# Memorandum

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| **To:** | Lindsay Poulin, Gonzales Development Company |
| **From:** | Claire Bromund, Project Manager |
| **Prepared By:** | Jacqueline Mansoor, Air Quality and Climate Change Specialist<br>Cory Matsui, Air Quality and Climate Change Senior Manager |
| **Date:** | April 14, 2022 |
| **Re:** | **Air Quality and Greenhouse Gas Analysis for the Notre Dame Boulevard Bridge Project in the City of Chico, California** |

# Introduction

Gonzales Development Company proposes constructing a new two-lane bridge across Little Chico Creek and completing the planned Notre Dame Boulevard roadway link from Emerson Way, south of Little Chico Creek, to the terminus of Notre Dame Boulevard north of the creek in the city of Chico. The project road segment is approximately 500 feet in length and would include width for bicycle and pedestrian facilities.

This memorandum was prepared to provide an impact analysis of criteria pollutant, toxic air contaminant (TAC), and greenhouse gas (GHG) emissions resulting from construction and operation of the project according to the City of Chico (City) standards with respect to the California Environmental Quality Act (CEQA). Potential air quality and GHG emissions generated by construction and operation of the project are presented. This analysis demonstrates that neither construction nor long-term operation of the project would result in any significant air quality or GHG impacts, as described below.

# Air Quality

This section describes ambient air quality conditions, including existing pollutant concentrations, meteorology, and locations of sensitive receptors in the air quality study area. The section also discusses applicable air quality regulations as they pertain to the proposed project and describes the air quality impacts that would result from construction and operation of the proposed project.

# Existing Conditions

## Regulatory Setting

The federal Clean Air Act (CAA) and its subsequent amendments form the basis for the nation's air pollution control effort. The U.S. Environmental Protection Agency (USEPA) is responsible for implementing most aspects of the CAA. A key element of the CAA is the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The CAA delegates enforcement of the NAAQS to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations and ensuring the NAAQS and California Ambient Air Quality Standards (CAAQS) are met. CARB, in turn, delegates regulatory authority for stationary sources and other air quality management responsibilities to local air agencies. The Butte County Air Quality Management District (BCAQMD) is the local air agency with jurisdiction over the project area. The following sections provide more detailed information on federal, state, and local air quality regulations that apply to the project.

### Federal

#### Clean Air Act and National Ambient Air Quality Standards

The CAA was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as NAAQS, for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 1 shows the NAAQS currently in effect for each criteria pollutant, as well as the CAAQS (discussed further below).

**Table 1. Federal and State Ambient Air Quality Standards**

| | | | National Standards[a] | |
|---|---|---|---|---|
| **Criteria Pollutant** | **Average Time** | **California Standards** | **Primary** | **Secondary** |
| Ozone | 1-hour | 0.09 ppm | None[b] | None[b] |
| | 8–hour | 0.070 ppm | 0.070 ppm | 0.070 ppm |
| Particulate Matter (PM10) | 24-hour | 50 μg/m³ | 150 μg/m³ | 150 μg/m³ |
| | Annual mean | 20 μg/m³ | None | None |
| Fine Particulate Matter (PM2.5) | 24-hour | None | 35 μg/m³ | 35 μg/m³ |
| | Annual mean | 12 μg/m³ | 12.0 μg/m³ | 15 μg/m³ |
| Carbon Monoxide | 8-hour | 9.0 ppm | 9 ppm | None |
| | 1-hour | 20 ppm | 35 ppm | None |
| Nitrogen Dioxide | Annual mean | 0.030 ppm | 0.053 ppm | 0.053 ppm |
| | 1-hour | 0.18 ppm | 0.100 ppm | None |
| Sulfur Dioxide[c] | Annual mean | None | 0.030 ppm | None |
| | 24-hour | 0.04 ppm | 0.014 ppm | None |
| | 3-hour | None | None | 0.5 ppm |
| | 1-hour | 0.25 ppm | 0.075 ppm | None |
| Lead | 30-day Average | 1.5 μg/m³ | None | None |
| | Calendar quarter | None | 1.5 μg/m³ | 1.5 μg/m³ |
| | 3-month average | None | 0.15 μg/m³ | 0.15 μg/m³ |
| Sulfates | 24-hour | 25 μg/m³ | None | None |
| Visibility-reducing Particles | 8-hour | -[d] | None | None |
| Hydrogen Sulfide | 1-hour | 0.03 ppm | None | None |
| Vinyl Chloride | 24-hour | 0.01 ppm | None | None |

Source: California Air Resources Board 2016.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for State Implementation Plans.

