.065391	0	0	0	0	0	0.074442	0	0	0	0	0	0.22	0.073798	0	0	0.011106	0	0
Sonoma	2024	UBUS	Aggregate	Aggregate	Electricity	1.009351	26.88826	0	26.88826	4.037406	0	0	0	0	0	0	0.003	0.01925	0	0	0	0.012	0.055	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2024	UBUS	Aggregate	Aggregate	Natural Ga	41.95244	5308.66	5308.66	0	167.8098	0.424471	0	0	0.000158	0	0	0.008065	0.0385	0.000165	0	0	0.032259	0.11	1460.863	0	0	1.468537	0	0	0.297806	0	0	0.020982	0	0	0	0	0	1.49875	0	0	0	0	0	0.97	23.55344	0	0	0	0	0

Source: EMFAC2021 (v1.0.1) Emission Rates
Region Type: County
Region: Sonoma
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

Region	Calendar Y	Vehicle Cat	Model Yea	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RU	PM2.5_IDL	PM2.5_STR	PM2.5_PM	PM2.5_PM	PM10_RUN	PM10_IDLE	PM10_STR	PM10_PM	PM10_PM	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNE	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTS	ROG_RUNL	ROG_DIUR	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_HOTS	TOG_RUNL	TOG_DIUR	NH3_RUNEX	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNE	SOx_IDLEX	SOx_STREX
Sonoma	2025	HHDT	Aggregate	Aggregate	Gasoline	1.21518	48.59365	48.59365	0	24.31331	13.73028	0	1.440054	0.004235	0	0.001807	0.005	0.036447	0.004606	0	0.001965	0.02	0.104133	2397.082	0	50.80033	0.425413	0	8.67E-05	0.331337	0	0.026677	2.694014	0	0.00047	0.127801	1.171774	9.031115	3.931099	0	0.000515	0.127801	1.171774	9.031115	0.041149	92.94988	0	1.652463	0.023698	0	0.000502
Sonoma	2025	HHDT	Aggregate	Aggregate	Diesel	2421.525	231305.3	231305.3	0	28846.83	2.155158	48.1138	2.93078	0.024118	0.032634	0	0.008845	0.027463	0.025208	0.034109	0	0.0338	0.078465	1684.799	8766.192	0	0.000938	0.17352	0	0.265441	1.381117	0	0.020199	3.735832	0	0	0	0	0.022995	4.252961	0	0	0	0	0.211893	0.097805	53.53372	0	0.015954	0.083011	0
Sonoma	2025	HHDT	Aggregate	Aggregate	Electricity	15.74556	1540.802	0	1540.802	176.6748	0	0	0	0	0	0	0.008288	0.013962	0	0	0	0.03315	0.039893	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	HHDT	Aggregate	Aggregate	Natural Ga	179.8749	11562.85	11562.85	0	1413.563	0.754642	10.53118	0	0.002054	0.020129	0	0.009	0.050376	0.002234	0.021893	0	0.036	0.143932	1370.045	8965.81	0	1.281121	27.51004	0	0.279293	1.827739	0	0.039102	0.429054	0	0	0	0	1.331173	28.11701	0	0	0	0	0.823694	9.76792	65.68454	0	0	0	0
Sonoma	2025	LDA	Aggregate	Aggregate	Gasoline	140486.4	5322382	5322382	0	646120	0.046823	0	0.267445	0.001211	0	0.001939	0.002	0.003108	0.001317	0	0.002109	0.008	0.00888	274.3141	0	70.37815	0.002564	0	0.074887	0.005004	0	0.033781	0.010003	0	0.34642	0.098815	0.267104	1.595624	0.014597	0	0.379286	0.098815	0.267104	1.595624	0.035182	0.785745	0	3.425075	0.002712	0	0.000696
Sonoma	2025	LDA	Aggregate	Aggregate	Diesel	851.5984	24681.27	24681.27	0	3537.917	0.286196	0	0	0.019618	0	0	0.002	0.003184	0.020506	0	0	0.008	0.009097	239.6326	0	0	0.001534	0	0	0.037754	0	0	0.033023	0	0	0	0	0	0.037594	0	0	0	0	0	0.0031	0.393172	0	0	0.002271	0	0
Sonoma	2025	LDA	Aggregate	Aggregate	Electricity	9242.163	448815.3	0	448815.3	45524.87	0	0	0	0	0	0	0.002	0.001532	0	0	0	0.008	0.004377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	LDA	Aggregate	Aggregate	Plug-in Hyb	4032.017	183395.4	89021.7	94373.67	1667.29	0.003358	0	0.117552	0.000584	0	0.001934	0.002	0.001452	0.000635	0	0.002103	0.008	0.004149	138.7438	0	65.13775	0.000453	0	0.043666	0.000601	0	0.021011	0.001444	0	0.178897	0.041472	0.038341	0.438942	0.002107	0	0.195869	0.041472	0.038341	0.438942	0.019063	0.215851	0	1.393428	0.001372	0	0.000644
Sonoma	2025	LDT1	Aggregate	Aggregate	Gasoline	17121.9	524067.4	524067.4	0	7308.55	0.177193	0	0.479994	0.002064	0	0.003206	0.002	0.003786	0.002245	0	0.003487	0.008	0.010818	332.1618	0	91.50685	0.008427	0	0.132839	0.012124	0	0.043144	0.038497	0	0.71763	0.229004	0.680273	3.61012	0.056174	0	0.785715	0.229004	0.680273	3.61012	0.037147	1.834518	0	7.037481	0.003284	0	0.000905
Sonoma	2025	LDT1	Aggregate	Aggregate	Diesel	18.67509	214.0794	214.0794	0	51.64827	1.634428	0	0	0.245796	0	0	0.002	0.004254	0.256909	0	0	0.008	0.012155	422.2783	0	0	0.014358	0	0	0.06653	0	0	0.309114	0	0	0	0	0	0.351905	0	0	0	0	0	0.0031	1.624959	0	0	0.004001	0	0
Sonoma	2025	LDT1	Aggregate	Aggregate	Electricity	40.49554	1768.493	0	1768.493	192.3787	0	0	0	0	0	0	0.002	0.001536	0	0	0	0.008	0.004388	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	LDT1	Aggregate	Aggregate	Plug-in Hyb	19.65765	968.3232	420.9054	547.4178	81.28439	0.003007	0	0.117545	0.000368	0	0.001373	0.002	0.001456	0.000401	0	0.001494	0.008	0.00416	124.2516	0	70.50737	0.000404	0	0.043506	0.000534	0	0.020868	0.001293	0	0.178878	0.023737	0.020467	0.271476	0.001887	0	0.195849	0.023737	0.020467	0.271476	0.018256	0.193342	0	1.393252	0.001228	0	0.000697
Sonoma	2025	LDT2	Aggregate	Aggregate	Gasoline	68880.93	2550114	2550114	0	317954.3	0.078036	0	0.360527	0.00129	0	0.002016	0.002	0.003608	0.001403	0	0.002192	0.008	0.010308	341.615	0	88.77211	0.003164	0	0.088846	0.006442	0	0.038631	0.012746	0	0.420523	0.094781	0.265998	1.604185	0.018598	0	0.46042	0.094781	0.265998	1.604185	0.036397	0.905494	0	4.026913	0.003377	0	0.000878
Sonoma	2025	LDT2	Aggregate	Aggregate	Diesel	298.1576	11304.4	11304.4	0	1392.486	0.055268	0	0	0.005556	0	0	0.002	0.003632	0.005808	0	0	0.008	0.010377	319.2147	0	0	0.000685	0	0	0.050292	0	0	0.014753	0	0	0	0	0	0.016795	0	0	0	0	0	0.0031	0.153856	0	0	0.003025	0	0
Sonoma	2025	LDT2	Aggregate	Aggregate	Electricity	425.6248	15763.32	0	15763.32	2163.859	0	0	0	0	0	0	0.002	0.001527	0	0	0	0.008	0.004362	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	LDT2	Aggregate	Aggregate	Plug-in Hyb	519.2548	24355.53	11146.44	13209.09	2147.119	0.003166	0	0.117546	0.000461	0	0.001629	0.002	0.001454	0.000501	0	0.001771	0.008	0.004154	130.8218	0	77.38691	0.000426	0	0.043518	0.000563	0	0.020879	0.001361	0	0.17888	0.026005	0.023579	0.300454	0.001986	0	0.195851	0.026005	0.023579	0.300454	0.019187	0.20357	0	1.393267	0.001293	0	0.000765
Sonoma	2025	LHDT1	Aggregate	Aggregate	Gasoline	7783.074	278514.3	278514.3	0	115956.2	0.247208	0.037645	0.659114	0.001829	0	0.000386	0.002	0.0273	0.001989	0	0.00042	0.008	0.078	896.6334	120.384	26.09693	0.011821	0.115132	0.036263	0.013307	0.002977	0.050931	0.060178	0.430901	0.184654	0.058583	0.338837	3.456852	0.087811	0.62877	0.202173	0.058583	0.338837	3.456852	0.044906	1.483903	3.743981	3.170893	0.008864	0.00119	0.000258
Sonoma	2025	LHDT1	Aggregate	Aggregate	Diesel	7905.64	276368.4	276368.4	0	99443	2.380051	2.251722	0	0.049447	0.026806	0	0.003	0.0273	0.051683	0.028019	0	0.012	0.078	641.6904	135.9855	0	0.010539	0.005098	0	0.101099	0.021425	0	0.226895	0.10976	0	0	0	0	0.258305	0.124954	0	0	0	0	0.147024	0.679739	0.909745	0	0.00608	0.001289	0	0
Sonoma	2025	LHDT1	Aggregate	Aggregate	Electricity	38.89736	2805.449	0	2805.449	543.9716	0	0	0	0	0	0	0.002	0.01365	0	0	0	0.008	0.039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	LHDT2	Aggregate	Aggregate	Gasoline	1205.277	44313.24	44313.24	0	17956.82	0.153874	0.036841	0.637577	0.001337	0	0.000224	0.002	0.03185	0.001454	0	0.000243	0.008	0.091	987.6709	138.2333	25.51978	0.006007	0.116308	0.032496	0.00936	0.003061	0.051171	0.028222	0.422564	0.158257	0.042057	0.226582	2.449546	0.041182	0.616604	0.173271	0.042057	0.226582	2.449546	0.044974	0.905461	3.766599	3.080702	0.009764	0.001367	0.000252