[c] The annual and 24-hour NAAQS for $SO_2$ only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual NAAQS.

[d] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.

ppm= parts per million; μg/m³ = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standard; $SO_2$ = sulfur dioxide; CAAQS = California Ambient Air Quality Standard

### Non-Road Diesel Rule

USEPA has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and locomotives. New equipment used within the project site, including heavy-duty trucks and off-road construction are required to comply with these emission standards.

### Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy (CAFE) standards were first enacted in 1975 to improve the average fuel economy of cars and light duty trucks. On August 2, 2018, the National Highway Traffic Safety Administrative (NHTSA) and USEPA proposed to amend the fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule). On September 19, 2019, USEPA and NHTSA issued a final action on the One National Program Rule, which is considered Part One of the SAFE Vehicles Rule and a precursor to the proposed fuel efficiency standards. The One National Program Rule enables USEPA/NHTSA to provide nationwide uniform fuel economy and GHG vehicle standards, specifically by 1) clarifying that federal law preempts state and local tailpipe GHG standards, 2) affirming NHTSA's statutory authority to set nationally applicable fuel economy standards, and 3) withdrawing California's CAA preemption waiver to set state-specific standards.

USEPA and NHTSA published their decisions to withdraw California's waiver and finalize regulatory text related to the preemption on September 27, 2019 (84 Fed. Reg. 51310). California, 22 other states, the District of Columbia, and two cities filed suit against Part One of the SAFE Vehicles Rule on September 20, 2019 (California et al. v. United States Department of Transportation et al., 1:19-cv-02826, U.S. District Court for the District of Columbia). The lawsuit requests a "permanent injunction prohibiting Defendants from implementing or relying on the Preemption Regulation."

On December 12, 2021, NHTSA repealed the SAFE Vehicles Rule, Part One, and, on December 19, 2021, NHTSA finalized its vehicle efficiency standards rule to reach a projected industry-wide target of 40 miles per gallon by 2026, an approximately 25 percent increase over the prior SAFE rule. Lastly, on March 9, 2022, the EPA reinstated California's authority under the CAA to implement its own GHG emission standards and zero emission vehicles (ZEV) sales mandate. This action concludes the EPA reconsideration of 2019's SAFE Vehicles Rule, Part One by finding that the actions taken under the previous administration as a part of SAFE-1 were decided in error and are now entirely rescinded (USEPA 2022a).

## State

### California Clean Air Act and California Ambient Air Quality Standards

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than

NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown in Table 1.

CARB and local air districts bear responsibility for meeting the CAAQS, which are to be achieved through district-level air quality management plans incorporated into the SIP. In California, EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures.

### Statewide Truck and Bus Regulation

Originally adopted in 2005, the on-road truck and bus regulation requires heavy trucks to be retrofitted with particulate matter filters. The regulation applies to privately and federally owned diesel-fueled trucks with a gross vehicle weight rating greater than 14,000 pounds. Compliance with the regulation can be reached through one of two paths: (1) vehicle retrofits according to engine year or (2) phase-in schedule. Compliance paths ensure that by January 2023, nearly all trucks and buses will have 2010 model year engines or newer.

### State Tailpipe Emission Standards

Like USEPA at the federal level, CARB has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft operating in California. New equipment used to construct the Project would be required to comply with the standards.

### Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer the Carl Moyer Program.

### Toxic Air Contaminant Regulations

California regulates TACs primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 ("Hot Spots" Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California's program to reduce exposure to air toxics. The "Hot Spots" Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

CARB has identified diesel particulate matter (DPM) as a TAC and has approved a comprehensive *Diesel Risk Reduction Plan* (2000) to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM emissions and the associated health risk by 75 percent by 2010 and by 85 percent by 2020. The plan identifies 14 measures that CARB will implement to reduce DPM over the next several years. The project would be required to comply with any applicable diesel control measures from the *Diesel Risk Reduction Plan*.

## Local

### Butte County Air Quality Management District

At the local level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA. The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The project is in the Northern Sacramento Valley Air Basin (NSVAB) and falls under the jurisdiction of the BCAQMD. BCAQMD developed advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its *CEQA Air Quality Handbook (*BCAQMD 2014). BCAQMD has also adopted air quality plans to improve air quality and protect public health, including the *2017 Chico, CA/Butte County PM2.5 Nonattainment Area Redesignation Request and Maintenance Plan* (BCAQMD 2017) and *Northern Sacramento Valley Planning Area 2015 Triennial Air Quality Attainment Plan* (AQAP) (BCAQMD 2015).

The AQAP includes an assessment of progress towards achieving the control measure commitments in the previous versions of the AQAP, a summary of the last three years of ozone ($O_3$) data, a comparison of the expected versus actual emission reductions for each measure committed to in the previous Triennial Plan, updated control measure commitments, and updated growth rates of population, industry, and vehicle related emissions.

In addition to air quality plans, BCAQMD also adopts rules and regulations to improve existing and future air quality. The project may be subject to the following district rules.

- **Rule 200 (Nuisance)**—This regulation prevents discharge from any non-vehicular source quantities of air contaminants which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or which cause injury or damage to business or property.
- **Rule 201 (Visible Emissions)**—This regulation restricts stationary diesel-powered equipment from emitting PM darker than No. 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.
- **Rule 205 (Fugitive Dust)**—This regulation requires that fugitive dust emissions be prevented from being airborne beyond the property line of the emission source and requires implementation of best available control measures.

- **Rule 230 (Architectural Coatings)**—This regulation limits the quantity of reactive organic gases (ROG) in architectural coatings.
- **Rule 231 (Cutback and Emulsified Asphalt)**—This regulation limits the quantity of ROG from the use of cutback and emulsified asphalt in paving, construction, or maintenance of parking lots, driveways, streets, and highways.

## Environmental Setting

This section describes the environmental setting relevant to air quality. The proposed project would be in the city of Chico, which is within the NSVAB. The NSVAB comprises the regional air quality study area for the proposed project. Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following sections summarize how air pollution moves through the air, water, and soil within the NSVAB, and how it is chemically changed in the presence of other chemicals and particles. This section also summarizes local climate conditions, existing air quality conditions, and sensitive receptors that may be affected by the project-generated emissions.

### Pollutants of Concern

#### Criteria Air Pollutants

As described above, the federal and state governments have established ambient air quality standards for six criteria pollutants. Ozone is considered a regional pollutant because its precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), and lead are considered local pollutants that tend to accumulate in the air locally. PM is both a regional and local pollutant. The primary criteria pollutants generated by the proposed project are ozone precursors—nitrogen oxides ($NO_x$) and ROG—as well as CO and PM.[1,2]

All criteria pollutants can have human health effects at certain concentrations. The ambient air quality standards for these pollutants are set to public health and the environment with an adequate margin of safety (CAA Section 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants, and form the scientific basis for new and revised ambient air quality standards.

Principal characteristics and possible health and environmental effects from exposure to the primary criteria pollutants generated by the proposed project are discussed below.

**Ozone**, or smog, is photochemical oxidant that is formed when ROG and $NO_X$ (both by-products of the internal combustion engine) react with sunlight. ROG are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major

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[1] As discussed above, there are also ambient air quality standards for sulfur dioxide, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility particulates. However, these pollutants are typically associated with industrial sources, which are not included as part of the Project. Accordingly, they are not evaluated further.

[2] Most emission of NOx are in the form of NO (Reşitoğlu 2018). Conversion to $NO_2$ occurs in the atmosphere as pollutants disperse downwind. Accordingly, $NO_2$ is not considered a local pollutant of concern for the proposed project and is not evaluated further.

source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of $NO_X$ are nitric oxide (NO) and $NO_2$. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. $NO_2$ is a reddish-brown irritating gas formed by the combination of NO and oxygen. In addition to serving as an integral participant in ozone formation, $NO_X$ also directly acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

Ozone poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoor. Exposure to ozone at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggregate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary diesel. Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (USEPA 2019a). The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrement in forced airway volume in the most responsive individual. Although the results vary, evidence suggest that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (USEPA 2016).

In addition to human health effect, ozone has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death. Ozone can also act as a corrosive and oxidant, resulting in property damage such as the degradation of rubber products and other materials.

**Carbon monoxide** is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. In the study area, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects to ambient CO (CARB 2019a).