Sonoma	2025	LHDT2	Aggregate	Aggregate	Diesel	2862.923	106708.8	106708.8	0	36011.97	1.571101	2.138683	0	0.040192	0.026755	0	0.003	0.03185	0.04201	0.027965	0	0.012	0.091	776.2399	214.7901	0	0.008586	0.005098	0	0.122297	0.03384	0	0.184852	0.10976	0	0	0	0	0.210442	0.124954	0	0	0	0	0.173907	0.510461	0.909745	0	0.007355	0.002035	0	0
Sonoma	2025	LHDT2	Aggregate	Aggregate	Electricity	9.993605	684.9295	0	684.9295	132.5256	0	0	0	0	0	0	0.002	0.015925	0	0	0	0.008	0.0455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	MCY	Aggregate	Aggregate	Gasoline	9752.792	51929.54	51929.54	0	19505.58	0.667685	0	0.170836	0.001873	0	0.003472	0.001	0.0042	0.001998	0	0.003683	0.004	0.012	191.5324	0	55.30658	0.195372	0	0.215552	0.043862	0	0.009742	1.339862	0	1.645974	3.55364	3.930139	4.933833	1.586926	0	1.788617	3.55364	3.930139	4.933833	0.008575	15.5304	0	8.728359	0.001893	0	0.000547
Sonoma	2025	MDV	Aggregate	Aggregate	Gasoline	46410.79	1625367	1625367	0	209909.6	0.112392	0	0.487202	0.001303	0	0.002162	0.002	0.003705	0.001417	0	0.002351	0.008	0.010587	418.1199	0	109.6989	0.00427	0	0.11476	0.008269	0	0.043847	0.018317	0	0.591641	0.12068	0.363104	2.117546	0.026724	0	0.647772	0.12068	0.363104	2.117546	0.035699	1.062326	0	4.591724	0.004134	0	0.001084
Sonoma	2025	MDV	Aggregate	Aggregate	Diesel	994.2816	35964.14	35964.14	0	4563.948	0.076663	0	0	0.007169	0	0	0.002	0.003756	0.007493	0	0	0.008	0.010731	419.6923	0	0	0.000686	0	0	0.066123	0	0	0.014764	0	0	0	0	0	0.016808	0	0	0	0	0	0.0031	0.247417	0	0	0.003977	0	0
Sonoma	2025	MDV	Aggregate	Aggregate	Electricity	453.7925	16839.5	0	16839.5	2308.753	0	0	0	0	0	0	0.002	0.001526	0	0	0	0.008	0.004361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	MDV	Aggregate	Aggregate	Plug-in Hyb	348.0362	16050.45	7542.262	8508.192	1439.13	0.003251	0	0.11755	0.000571	0	0.00197	0.002	0.001454	0.000621	0	0.002143	0.008	0.004154	134.3175	0	96.13818	0.000438	0	0.043573	0.000579	0	0.020927	0.001398	0	0.178891	0.03095	0.026787	0.335071	0.002039	0	0.195863	0.03095	0.026787	0.335071	0.019736	0.20898	0	1.393375	0.001328	0	0.00095
Sonoma	2025	MH	Aggregate	Aggregate	Gasoline	1039.787	8984.903	8984.903	0	104.0203	0.48055	0	0.442978	0.001699	0	0.000395	0.003	0.015758	0.001847	0	0.00043	0.012	0.045024	1948.189	0	31.73768	0.016611	0	0.038624	0.028518	0	0.045513	0.073355	0	0.163521	13.23757	0.31941	5.168088	0.107039	0	0.179034	13.23757	0.31941	5.168088	0.044839	1.753193	0	3.542845	0.01926	0	0.000314
Sonoma	2025	MH	Aggregate	Aggregate	Diesel	568.7615	5212.417	5212.417	0	56.87615	4.577001	0	0	0.11818	0	0	0.004	0.01568	0.123524	0	0	0.016	0.044799	1080.548	0	0	0.006335	0	0	0.170241	0	0	0.136395	0	0	0	0	0	0.155276	0	0	0	0	0	0.136096	0.464276	0	0	0.010239	0	0
Sonoma	2025	MHDT	Aggregate	Aggregate	Gasoline	625.5889	30798.27	30798.27	0	12516.78	0.495206	0.087071	0.430478	0.001435	0	0.000571	0.003	0.015758	0.00156	0	0.000621	0.012	0.045022	1787.22	532.9707	46.53496	0.015753	0.258027	0.04759	0.023669	0.007148	0.031611	0.079253	1.014637	0.267317	0.035882	0.296917	2.923409	0.115645	1.480555	0.292679	0.035882	0.296917	2.923409	0.04498	1.667897	15.33926	5.877323	0.017668	0.005269	0.00046
Sonoma	2025	MHDT	Aggregate	Aggregate	Diesel	5226.13	224489.2	224489.2	0	61547.48	1.053367	12.36555	1.704857	0.011369	0.024561	0	0.003	0.015841	0.011883	0.025672	0	0.012	0.045259	1130.739	2233.331	0	0.001136	0.011066	0	0.178148	0.351862	0	0.024454	0.238254	0	0	0	0	0.027839	0.271234	0	0	0	0	0.213697	0.100837	7.585003	0	0.010707	0.021148	0
Sonoma	2025	MHDT	Aggregate	Aggregate	Electricity	36.91507	1962.406	0	1962.406	452.8868	0	0	0	0	0	0	0.003	0.007917	0	0	0	0.012	0.02262	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	MHDT	Aggregate	Aggregate	Natural Ga	36.14371	1770.604	1770.604	0	380.4256	0.125652	5.972546	0	0.001151	0.017045	0	0.003	0.015901	0.001251	0.018538	0	0.012	0.045431	955.6612	4891.009	0	0.703883	15.76992	0	0.194818	0.997064	0	0.010057	0.225321	0	0	0	0	0.718364	16.09436	0	0	0	0	1.06	2.90962	32.77581	0	0	0	0
Sonoma	2025	OBUS	Aggregate	Aggregate	Gasoline	159.5321	7078.737	7078.737	0	3191.919	0.59652	0.064364	0.421822	0.001047	0	0.000313	0.003	0.015684	0.001139	0	0.00034	0.012	0.044811	1762.864	378.4252	32.03848	0.014988	0.193635	0.037563	0.026477	0.005178	0.030583	0.073812	0.744589	0.2037	0.0352	0.168635	3.074271	0.107707	1.086503	0.223026	0.0352	0.168635	3.074271	0.044998	1.624998	5.76449	4.282614	0.017428	0.003741	0.000317
Sonoma	2025	OBUS	Aggregate	Aggregate	Diesel	174.6367	12508.39	12508.39	0	2006.701	1.474796	11.0974	1.604562	0.029757	0.013594	0	0.003	0.019516	0.031103	0.014208	0	0.012	0.055759	1356.907	2385.125	0	0.002817	0.037341	0	0.213781	0.375777	0	0.060641	0.803931	0	0	0	0	0.069035	0.915214	0	0	0	0	0.214287	0.19475	12.59507	0	0.012849	0.022586	0
Sonoma	2025	OBUS	Aggregate	Aggregate	Electricity	0.529211	46.1494	0	46.1494	10.58846	0	0	0	0	0	0	0.003	0.007843	0	0	0	0.012	0.022408	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	OBUS	Aggregate	Aggregate	Natural Ga	1.288787	85.28426	85.28426	0	11.4702	0.16443	1.525314	0	0.001186	0.004188	0	0.003	0.016148	0.00129	0.004555	0	0.012	0.046137	1003.071	1208.666	0	0.804274	4.087505	0	0.204483	0.246394	0	0.011491	0.058402	0	0	0	0	0.820821	4.171599	0	0	0	0	1.06	3.293332	8.003782	0	0	0	0
Sonoma	2025	SBUS	Aggregate	Aggregate	Gasoline	61.32417	3195.382	3195.382	0	245.2967	0.217022	0.914613	0.735447	0.000811	0	0.000548	0.002	0.015721	0.000882	0	0.000596	0.008	0.044917	807.8878	2584.346	55.7166	0.003904	2.507831	0.065498	0.016475	0.088576	0.070807	0.017905	10.64006	0.359637	0.106591	0.204906	1.384826	0.026128	15.52595	0.393757	0.106591	0.204906	1.384826	0.045	0.425924	82.23203	9.033585	0.007987	0.025549	0.000551
Sonoma	2025	SBUS	Aggregate	Aggregate	Diesel	398.7543	9054.595	9054.595	0	5773.963	3.466954	21.36663	0.471225	0.01826	0.016452	0	0.003	0.015721	0.019086	0.017195	0	0.012	0.044917	1166.695	2258.115	0	0.002812	0.008097	0	0.183813	0.355767	0	0.06054	0.174317	0	0	0	0	0.068921	0.198446	0	0	0	0	0.146465	0.182278	4.652341	0	0.011048	0.021383	0
Sonoma	2025	SBUS	Aggregate	Aggregate	Electricity	1.940155	57.89982	0	57.89982	25.38308	0	0	0	0	0	0	0.002	0.769	0.00786	0	0	0	0.011075	0.022459	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	SBUS	Aggregate	Aggregate	Natural Ga	27.7498	692.2158	692.2158	0	401.8171	0.634346	5.31306	0	0.003378	0.010352	0	0.003	0.015721	0.003674	0.011258	0	0.012	0.044917	1268.239	3954.118	0	3.616436	15.77724	0	0.258539	0.806073	0	0.051672	0.225426	0	0	0	0	3.690838	16.10183	0	0	0	0	1.06	12.49495	18.47933	0	0	0	0
Sonoma	2025	UBUS	Aggregate	Aggregate	Gasoline	49.30045	3642.863	3642.863	0	197.2018	0.095362	0	0.556336	0.001166	0	0.000342	0.002	0.033765	0.001268	0	0.000372	0.009152	0.096472	1150.719	0	58.47794	0.00227	0	0.066333	0.009464	0	0.06783	0.006844	0	0.261271	0.035114	0.096597	0.425045	0.009986	0	0.286059	0.035114	0.096597	0.425045	0.045	0.508125	0	7.550026	0.011376	0	0.000578
Sonoma	2025	UBUS	Aggregate	Aggregate	Diesel	54.53463	5217.373	5217.373	0	218.1385	0.37041	0	0.006733	0	0	0.007999	0.0385	0.007037	0	0	0	0.031996	0.11	1187.166	0	0	0.003112	0	0	0.187039	0	0	0.067001	0	0	0	0	0	0.076275	0	0	0	0	0	0.22	0.076148	0	0	0.011249	0	0
Sonoma	2025	UBUS	Aggregate	Aggregate	Electricity	1.009351	26.88826	0	26.88826	4.037406	0	0	0	0	0	0	0.003	0.01925	0	0	0	0.012	0.055	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2025	UBUS	Aggregate	Aggregate	Natural Ga	34.84019	4380.252	4380.252	0	139.3608	0.363561	0	0	0.00017	0	0	0.007864	0.0385	0.000178	0	0	0.031458	0.11	1418.21	0	0	1.799141	0	0	0.289111	0	0	0.025706	0	0	0	0	0	1.836156	0	0	0	0	0	0.97	26.18148	0	0	0	0	0