**Particulate matter** consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of particulates are now generally considered: inhalable coarse particles (PM10), and inhalable fine particles (PM2.5). Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading.

Particulate pollution can be transported over long distances and may adversely affect the human, especially for people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lunch function, and increased respiratory symptoms. Depending on its composition, both PM10 and PM2.5 can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (USEPA 2018a).

**Toxic Air Contaminants**

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for TACs. A TAC is defined by California law as an air pollutant that "may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." The primary TACs of concern associated with the project are asbestos and MSAT, including DPM.

Asbestos is the name given to several naturally occurring fibrous silicate minerals. Naturally occurring asbestos (NOA), which can be found in rock or soil, has been identified by CARB as a TAC. BCAQMD has identified areas in Butte County where NOA may be present (BCAQMD 2018). These areas are not within the limits of the proposed project. There are no geologic features normally associated with NOA (i.e., serpentine rock or ultramafic rock near fault zones) in or near the project area (California Department of Conservation 2000). Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities.

Before the adverse health effects of asbestos were identified, asbestos was widely used as insulation and fireproofing in buildings, and it can still be found in some older buildings and other structures such as bridges. The inhalation of asbestos fibers into the lungs can result in a variety of adverse health effects, including inflammation of the lungs, respiratory ailments (e.g., asbestosis, which is scarring of lung tissue that results in constricted breathing), and cancer (e.g., lung cancer and mesothelioma, which is cancer of the linings of the lungs and abdomen).

MSATs are a group of 93 compounds emitted from mobile sources that are regulated under USEPA's 2007 Rule on the Control of Hazardous Air Pollutants from Mobile Sources. USEPA has further identified nine compounds with significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers. These are acrolein, benzene, 1,3-butadiene, acetaldehyde, DPM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. CARB estimates that DPM emissions are responsible for about 70 percent of the total ambient air toxics risk in California (CARB 2019b). Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm). USEPA has determined that diesel exhaust is "likely to be carcinogenic to humans by inhalation" (USEPA 2002).

**Odors**

Offensive odors can be unpleasant and lead to citizen complaints to local governments and air districts. According to CARB's (2005) *Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, manufacturing, and agricultural activities. CARB provides recommended screening distances for siting new receptors near existing odor sources.

## Climate and Meteorology

While the primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources, meteorological conditions and topography are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Unique geographic features throughout the state define fifteen air basins with distinctive regional climates. As discussed above, the City of Chico is located within the NSVAB.

Emissions from the urbanized portion of the NSVAB (Sacramento, Yolo, Solano, and Placer Counties) dominate the emission inventory for the Sacramento Valley Air Basin (SVAB), and on-road motor vehicles are the primary source of emissions in the Sacramento metropolitan area. While pollutant concentrations have generally declined over the years, additional emission reductions will be needed to attain the State and national ambient air quality standards in the SVAB.

Seasonal weather patterns have a significant effect upon regional and local air quality. The Sacramento Valley and Butte County have a Mediterranean climate, characterized by hot, dry summers and cool, wet winters. Winter weather is governed by cyclonic storms from the North Pacific, while summer weather is typically subject to a high-pressure cell that deflects storms from the region.

In Butte County, winters are generally mild with daytime average temperatures in the low 50s °F and nighttime temperatures in the upper 30s °F. Temperatures range from an average January low of approximately 36°F to an average July high of approximately 96°F, although periodic lower and higher temperatures are common. Rainfall between October and May averages about 26 inches but varies considerably year to year. Heavy snowfall often occurs in the northeastern mountainous portion of the County. Periodic rainstorms contrast with occasional stagnant weather and thick ground or "tule" fog in the moister, flatter parts of the valley. Winter winds generally come from the south, although north winds also occur.

Diminished air quality within Butte County largely results from local air pollution sources, transport of pollutants into the area from the south, the NSVAB topography, prevailing wind patterns, and certain inversion conditions that differ with the season. During the summer, sinking air forms a "lid" over the region, confining pollution within a shallow layer near the ground that leads to photochemical smog and visibility problems. During winter nights, air near the ground cools while the air above remains relatively warm, resulting in little air movement and localized pollution "hot spots" near emission sources. $NO_2$, CO, PM, and lead particulate concentrations tend to elevate during winter inversion conditions when little air movement may persist for weeks.

As a result, high levels of PM and ground-level $O_3$ are the pollutants of most concern to the NSVAB Districts. $O_3$ levels tend to be highest in Butte County during late spring through early fall, when sunlight is strong and constant, and emissions of the precursor pollutants are highest (BCAQMD 2014).

## Existing Air Quality Conditions

### Local Monitoring Data

CARB collects ambient air quality data through a network of air monitoring stations throughout the state to monitor progress toward air quality standards attainment of NAAQS and CAAQS. The nearest monitoring station to the project area is the Chico East Avenue monitoring station, which is located approximately 3.0 miles northwest of the project area. The Chico East Avenue station monitors $O_3$, CO, PM, and $NO_2$.

Table 2 summarizes data for criteria air pollutant levels for the last 3 years in which complete data are available (2018 through 2020) and also provides an annual average for this period. Table 2 shows the Chico East Avenue station experienced violations of the state and federal $O_3$, CO, PM10, and PM2.5 standards.

**Table 2. Ambient Air Quality Monitoring Data Measured at the Chico East Avenue Monitoring Station**

| Pollutant Standards | 2018 | 2019 | 2020 | 3-Year Average |
|---|---|---|---|---|
| **Ozone ($O_3$)** | | | | |
| Maximum 1-hour concentration (ppm) | 0.076 | 0.072 | 0.097 | 0.082 |
| Maximum 8-hour concentration (ppm) | 0.069 | 0.064 | 0.083 | 0.072 |
| ***Number of days standard exceeded***[a] | | | | |
| CAAQS 1-hour (>0.09 ppm) | 0 | 0 | 1 | |
| CAAQS 8-hour (>0.070 ppm) | 0 | 0 | 1 | |
| NAAQS 8-hour (>0.070 ppm) | 0 | 0 | 1 | |
| **Nitrogen Dioxide ($NO_2$)** | | | | |
| State maximum 1-hour concentration (ppb) | 51 | 42 | 33 | 42.3 |
| State second-highest 1-hour concentration (ppb) | 47 | 39 | 31 | 39.0 |
| Annual average concentration (ppb) | 6 | 7 | 5 | 6.0 |
| ***Number of days standard exceeded***[a] | | | | |
| CAAQS 1-hour (180 ppb) | 0 | 0 | 0 | |
| **Particulate Matter (PM10)** | | | | |
| National[b] maximum 24-hour concentration (μg/m$^3$) | 454.0 | 54.4 | 391.3 | 299.9 |
| National[b] second-highest 24-hour concentration (μg/m$^3$) | 339.1 | 54.1 | 325.8 | 239.7 |
| State[c] maximum 24-hour concentration (μg/m$^3$) | 478.7 | 55.7 | 387.0 | 307.1 |
| State[c] second-highest 24-hour concentration (μg/m$^3$) | 361.7 | 53.1 | 321.6 | 245.5 |
| National annual average concentration (μg/m$^3$) | 31.4 | 20.4 | 35.6 | 29.1 |
| State annual average concentration (μg/m$^3$)[d] | 32.3 | * | * | * |
| ***Number of days standard exceeded***[a,e] | | | | |
| NAAQS 24-hour (>150 μg/m$^3$) | 9.0 | 0.0 | 10.0 | |

| Pollutant Standards | 2018 | 2019 | 2020 | 3-Year Average |
|---|---|---|---|---|
| CAAQS 24-hour (>50 μg/m$^3$) | 40 | 4 | 53 | |
| **Particulate Matter (PM2.5)** | | | | |
| National[f] maximum 24-hour concentration (μg/m$^3$) | 411.7 | 34.6 | 329.3 | 258.5 |
| National[f] second-highest 24-hour concentration (μg/m$^3$) | 299.9 | 33.8 | 227.6 | 187.1 |
| State[g] maximum 24-hour concentration (μg/m$^3$) | 417.0 | 34.6 | 329.3 | 260.3 |
| State[g] second-highest 24-hour concentration (μg/m$^3$) | 306.2 | 33.8 | 227.6 | 189.2 |
| National annual average concentration (μg/m$^3$) | 13.7 | 7.0 | 15.9 | 12.2 |
| State annual average concentration (μg/m$^3$) | 18.1 | * | 16.1 | * |
| ***Measured number of days standard exceeded[a]*** | | | | |
| NAAQS 24-hour (>35 μg/m$^3$) | 18 | 0 | 33 | |
| **Carbon Monoxide (CO)** | | | | |
| Maximum 8-hour concentration (ppm) | 12.8 | 1.3 | 4.9 | 6 |
| Maximum 1-hour concentration (ppm) | 20.7 | 1.6 | 7.4 | 9.9 |
| ***Measured number of days standard exceeded[a]*** | | | | |
| NAAQS 8-hour (>9 ppm) | 6 | 0 | 0 | |
| CAAQS 8-hour (>9.0 ppm) | * | * | * | |
| NAAQS 1-hour (>35 ppm) | 0 | 0 | 0 | |
| CAAQS 1-hour (>20 ppm) | * | * | * | |