CalEEMod EMFAC2021 Emission Factors Input

Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
A	CH4_IDLEX	0	0	0	0	0.004336	0.002868	0.010538	0.176241154	0.008175	0	0	0.092273	0
A	CH4_RUNEX	0.002303	0.008386	0.003109	0.004115	0.011126	0.007794	0.007669	0.061569324	0.010646	0.595837346	0.195372	0.195483	0.012838
A	CH4_STREX	0.068995	0.132298	0.087569	0.110677	0.019472	0.010812	0.007953	6.92229E-08	0.022966	0.023411516	0.215552	0.002492	0.024971
A	CO_IDLEX	0	0	0	0	0.168247	0.132379	0.673198	4.643527769	0.599443	0	0	1.149583	0
A	CO_RUNEX	0.707665	1.825262	0.89017	1.026384	1.077926	0.623534	0.305601	0.573042397	0.721138	8.813333273	15.5304	0.896966	1.279979
A	CO_STREX	3.141427	7.007848	3.965194	4.426019	1.702692	1.02503	0.98221	0.001318944	2.618387	2.66471502	8.728359	0.34374	2.290465
A	CO2_NBIO_IDLEX	0	0	0	0	9.317312	14.48127	162.6472	749.8111198	91.64692	0	0	181.284	0
A	CO2_NBIO_RUNEX	249.4222	330.7017	337.4743	411.3088	765.7831	834.4938	1199.033	1659.433495	1497.935	1251.032329	191.5324	1078.712	1629.642
A	CO2_NBIO_STREX	65.40479	91.17952	87.72116	106.1546	14.01341	8.491098	7.77686	0.040547226	19.5883	20.63927465	55.30658	2.12009	20.51856
A	NOX_IDLEX	0	0	0	0	0.083792	0.114275	0.866441	3.886989817	0.373562	0	0	1.353231	0
A	NOX_RUNEX	0.042963	0.17687	0.076763	0.109482	1.302918	1.150039	0.972678	2.077630497	1.150386	0.291877272	0.667685	2.501862	1.984525
A	NOX_STREX	0.245501	0.477998	0.354953	0.46942	0.353928	0.212139	1.472916	2.77658869	0.874656	0.196353842	0.170836	0.450051	0.286387
A	PM10_IDLEX	0	0	0	0	0.001026	0.001483	0.0018	0.002840805	0.000476	0	0	0.001112	0
A	PM10_PMBW	0.008398	0.010785	0.010215	0.010467	0.077804	0.090795	0.045061	0.081323905	0.051709	0.106400292	0.012	0.044817	0.044941
A	PM10_PMTW	0.008	0.008	0.008	0.008	0.009982	0.010814	0.012	0.03389725	0.012	0.025554966	0.004	0.011013	0.013469
A	PM10_RUNEX	0.001277	0.002337	0.001405	0.001524	0.026605	0.029974	0.010493	0.023958744	0.020144	0.003174417	0.001998	0.013706	0.04652
A	PM10_STREX	0.001964	0.003473	0.002165	0.002276	0.000226	8.09E-05	0.000104	1.56829E-06	0.000208	0.000131139	0.003683	2.27E-05	0.000278
A	PM25_IDLEX	0	0	0	0	0.000981	0.001419	0.001722	0.002713094	0.000456	0	0	0.001062	0
A	PM25_PMBW	0.002939	0.003775	0.003575	0.003663	0.027231	0.031778	0.015771	0.028463367	0.018098	0.037240102	0.0042	0.015686	0.015729
A	PM25_PMTW	0.002	0.002	0.002	0.002	0.002496	0.002703	0.003	0.008474312	0.003	0.006388742	0.001	0.002753	0.003367
A	PM25_RUNEX	0.001177	0.002153	0.001293	0.001407	0.025417	0.028661	0.010032	0.022918326	0.019257	0.003024111	0.001873	0.013097	0.044464
A	PM25_STREX	0.001806	0.003193	0.001991	0.002092	0.000207	7.44E-05	9.55E-05	1.44199E-06	0.000191	0.000120578	0.003472	2.08E-05	0.000256
A	ROG_DIURN	0.317387	0.841811	0.341885	0.450889	0.124593	0.054705	0.024418	0.000360273	0.093943	0.037503974	4.933833	0.013174	33.39857
A	ROG_HTSK	0.090661	0.228016	0.093283	0.116287	0.031458	0.013994	0.005996	0.000102007	0.021521	0.012393092	3.55364	0.004056	8.558151
A	ROG_IDLEX	0	0	0	0	0.019549	0.01526	0.025208	0.299513318	0.04966	0	0	0.11297	0
A	ROG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
A	ROG_RUNEX	0.009085	0.038409	0.012571	0.017899	0.142494	0.138266	0.030686	0.021497505	0.065015	0.036714064	1.339862	0.049319	0.096499
A	ROG_RUNLS	0.243336	0.677282	0.261467	0.34945	0.181947	0.07539	0.04962	0.000935273	0.103103	0.034092953	3.930139	0.007797	0.2065
A	ROG_STREX	0.31862	0.714649	0.4143	0.570286	0.099155	0.052656	0.044674	3.75532E-07	0.124542	0.092213413	1.645974	0.013685	0.105717
A	SO2_IDLEX	0	0	0	0	9.01E-05	0.000138	0.00152	0.006598922	0.00087	0	0	0.001566	0
A	SO2_RUNEX	0.002465	0.003269	0.003336	0.004063	0.00744	0.008026	0.011381	0.015100394	0.014407	0.0075472	0.001893	0.009658	0.015948
A	SO2_STREX	0.000647	0.000901	0.000867	0.001049	0.000139	8.39E-05	7.69E-05	4.00851E-07	0.000194	0.00020404	0.000547	2.1E-05	0.000203
A	TOG_DIURN	0.317387	0.841811	0.341885	0.450889	0.124593	0.054705	0.024418	0.000360273	0.093943	0.037503974	0.145453	0.013174	33.39857
A	TOG_HTSK	0.090661	0.228016	0.093283	0.116287	0.031458	0.013994	0.005996	0.000102007	0.021521	0.012393092	3.55364	0.004056	8.558151
A	TOG_IDLEX	0	0	0	0	0.027237	0.020399	0.039059	0.504120262	0.064846	0	0	0.229284	0
A	TOG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
A	TOG_RUNEX	0.013213	0.056006	0.018322	0.026014	0.17186	0.160051	0.042789	0.085503999	0.086008	0.638947864	1.586926	0.250951	0.124749
A	TOG_RUNLS	0.243336	0.677282	0.261467	0.34945	0.181947	0.07539	0.04962	0.000935273	0.103103	0.034092953	3.930139	0.007797	0.2065
A	TOG_STREX	0.348849	0.782451	0.453606	0.62439	0.108562	0.057652	0.048912	4.1116E-07	0.136358	0.10096208	1.788617	0.014983	0.115747
A	N2O_IDLEX	0	0	0	0	0.000892	0.001864	0.025093	0.120584645	0.012789	0	0	0.026319	0
A	N2O_RUNEX	0.004629	0.012084	0.006539	0.009342	0.056746	0.088756	0.158545	0.264435998	0.146001	0.171601889	0.043862	0.145842	0.08055
A	N2O_STREX	0.031154	0.042976	0.038089	0.042315	0.027349	0.017026	0.005283	2.12927E-05	0.018698	0.023940172	0.009742	0.002694	0.029424