Source: CARB 2022a and USEPA 2022b.

Notes:
ppm= parts per million
NAAQS = National Ambient Air Quality Standards
CAAQS = California Ambient Air Quality Standards
μg/m$^3$ = micrograms per cubic meter
mg/m$^3$ = milligrams per cubic meter
* = insufficient data available to determine the value

a An exceedance is not necessarily related to a violation of the standard.
b National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
c State statistics are based on approved local samplers and local conditions data.
d State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
e Measurements usually are collected every 6 days.

## Regional Attainment Status

Local monitoring data are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the ambient air quality standards. The four designations are further defined as shown below.

- Nonattainment—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.

- Attainment—assigned to areas where pollutant concentrations meet the standard in question over a designated period.
- Unclassified—assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Tables 3 summarizes the attainment status of Butte County.

**Table 3. Federal and State Ambient Air Quality Attainment Status for Butte County**

| Criteria Pollutant | Federal Designation | State Designation |
|---|---|---|
| $O_3$ (8-hour) | Marginal Nonattainment | Nonattainment |
| CO | Attainment | Attainment |
| PM10 | Attainment | Nonattainment |
| PM2.5 | Moderate Maintenance (P)[a] | Nonattainment |
| $NO_2$ | Attainment | Attainment |
| $SO_2$ | Attainment | Attainment |
| Lead | Attainment | Attainment |
| Sulfates | (No Federal Standard) | Attainment |
| Hydrogen Sulfide | (No Federal Standard) | Unclassified |
| Visibility Reducing Particles | (No Federal Standard) | Unclassified |

Source: CARB 2018; USEPA 2019b.
CO = carbon monoxide; PM10 = particulate matter less than or equal to 10 microns; PM2.5 = particulate matter less than or equal to 2.5 microns; $NO_2$ = nitrogen dioxide; $SO_2$ = sulfur dioxide
[a] Designation applies to the Chico urbanized area, inclusive of the project area.

## Sensitive Receptors

Sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (i.e., 24-hour, 8-hour). Typical sensitive receptors are residences, hospitals, nursing homes, day care centers, schools, and religious centers (BCAQMD 2014). Offices and other places of employment are not considered sensitive receptors because health-sensitive individuals (e.g., children and seniors) are not present.

Figure 2, at the end of this memorandum, shows the location of the existing sensitive receptors that are within 1,000 feet of the proposed project. Most of the bordering land consists of open space, however, there are several sensitive receptors in proximity to the proposed project. The closest sensitive receptor is a park with a playground south and adjacent to the proposed project along Emerson Way next to the Parkside Terrace residential development. The Murphy Commons Apartments to the north are approximately 200 feet from the proposed project. Little Chico Creek Elementary is approximately 350 feet west, and Marsh Junior High School is approximately 460 feet north of the proposed project. Additionally, there are several residential developments within a 1,000 feet radius of the proposed project including the Amanda Place Apartments (945 feet northwest), the Chico Commons Apartments (980 feet west), the development along Hartford and

Bedford Drive (670 feet), and development along Kenrick Lane, Devonshire Drive, and Notre Dame Boulevard (785 feet).

# Environmental Impacts

This section describes the impact analysis related to air quality for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

## Methods for Analysis

Air quality impacts associated with construction and operation of the proposed project were assessed and quantified (where applicable) using standard and accepted software tools, techniques, and emission factors. A summary of the methodology is provided below.