CalEEMod EMFAC2021 Fleet Mix Input

FleetMixLandUseSubType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	0.467361	0.051994	0.21197	0.14572	0.047541	0.012328	0.017909	0.007915	0.001016	0.000422	0.029481	0.00148	0.004862

Source: EMFAC2021 (v1.0.1) Emission Rates
Region Type: County
Region: Sonoma
Calendar Year: 2030
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

Region	Calendar Y	Vehicle Cat	Model Yea	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	NOx_RUNE	NOx_IDLEX	NOx_STREX	PM2.5_RU	PM2.5_IDL	PM2.5_STR	PM2.5_PM	PM10_RUN	PM10_IDLE	PM10_STR	PM10_PM	PM10_PMI	CO2_RUNE	CO2_IDLEX	CO2_STREX	CH4_RUNE	CH4_IDLEX	CH4_STREX	N2O_RUNE	N2O_IDLEX	N2O_STREX	ROG_RUNE	ROG_IDLEX	ROG_STREX	ROG_HOTS	ROG_RUNL	ROG_DIUR	TOG_RUNE	TOG_IDLEX	TOG_STREX	TOG_HOTS	TOG_RUNL	TOG_DIUR	NH3_RUNE	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNE	SOx_IDLEX	SOx_STREX
Sonoma	2030	HHDT	Aggregate	Aggregate	Gasoline	0.413995	42.11769	42.11769	0	8.283209	3.894982	0	0.013127	0.001645	0	0.000654	0.005	0.032961	0.00179	0	0.000711	0.02	0.094173	1980.532	0	49.57901	0.12306	0	0.000156	0.144233	0	0.000497	0.625235	0	0.000843	0.059411	0.544129	4.324643	0.912342	0	0.000923	0.059411	0.544129	4.324643	0.045	26.7312	0	4.140578	0.01958	0	0.00049
Sonoma	2030	HHDT	Aggregate	Aggregate	Diesel	2531.088	230058.1	230058.1	0	30502.97	1.797338	46.86979	2.913492	0.023188	0.023038	0	0.008471	0.027953	0.024237	0.02408	0	0.033884	0.078866	1557.17	8168.68	0	0.000778	0.174071	0	0.245333	1.286979	0	0.016748	3.747694	0	0	0	0	0.019067	4.266465	0	0	0	0	0.214858	0.078325	54.54121	0	0.014745	0.077353	0
Sonoma	2030	HHDT	Aggregate	Aggregate	Electricity	150.6212	14705.17	0	14705.17	1610.428	0	0	0	0	0	0	0.008174	0.014886	0	0	0	0.032696	0.042533	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	HHDT	Aggregate	Aggregate	Natural Ga	206.7115	12409.7	12409.7	0	1581.181	0.493118	9.197225	0	0.001758	0.021084	0	0.009	0.053724	0.001912	0.022931	0	0.036	0.153496	1323.966	8728.987	0	0.979602	23.63665	0	0.269899	1.779461	0	0.025336	0.356045	0	0	0	0	1.012674	24.14381	0	0	0	0	0.791639	8.864507	65.7216	0	0	0	0
Sonoma	2030	LDA	Aggregate	Aggregate	Gasoline	142725.9	5430197	5430197	0	656692.8	0.031585	0	0.220415	0.000953	0	0.001593	0.002	0.003106	0.001036	0	0.001732	0.008	0.008875	253.5562	0	64.06943	0.001705	0	0.05686	0.004032	0	0.030321	0.006117	0	0.250585	0.07795	0.227958	1.368444	0.088926	0	0.27414	0.07795	0.227958	1.368444	0.038932	0.620367	0	2.644025	0.002507	0	0.000633
Sonoma	2030	LDA	Aggregate	Aggregate	Diesel	473.972	13717.09	13717.09	0	1994.109	0.155082	0	0	0.009189	0	0	0.002	0.003212	0.009605	0	0	0.008	0.009178	227.8699	0	0	0.000883	0	0	0.035901	0	0	0.019	0	0	0	0	0	0.021631	0	0	0	0	0	0.0031	0.311844	0	0	0.002159	0	0
Sonoma	2030	LDA	Aggregate	Aggregate	Electricity	13755.14	624521.5	0	624521.5	66276.01	0	0	0	0	0	0	0.002	0.001535	0	0	0	0.008	0.004387	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	LDA	Aggregate	Aggregate	Plug-in Hyb	5522.463	234980	105414.8	129565.2	22835.38	0.003104	0	0.117546	0.000416	0	0.001528	0.002	0.001463	0.000452	0	0.001662	0.008	0.00418	128.2417	0	62.28463	0.000411	0	0.042883	0.000537	0	0.0203	0.001334	0	0.178881	0.041226	0.051809	0.522406	0.001947	0	0.195852	0.041226	0.051809	0.522406	0.018297	0.195572	0	1.393277	0.001268	0	0.000616
Sonoma	2030	LDT1	Aggregate	Aggregate	Gasoline	13477.03	412493.8	412493.8	0	57417.71	0.105603	0	0.36813	0.001502	0	0.002447	0.002	0.003777	0.001633	0	0.002662	0.008	0.010792	309.7482	0	82.88501	0.00512	0	0.098471	0.008194	0	0.037704	0.022639	0	0.508741	0.183951	0.550875	3.055465	0.033034	0	0.557008	0.183951	0.550875	3.055465	0.038255	1.250944	0	5.034164	0.003062	0	0.000819
Sonoma	2030	LDT1	Aggregate	Aggregate	Diesel	0.058128	2.32042	2.32042	0	0.26867	0.092126	0	0	0.01286	0	0	0.002	0.003452	0.013442	0	0	0.008	0.009862	365.2716	0	0	0.001244	0	0	0.057549	0	0	0.026778	0	0	0	0	0	0.030485	0	0	0	0	0	0.0031	0.213074	0	0	0.003461	0	0
Sonoma	2030	LDT1	Aggregate	Aggregate	Electricity	85.45005	4055.881	0	4055.881	416.4733	0	0	0	0	0	0	0.002	0.001532	0	0	0	0.008	0.004377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	LDT1	Aggregate	Aggregate	Plug-in Hyb	60.94763	2831.598	1171.787	1659.811	252.0184	0.002863	0	0.117545	0.000247	0	0.000989	0.002	0.001464	0.000269	0	0.001075	0.008	0.004182	118.3043	0	67.8439	0.00038	0	0.04292	0.000496	0	0.020334	0.001231	0	0.178878	0.022869	0.020158	0.272167	0.001796	0	0.195849	0.022869	0.020158	0.272167	0.017381	0.184134	0	1.393247	0.00117	0	0.000671
Sonoma	2030	LDT2	Aggregate	Aggregate	Gasoline	69031.68	2525220	2525220	0	316825.8	0.051531	0	0.288183	0.001013	0	0.001668	0.002	0.00362	0.001102	0	0.001814	0.008	0.010344	315.5053	0	81.01569	0.00226	0	0.070142	0.005034	0	0.034674	0.008546	0	0.314842	0.079266	0.238575	1.444228	0.01247	0	0.348698	0.079266	0.238575	1.444228	0.039358	0.730668	0	3.22032	0.003119	0	0.000801
Sonoma	2030	LDT2	Aggregate	Aggregate	Diesel	284.4128	10395.67	10395.67	0	1310.497	0.038468	0	0	0.004576	0	0	0.002	0.003656	0.004783	0	0	0.008	0.010446	297.9877	0	0	0.000623	0	0	0.046948	0	0	0.013408	0	0	0	0	0	0.015264	0	0	0	0	0	0.0031	0.145602	0	0	0.002824	0	0
Sonoma	2030	LDT2	Aggregate	Aggregate	Electricity	1062.635	36824.85	0	36824.85	5285.132	0	0	0	0	0	0	0.002	0.001531	0	0	0	0.008	0.004374	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	LDT2	Aggregate	Aggregate	Plug-in Hyb	958.0116	41659.09	17857.07	23802.02	3961.378	0.002965	0	0.117547	0.000317	0	0.001221	0.002	0.001464	0.000345	0	0.001328	0.008	0.004183	122.5422	0	74.46949	0.000392	0	0.042758	0.00051	0	0.020185	0.001275	0	0.178884	0.02676	0.026574	0.321313	0.00186	0	0.195855	0.02676	0.026574	0.321313	0.017992	0.190733	0	1.393304	0.001211	0	0.000736
Sonoma	2030	LHDT1	Aggregate	Aggregate	Gasoline	6521.007	229482.1	229482.1	0	9715.29	0.162587	0.034303	0.594743	0.001613	0	0.000302	0.002	0.0273	0.001754	0	0.000328	0.008	0.078	844.3063	116.9743	25.90841	0.00717	0.106961	0.031384	0.008862	0.002853	0.047908	0.034655	0.392875	0.156237	0.049559	0.298022	3.043991	0.050568	0.573282	0.17106	0.049559	0.298022	3.043991	0.045	1.077512	3.753036	3.235482	0.008347	0.001156	0.000256
Sonoma	2030	LHDT1	Aggregate	Aggregate	Diesel	6325.365	209752.3	209752.3	0	79565.13	1.756527	2.039396	0	0.041204	0.026148	0	0.003	0.0273	0.043067	0.02733	0	0.012	0.078	637.9858	132.4149	0	0.00876	0.005098	0	0.100515	0.020862	0	0.188607	0.10976	0	0	0	0	0.214716	0.124954	0	0	0	0	0.168471	0.556904	0.909745	0	0.006045	0.001255	0
Sonoma	2030	LHDT1	Aggregate	Aggregate	Electricity	401.741	25016.01	0	25016.01	5627.769	0	0	0	0	0	0	0.002	0.01365	0	0	0	0.008	0.039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	LHDT2	Aggregate	Aggregate	Gasoline	1003.491	34713.27	34713.27	0	1495.052	0.096868	0.034003	0.596175	0.001188	0	0.000159	0.002	0.03185	0.001292	0	0.000173	0.008	0.091	947.5211	135.3721	24.97448	0.003263	0.10822	0.028959	0.006348	0.002878	0.048574	0.013858	0.390299	0.138274	0.038137	0.220269	2.47219	0.020222	0.569523	0.151393	0.038137	0.220269	2.47219	0.045	0.689947	3.775156	3.087357	0.009367	0.001338	0.000247
Sonoma	2030	LHDT2	Aggregate	Aggregate	Diesel	2527.749	87158.93	87158.93	0	31795.9	1.262464	1.932125	0	0.035954	0.026901	0	0.003	0.03185	0.03758	0.028118	0	0.012	0.091	760.7058	209.4344	0	0.007537	0.005098	0	0.11985	0.032996	0	0.162272	0.10976	0	0	0	0	0.184736	0.124954	0	0	0	0	0.188844	0.45676	0.909745	0	0.007208	0.001984	0
Sonoma	2030	LHDT2	Aggregate	Aggregate	Electricity	101.4218	6044.223	0	6044.223	1344.994	0	0	0	0	0	0	0.002	0.015925	0	0	0	0.008	0.0455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	MCY	Aggregate	Aggregate	Gasoline	8919.366	46274.62	46274.62	0	17838.73	0.599049	0	0.143541	0.001878	0	0.00315	0.001	0.0042	0.002009	0	0.000355	0.004	0.012	188.9008	0	50.69062	0.17227	0	0.192786	0.040918	0	0.00832	1.138941	0	1.452324	3.556898	3.992608	4.994778	1.369677	0	1.57884	3.556898	3.992608	4.994778	0.008794	13.62555	0	8.599194	0.001867	0	0.000501
Sonoma	2030	MDV	Aggregate	Aggregate	Gasoline	43637.17	1521765	1521765	0	196576.2	0.066456	0	0.358384	0.001026	0	0.001777	0.002	0.003699	0.001116	0	0.001933	0.008	0.010568	385.5154	0	100.2176	0.002763	0	0.085246	0.00583	0	0.037738	0.011132	0	0.418084	0.101245	0.318422	1.887922	0.016244	0	0.457749	0.101245	0.318422	1.887922	0.038657	0.807704	0	3.606472	0.003811	0	0.000991
Sonoma	2030	MDV	Aggregate	Aggregate	Diesel	825.7898	27286.55	27286.55	0	3695.515	0.045341	0	0	0.004648	0	0	0.002	0.003854	0.004859	0	0	0.008	0.011011	400.4868	0	0	0.000525	0	0	0.063097	0	0	0.011311	0	0	0	0	0	0.012877	0	0	0	0	0	0.0031	0.230823	0	0	0.003795	0	0
Sonoma	2030	MDV	Aggregate	Aggregate	Electricity	1060.895	36570.42	0	36570.42	5268.017	0	0	0	0	0	0	0.002	0.001532	0	0	0	0.008	0.004377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	MDV	Aggregate	Aggregate	Plug-in Hyb	612.9674	26649.6	11517.12	15132.48	2534.62	0.00299	0	0.117549	0.000356	0	0.001375	0.002	0.001465	0.000388	0	0.001495	0.008	0.004185	123.5422	0	91.41604	0.000396	0	0.042802	0.000515	0	0.020224	0.001285	0	0.178888	0.030271	0.032013	0.365898	0.001876	0	0.19586	0.030271	0.032013	0.365898	0.018151	0.192262	0	1.393342	0.001221	0	0.000904
Sonoma	2030	MH	Aggregate	Aggregate	Gasoline	749.2935	6715.176	6715.176	0	74.95932	0.294672	0	0.50334	0.00138	0	0.000323	0.003	0.015758	0.001501	0	0.000351	0.012	0.045023	1946.106	0	31.00569	0.0087	0	0.037225	0.020914	0	0.053775	0.032663	0	0.148981	10.10927	0.250437	4.261365	0.047662	0	0.163115	10.10927	0.250437	4.261365	0.045	0.569221	0	3.112292	0.019239	0	0.000307
Sonoma	2030	MH	Aggregate	Aggregate	Diesel	514.3636	4402.26	4402.26	0	51.43636	4.183013	0	0	0.101843	0	0	0.004	0.015679	0.106448	0	0	0.016	0.044799	1081.424	0	0	0.006018	0	0	0.170379	0	0	0.129568	0	0	0	0	0	0.147504	0	0	0	0	0	0.150223	0.435354	0	0	0.010247	0	0
Sonoma	2030	MHDT	Aggregate	Aggregate	Gasoline	521.4089	24569.24	24569.24	0	10432.35	0.268753	0.08113	0.37749	0.001358	0	0.000486	0.003	0.015758	0.001477	0	0.000528	0.012	0.045022	1720.172	517.8608	43.71408	0.008328	0.264577	0.043078	0.015078	0.006967	0.029787	0.039704	1.023973	0.230633	0.027057	0.228213	2.361834	0.057937	1.494179	0.252515	0.027057	0.228213	2.361834	0.045	0.771807	15.44658	4.875127	0.017006	0.00512	0.000432
Sonoma	2030	MHDT	Aggregate	Aggregate	Diesel	5349.171	213341.1	213341.1	0	63105.51	0.726654	11.28423	1.598915	0.006302	0.009065	0	0.003	0.015841	0.006587	0.009474	0	0.012	0.045259	1101.012	2150.762	0	0.000624	0.009093	0	0.173465	0.338853	0	0.013437	0.195778	0	0	0	0	0.015297	0.222878	0	0	0	0	0.217136	0.070484	7.517934	0	0.010426	0.020366	0
Sonoma	2030	MHDT	Aggregate	Aggregate	Electricity	425.7384	22068.39	0	22068.39	5208.828	0	0	0	0	0	0	0.003	0.007914	0	0	0	0.012	0.022611	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	MHDT	Aggregate	Aggregate	Natural Ga	51.88113	2273.593	2273.593	0	554.0146	0.097949	5.858532	0	0.001295	0.01839	0	0.003	0.015901	0.001408	0.020001	0	0.012	0.045432	937.1382	4870.323	0	0.72208	14.86182	0	0.191042	0.992847	0	0.010317	0.212346	0	0	0	0	0.736935	15.16758	0	0	0	0	1.06	2.898573	35.85688	0	0	0	0
Sonoma	2030	OBUS	Aggregate	Aggregate	Gasoline	128.416	4852.623	4852.623	0	2569.347	0.492217	0.060669	0.417217	0.001145	0	0.00033	0.003	0.015684	0.001245	0	0.000359	0.012	0.044812	1702.792	372.1376	31.35564	0.01176	0.189929	0.03656	0.021353	0.004705	0.029285	0.058564	0.744307	0.201266	0.038761	0.208544	3.745891	0.085457	1.086091	0.220361	0.038761	0.208544	3.745891	0.045	1.299439	5.762787	4.123097	0.016834	0.003679	0.00031
Sonoma	2030	OBUS	Aggregate	Aggregate	Diesel	191.8074	12613.93	12613.93	0	2232.53	1.278636	9.514459	1.453788	0.024297	0.00955	0	0.003	0.01994	0.025396	0.009982	0	0.012	0.056972	1285.671	2352.495	0	0.002243	0.038678	0	0.202558	0.370636	0	0.048287	0.832736	0	0	0	0	0.054971	0.948007	0	0	0	0	0.215498	0.161462	13.17564	0	0.012175	0.022277	0
Sonoma	2030	OBUS	Aggregate	Aggregate	Electricity	4.541431	376.7337	0	376.7337	90.86496	0	0	0	0	0	0	0.003	0.007843	0	0	0	0.012	0.022408	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	OBUS	Aggregate	Aggregate	Natural Ga	1.836737	114.2093	114.2093	0	16.34696	0.105774	1.500808	0	0.001465	0.004772	0	0.003	0.016148	0.001594	0.00519	0	0.012	0.046137	942.9386	1181.93	0	0.836326	3.784927	0	0.192224	0.240944	0	0.011949	0.054079	0	0	0	0	0.853532	3.862796	0	0	0	0	1.06	3.379684	9.321763	0	0	0	0
Sonoma	2030	SBUS	Aggregate	Aggregate	Gasoline	65.12182	3395.691	3395.691	0	260.4873	0.219977	0.868542	0.852507	0.000838	0	0.00057	0.002	0.015721	0.000911	0	0.00062	0.008	0.044917	798.4079	2556.383	55.17101	0.003431	2.508051	0.069078	0.017082	0.081249	0.078222	0.015579	10.64152	0.378577	0.11454	0.404854	2.517257	0.022732	15.52808	0.414494	0.14454	0.404854	2.517257	0.045	0.379965	82.24088	8.943879	0.007893	0.025272	0.000545
Sonoma	2030	SBUS	Aggregate	Aggregate	Diesel	396.9095	8624.815	8624.815	0	5747.25	2.567954	18.52061	0.514688	0.014637	0.011241	0	0.003	0.015721	0.015299	0.01175	0	0.012	0.044917	1145.501	2202.648	0	0.002428	0.008039	0	0.180474	0.347028	0	0.052268	0.173088	0	0	0	0	0.055504	0.197047	0	0	0	0	0.164826	0.16313	5.167433	0	0.010847	0.020858	0
Sonoma	2030	SBUS	Aggregate	Aggregate	Electricity	19.89124	588.3571	0	588.3571	264.8425	0	0	0	0	0	0	0.002804	0.00786	0	0	0	0.011217	0.022459	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	SBUS	Aggregate	Aggregate	Natural Ga	29.87439	693.279	693.279	0	432.5812	0.589197	5.287795	0	0.003378	0.010954	0	0.003	0.015721	0.003674	0.011914	0	0.012	0.044917	1247.825	3977.009	0	3.492392	15.4653	0	0.254377	0.810739	0	0.049899	0.220969	0	0	0	0	3.564242	15.78348	0	0	0	0	1.06	11.91122	19.83808	0	0	0	0
Sonoma	2030	UBUS	Aggregate	Aggregate	Gasoline	48.69525	3527.976	3527.976	0	194.781	0.072783	0	0.480798	0.001212	0	0.000345	0.002	0.254	0.033539	0.001318	0	0.000375	0.009016	0.095826	1105.925	0	55.60481	0.00194	0	0.059744	0.007788	0	0.061083	0.005777	0	0.232539	0.027469	0.099548	0.385851	0.00843	0	0.254601	0.027469	0.099548	0.385851	0.045	0.50214	0	7.124608	0.010933	0	0.00055
Sonoma	2030	UBUS	Aggregate	Aggregate	Diesel	56.14719	5633.031	5633.031	0	224.5888	0.377226	0	0	0.006857	0	0	0.008129	0.0385	0.007168	0	0	0.032514	0.11	1195.998	0	0	0.003156	0	0	0.18843	0	0	0.06795	0	0	0	0	0	0.077356	0	0	0	0	0	0.22	0.077533	0	0	0.011333	0	0
Sonoma	2030	UBUS	Aggregate	Aggregate	Electricity	14.65998	1857.657	0	1857.657	58.63992	0	0	0	0	0	0	0.006942	0.01925	0	0	0	0.027769	0.055	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonoma	2030	UBUS	Aggregate	Aggregate	Natural Ga	22.23797	2443.971	2443.971	0	88.9519	0.13016	0	0	0.000246	0	0	0.007859	0.0385	0.000257	0	0	0.031435	0.11	1309.397	0	0	3.516398	0	0	0.266929	0	0	0.050242	0	0	0	0	0	3.588742	0	0	0	0	0	0.97	41.82134	0	0	0	0	0

CalEEMod EMFAC2021 Emission Factors Input

Season	EmissionType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
A	CH4_IDLEX	0	0	0	0	0.004002	0.002599	0.012076	0.158044621	0.007896	0	0	0.093739	0
A	CH4_RUNEX	0.001486	0.005038	0.002191	0.002623	0.007502	0.006021	0.007548	0.04797817	0.010072	0.640186559	0.17227	0.184466	0.007638
A	CH4_STREX	0.051242	0.097523	0.068398	0.081057	0.016721	0.009262	0.005667	3.82537E-08	0.019135	0.020525139	0.192786	0.002684	0.022077
A	CO_IDLEX	0	0	0	0	0.165773	0.130233	0.632138	4.499144361	0.669033	0	0	1.193011	0
A	CO_RUNEX	0.542545	1.231638	0.709444	0.769447	0.784235	0.498458	0.154774	0.502112997	0.486056	7.756167471	13.62555	0.823552	0.516213
A	CO_STREX	2.364446	4.982249	3.133335	3.424152	1.723851	0.987404	0.641344	0.001017637	2.15797	2.447675863	8.599194	0.347459	1.845754
A	CO2_NBIO_IDLEX	0	0	0	0	8.776507	14.23087	151.6694	667.0067336	102.0933	0	0	172.9323	0
A	CO2_NBIO_RUNEX	223.7073	305.4603	307.916	372.6941	705.5937	775.4584	1064.948	1456.963698	1369.237	1027.94879	188.9008	1011.564	1603.711
A	CO2_NBIO_STREX	58.16572	82.22509	79.3043	95.79318	13.80389	7.987382	5.750776	0.012185117	16.41109	19.10316457	50.69062	2.143326	18.38802
A	NOX_IDLEX	0	0	0	0	0.071971	0.105207	0.765536	3.576336104	0.373896	0	0	1.128316	0
A	NOX_RUNEX	0.027662	0.103888	0.049979	0.063542	0.873981	0.886498	0.617157	1.632002112	1.031839	0.200540925	0.599049	1.751867	1.834369
A	NOX_STREX	0.197151	0.364401	0.280313	0.340012	0.316877	0.19067	1.322037	2.636875785	0.879512	0.165179429	0.143541	0.474278	0.298507
A	PM10_IDLEX	0	0	0	0	0.000948	0.00152	0.000652	0.001949054	0.000392	0	0	0.000749	0
A	PM10_PMBW	0.008256	0.010685	0.010162	0.010329	0.075899	0.08885	0.043332	0.081286554	0.052892	0.132912514	0.012	0.043924	0.044934
A	PM10_PMTW	0.008	0.008	0.008	0.008	0.009807	0.010725	0.012	0.033915468	0.012	0.042780998	0.004	0.010944	0.013584
A	PM10_RUNEX	0.00093	0.001608	0.001089	0.001142	0.020325	0.025956	0.005509	0.021770224	0.018185	0.003391016	0.002009	0.010343	0.043058
A	PM10_STREX	0.001572	0.002636	0.001772	0.001844	0.000175	5.53E-05	6.95E-05	1.74831E-07	0.000188	0.000128921	0.003355	2.41E-05	0.000208
A	PM25_IDLEX	0	0	0	0	0.000907	0.001455	0.000623	0.001859496	0.000375	0	0	0.000714	0
A	PM25_PMBW	0.00289	0.00374	0.003557	0.003615	0.026564	0.031098	0.015166	0.028450294	0.018512	0.04651938	0.0042	0.015373	0.015727
A	PM25_PMTW	0.002	0.002	0.002	0.002	0.002452	0.002681	0.003	0.008478867	0.003	0.01069525	0.001	0.002736	0.003396
A	PM25_RUNEX	0.000856	0.001479	0.001002	0.001053	0.019413	0.02482	0.005265	0.020825004	0.017386	0.003231449	0.001878	0.00988	0.041161
A	PM25_STREX	0.001445	0.002424	0.001629	0.001696	0.000161	5.08E-05	6.39E-05	1.60751E-07	0.000173	0.000118538	0.00315	2.21E-05	0.000191
A	ROG_DIURN	0.265041	0.709205	0.305469	0.397011	0.108858	0.05307	0.015529	5.31225E-05	0.097988	0.033140013	4.994778	0.024448	25.26204
A	ROG_HTSK	0.069712	0.181933	0.077033	0.096019	0.026405	0.012197	0.003559	1.46014E-05	0.020287	0.00943693	3.556898	0.005615	5.995331
A	ROG_IDLEX	0	0	0	0	0.017857	0.014314	0.020078	0.283636011	0.052027	0	0	0.114583	0
A	ROG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
A	ROG_RUNEX	0.005361	0.022275	0.008329	0.01072	0.102344	0.114329	0.01474	0.016304923	0.04982	0.039066427	1.138941	0.040467	0.071035
A	ROG_RUNLS	0.201767	0.544621	0.231203	0.301216	0.158785	0.070447	0.030022	0.000133731	0.109149	0.034199975	3.992608	0.015728	0.148522
A	ROG_STREX	0.225343	0.50366	0.310376	0.39716	0.083243	0.044223	0.030341	2.07187E-07	0.10534	0.07988923	1.452324	0.014707	0.088353
A	SO2_IDLEX	0	0	0	0	8.49E-05	0.000136	0.001407	0.005809182	0.000967	0	0	0.00148	0
A	SO2_RUNEX	0.002211	0.00302	0.003044	0.003682	0.006857	0.007453	0.010075	0.013191837	0.013101	0.007606938	0.001867	0.009048	0.015679
A	SO2_STREX	0.000575	0.000813	0.000784	0.000947	0.000136	7.9E-05	5.69E-05	1.20462E-07	0.000162	0.000188854	0.000501	2.12E-05	0.000182
A	TOG_DIURN	0.265041	0.709205	0.305469	0.397011	0.108858	0.05307	0.015529	5.31225E-05	0.097988	0.033140013	0.134652	0.024448	25.26204
A	TOG_HTSK	0.069712	0.181933	0.077033	0.096019	0.026405	0.012197	0.003559	1.46014E-05	0.020287	0.00943693	3.556898	0.005615	5.995331
A	TOG_IDLEX	0	0	0	0	0.024836	0.018982	0.034782	0.468494471	0.066897	0	0	0.232798	0
A	TOG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
A	TOG_RUNEX	0.007809	0.032504	0.012137	0.015581	0.122007	0.131362	0.024261	0.066061059	0.067134	0.686067104	1.369677	0.230144	0.087197
A	TOG_RUNLS	0.201767	0.544621	0.231203	0.301216	0.158785	0.070447	0.030022	0.000133731	0.109149	0.034199975	3.992608	0.015728	0.148522
A	TOG_STREX	0.246722	0.551445	0.339823	0.43484	0.09114	0.048419	0.033219	2.26844E-07	0.115334	0.087468651	1.57884	0.016103	0.096736
A	N2O_IDLEX	0	0	0	0	0.000826	0.001846	0.023552	0.107566318	0.014695	0	0	0.024943	0
A	N2O_RUNEX	0.003572	0.008063	0.005058	0.006579	0.049794	0.083385	0.144182	0.232475625	0.149276	0.129341237	0.040918	0.134634	0.080099
A	N2O_STREX	0.027247	0.037359	0.0338	0.035899	0.025525	0.015535	0.003919	1.22219E-07	0.015327	0.020985331	0.00832	0.003039	0.031891

CalEEMod EMFAC2021 Fleet Mix Input

FleetMixLandUseSubType	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	0.491083	0.041177	0.215613	0.139447	0.040042	0.01098	0.019187	0.008731	0.000987	0.000428	0.026958	0.001547	0.003819

Attachment 4: Project Construction Emissions and Health Risk Calculations

270 & 280 Casa Grande Road, Petaluma, CA

DPM Construction Emissions and Modeling Emission Rates

Construction Year	Activity	DPM (ton/year)	Source Type	No. Sources	DPM Emissions (lb/yr)	(lb/hr)	(g/s)	Emissions per Point Source (g/s)
2023	Construction	0.0511	Point	373	102.2	0.03111	3.92E-03	1.05E-05
2024	Construction	0.0149	Point	373	29.8	0.00908	1.14E-03	3.07E-06
Total		***0.0660***			***132.0***	***0.0402***	***0.0051***	

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(8am -5pm)
days/yr =	365	
hours/year =	3285	

270 & 280 Casa Grande Road, Petaluma, CA

PM2.5 Fugitive Dust Construction Emissions for Modeling

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	(lb/yr)	(lb/hr)	(g/s)	Modeled Area (m^2)	DPM Emission Rate $g/s/m^2$
2022	Construction	CON_FUG	0.1054	210.8	0.06418	8.09E-03	18204.2	4.44E-07
2023	Construction	CON_FUG	0.0003	0.7	0.00020	2.53E-05	18204.2	1.39E-09
Total			***0.1058***	***211.5***	***0.0644***	***0.0081***		

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(8am -5pm)
days/yr =	365	
hours/year =	3285	

270 & 280 Casa Grande Road, Petaluma, CA
Construction Health Impact Summary

Maximum Impacts at MEI Location - Without Mitigation

Emissions Year	Maximum Concentrations Exhaust PM10/DPM ($\mu g/m^3$)	Maximum Concentrations Fugitive PM2.5 ($\mu g/m^3$)	Cancer Risk (per million) Infant/Child	Cancer Risk (per million) Adult	Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2023	0.0264	0.1622	4.70	0.08	0.01	0.19
2024	0.0077	0.0005	1.27	0.02	0.00	0.01
Total	-	-	**5.97**	**0.10**		-
Maximum	0.0264	0.1622	**-**	**-**	**0.01**	**0.19**

Maximum Impacts at Casa Grande High School

Construction Year	Unmitigated Emissions: Maximum Concentrations Exhaust PM10/DPM ($\mu g/m^3$)	Unmitigated Emissions: Maximum Concentrations Fugitive PM2.5 ($\mu g/m^3$)	Unmitigated Emissions: Child Cancer Risk (per million)	Unmitigated Emissions: Hazard Index (-)	Unmitigated Emissions: Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2023	0.0071	0.0202	0.45	0.0014	0.027
2024	0.0021	0.0001	0.13	0.0004	0.002
Total	-	-	**0.58**	-	-
Maximum	0.0071	0.0202	**-**	**0.0014**	**0.027**

270 & 280 Casa Grande Road, Petaluma, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Off-Site MEI Location - 4.5 meter receptor height

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
Parameter				
ASF =	10	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

			Infant/Child - Exposure Information				Adult - Exposure Information						
							Modeled				Maximum		
Exposure Year	**Exposure Duration (years)**	**Age**	**DPM Conc (ug/m3) Year**	**DPM Conc (ug/m3) Annual**	**Age Sensitivity Factor**	**Infant/Child Cancer Risk (per million)**	**DPM Conc (ug/m3) Year**	**DPM Conc (ug/m3) Annual**	**Age Sensitivity Factor**	**Adult Cancer Risk (per million)**	**Hazard Index**	**Fugitive PM2.5**	**Total PM2.5**
0	0.25	-0.25 - 0*	2023	0.0243	10	0.33	2023	0.0243	-	-			
1	1	0 - 1	2023	0.0243	10	3.99	2023	0.0243	1	0.07	0.005	0.159	0.18
2	1	1 - 2	2024	0.0071	10	1.17	2024	0.0071	1	0.02	0.001	0.000	0.01
3	1	2 - 3		0.0000	3	0.00		0.0000	1	0.00			
4	1	3 - 4		0.0000	3	0.00		0.0000	1	0.00			
5	1	4 - 5		0.0000	3	0.00		0.0000	1	0.00			
6	1	5 - 6		0.0000	3	0.00		0.0000	1	0.00			
7	1	6 - 7		0.0000	3	0.00		0.0000	1	0.00			
8	1	7 - 8		0.0000	3	0.00		0.0000	1	0.00			
9	1	8 - 9		0.0000	3	0.00		0.0000	1	0.00			
10	1	9 - 10		0.0000	3	0.00		0.0000	1	0.00			
11	1	10 - 11		0.0000	3	0.00		0.0000	1	0.00			
12	1	11 - 12		0.0000	3	0.00		0.0000	1	0.00			
13	1	12 - 13		0.0000	3	0.00		0.0000	1	0.00			
14	1	13 - 14		0.0000	3	0.00		0.0000	1	0.00			
15	1	14 - 15		0.0000	3	0.00		0.0000	1	0.00			
16	1	15 - 16		0.0000	3	0.00		0.0000	1	0.00			
17	1	16-17		0.0000	1	0.00		0.0000	1	0.00			
18	1	17-18		0.0000	1	0.00		0.0000	1	0.00			
19	1	18-19		0.0000	1	0.00		0.0000	1	0.00			
20	1	19-20		0.0000	1	0.00		0.0000	1	0.00			
21	1	20-21		0.0000	1	0.00		0.0000	1	0.00			
22	1	21-22		0.0000	1	0.00		0.0000	1	0.00			
23	1	22-23		0.0000	1	0.00		0.0000	1	0.00			
24	1	23-24		0.0000	1	0.00		0.0000	1	0.00			
25	1	24-25		0.0000	1	0.00		0.0000	1	0.00			
26	1	25-26		0.0000	1	0.00		0.0000	1	0.00			
27	1	26-27		0.0000	1	0.00		0.0000	1	0.00			
28	1	27-28		0.0000	1	0.00		0.0000	1	0.00			
29	1	28-29		0.0000	1	0.00		0.0000	1	0.00			
30	1	29-30		0.0000	1	0.00		0.0000	1	0.00			
Total Increased Cancer Risk						**5.49**				**0.09**			

* Third trimester of pregnancy

270 & 280 Casa Grande Road, Petaluma, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Off-Site MEI Location - 1.5 meter receptor height

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child			Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 16**	**16 - 30**
Parameter				
ASF =	10	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

			Infant/Child - Exposure Information				Adult - Exposure Information						
							Modeled				Maximum		
			DPM Conc (ug/m3)				DPM Conc (ug/m3)						
Exposure Year	**Exposure Duration (years)**	**Age**	**Year**	**Annual**	**Age Sensitivity Factor**	**Infant/Child Cancer Risk (per million)**	**Year**	**Annual**	**Age Sensitivity Factor**	**Adult Cancer Risk (per million)**	**Hazard Index**	**Fugitive PM2.5**	**Total PM2.5**
0	0.25	-0.25 - 0*	2023	0.0264	10	0.36	2023	0.0264	-	-			
1	1	0 - 1	2023	0.0264	10	4.34	2023	0.0264	1	0.08	0.01	0.162	0.19
2	1	1 - 2	2024	0.0077	10	1.27	2024	0.0077	1	0.02	0.00	0.001	0.01
3	1	2 - 3		0.0000	3	0.00		0.0000	1	0.00			
4	1	3 - 4		0.0000	3	0.00		0.0000	1	0.00			
5	1	4 - 5		0.0000	3	0.00		0.0000	1	0.00			
6	1	5 - 6		0.0000	3	0.00		0.0000	1	0.00			
7	1	6 - 7		0.0000	3	0.00		0.0000	1	0.00			
8	1	7 - 8		0.0000	3	0.00		0.0000	1	0.00			
9	1	8 - 9		0.0000	3	0.00		0.0000	1	0.00			
10	1	9 - 10		0.0000	3	0.00		0.0000	1	0.00			
11	1	10 - 11		0.0000	3	0.00		0.0000	1	0.00			
12	1	11 - 12		0.0000	3	0.00		0.0000	1	0.00			
13	1	12 - 13		0.0000	3	0.00		0.0000	1	0.00			
14	1	13 - 14		0.0000	3	0.00		0.0000	1	0.00			
15	1	14 - 15		0.0000	3	0.00		0.0000	1	0.00			
16	1	15 - 16		0.0000	3	0.00		0.0000	1	0.00			
17	1	16-17		0.0000	1	0.00		0.0000	1	0.00			
18	1	17-18		0.0000	1	0.00		0.0000	1	0.00			
19	1	18-19		0.0000	1	0.00		0.0000	1	0.00			
20	1	19-20		0.0000	1	0.00		0.0000	1	0.00			
21	1	20-21		0.0000	1	0.00		0.0000	1	0.00			
22	1	21-22		0.0000	1	0.00		0.0000	1	0.00			
23	1	22-23		0.0000	1	0.00		0.0000	1	0.00			
24	1	23-24		0.0000	1	0.00		0.0000	1	0.00			
25	1	24-25		0.0000	1	0.00		0.0000	1	0.00			
26	1	25-26		0.0000	1	0.00		0.0000	1	0.00			
27	1	26-27		0.0000	1	0.00		0.0000	1	0.00			
28	1	27-28		0.0000	1	0.00		0.0000	1	0.00			
29	1	28-29		0.0000	1	0.00		0.0000	1	0.00			
30	1	29-30		0.0000	1	0.00		0.0000	1	0.00			
Total Increased Cancer Risk						**5.97**				**0.10**			

* Third trimester of pregnancy

270 & 280 Casa Grande Road, Petaluma, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Casa Grande High School - 1.5 meter - Child Exposure

Student Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)

Inhalation Dose = C_{air} x SAF x 8-Hr BR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
SAF = Student Adjustment Factor (unitless)
= (24 hrs/9 hrs) x (7 days/5 days) = 3.73
8-Hr BR = Eight-hour breathing rate (L/kg body weight-per 8 hrs)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	School Infant	School Child	Adult
Age -->	**0 - <2**	**2 - <16**	**16 - 30**
Parameter			
ASF =	10	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00
8-Hr BR* =	1200	520	240
A =	1	1	1
EF =	250	250	250
AT =	70	70	70
SAF =	3.73	3.73	1.00

* 95th percentile 8-hr breathing rates for moderate intensity activities

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Child - Exposure Information: DPM Conc (ug/m3) Year	DPM Conc (ug/m3) Annual	Age* Sensitivity Factor	Child Cancer Risk (per million)
1	1	13 - 14	2023	0.0071	3	0.4
2	1	14 - 15	2024	0.0021	3	0.1
3	1			0.0000	3	0.0
4	1			0.0000	3	0.0
5	1			0.0000	3	0.0
6	1			0.0000	3	0.0
7	1			0.0000	3	0.0
8	1			0.0000	3	0.0
9	1			0.0000	3	0.0
Total Increased Cancer Risk						**0.58**

Maximum Hazard Index	Maximum Fugitive PM2.5	Maximum Total PM2.5
0.0014	0.0202	0.027
0.0004	0.0001	0.002

* Children assumed to be 13 years of age or older with 3 years of Construction Exposure

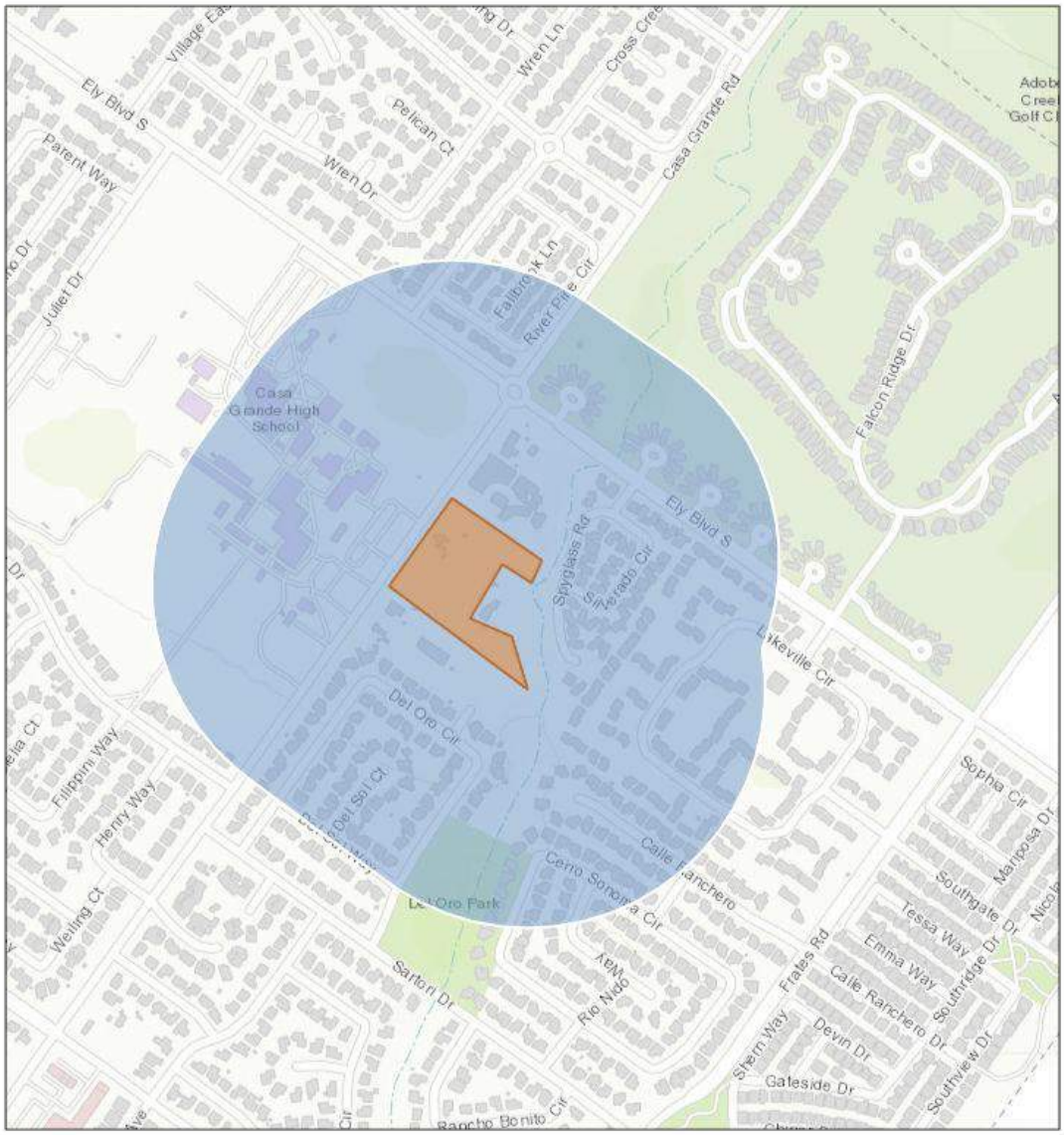
Attachment 5: Community Risk Modeling Information and Calculations

Stationary Source Risk & Hazards Screening Report

Area of Interest (AOI) Information

Area : 5,591,561.68 ft²

Dec 16 2021 11:23:02 Pacific Standard Time



1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

County of Marin, County of Napa, Sonoma County, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA

Summary

Name	Count	Area(ft^2)	Length(ft)
Permitted Facilities 2018	0	N/A	N/A

Note: The estimated risk and hazard impacts from these sources would be expected to be substantially lower when site specific Health Risk Screening Assessments are conducted.

The screening level map is not recommended for evaluating sensitive land uses such as schools, senior centers, day cares, and health facilities.

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