### Construction

Construction of the proposed project would generate emissions of ROG, $NO_X$, CO, sulfur oxides ($SO_X$), PM10, and PM2.5 that could result in short-term air quality effects. Emissions would originate from off-road equipment exhaust, vehicle exhaust (on-road vehicles), site grading and earth movement, and paving. These emissions would be temporary (i.e., limited to the construction period) and would cease when construction activities are complete. It was assumed that construction of the proposed project would commence in June 2023 and extend through July 2024. Although these dates represent a duration of approximately 13 months, construction activities would only occur for approximately 3 months of that period. No activity would occur from September 2023 through June 2024. The proposed construction would be conducted within the hours specified in the individual noise ordinances for the city of Chico

Construction emissions were estimated using the Sacramento Metropolitan Air Quality Management District's Roadway Construction Emission Model (RCEM) (Version 9.0) based on project-specific construction data (e.g., schedule, equipment, truck volumes) provided by Gonzales Development Company (Poulin pers. comm.). Construction activities include the construction of the new two-lane bridge across Little Chico Creek and completing the planned Notre Dame Boulevard roadway link from Emerson Way north to the current terminus of Notre Dame Boulevard. The project road segment is approximately 500 feet in length and will include width for bicycle and pedestrian facilities.

A full list of the assumptions and methods used to quantify construction emissions in RCEM are presented in Attachment 1.

### Operational Mobile Source Emissions

Emissions from motor vehicles within the project area were evaluated using the California Department of Transportation CT-EMFAC model and traffic data provided by Headway Transportation (Headway Transportation 2022). The traffic data included vehicle activity for affected roadways in the immediate project vicinity. Emissions from vehicle movements were calculated by multiplying the vehicle-miles-traveled (VMT) estimates by the appropriate emission factors provided in CT-EMFAC2017. The operational scenarios evaluated include the following.

- Existing conditions (2019) with and without the project
- Opening year (2025) with and without the project

The CT-EMFAC output results are included in Attachment 2.

### Mobile Source Air Toxics/Toxic Air Contaminants

The Federal Highway Administration (FHWA) (2016) has issued an updated interim guidance using a tiered approach on how mobile source air toxics (MSAT) for transportation projects should be evaluated. Depending on the specific project circumstances, FHWA has identified the following three categories of analysis.

1. No analysis for exempt projects or projects that have no potential for meaningful MSAT effects.
2. Qualitative analysis for projects with low potential MSAT effects.
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Potential MSAT effects associated with the proposed project are assessed according to FHWA's updated interim guidance and the project analysis tiers identified above. The analysis also considers guidance from the CARB's (2005) *Air Quality and Land Use Handbook*.

### Carbon Monoxide Hot Spots

The analysis of CO impacts was conducted using CARB's EMFAC2017 model, the CALINE4 dispersion model, and p.m. peak-hour turning movement data provided by Headway Transportation Headway Transportation 2022).

Based on the turning movement data, the intersection with the highest traffic volume would be 20$^{th}$ Street and Notre Dame Boulevard. Traffic conditions for the opening year were modeled to evaluate CO hot spot concentrations at the 20$^{th}$ Street and Notre Dame Boulevard intersection, because this intersection represents the worst-case scenario. Receptors were placed at each intersection corner. A standard receptor elevation of 5.9 feet was used consistent with CO protocol guidance (Garza et al. 1997). Worst-case wind angles and meteorological conditions were modeled to estimate conservative CO concentrations at each receptor. CO concentrations from the nearest monitoring station to the project area (Chico East Avenue monitoring station) for the last 3 years in which complete data are available (2018 through 2020) were gathered and converted into a 3-year average to represent background CO levels.

## Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would be considered to have a significant air quality impact if it would result in any of the conditions listed below.

- **AQ-1:** Conflict with or obstruct implementation of the applicable air quality plan.
- **AQ-2:** Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
- **AQ-3:** Expose sensitive receptors to substantial pollutant concentrations.
- **AQ-4:** Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

According to the State CEQA Guidelines Section 15064.7, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources. As described above, the BCAQMD is responsible for ensuring that state and federal ambient air quality standards are not violated within Butte County. The BCAQMD *CEQA Air Quality Handbook* (2014) provides guidance for evaluating project-level air quality impacts and identified significance thresholds to assist lead agencies in determining criteria pollutant impacts for projects located in Butte County. The following sections summarize the local air district thresholds (where applicable) for each of the four impact criteria.

## Plan Consistency

Projects that propose development that is consistent with the growth (i.e., population, employment, and VMT growth) anticipated by the Butte County Association of Governments (BCAG) would be consistent with BCAQMD's AQAP, further described in *Regulatory Setting*.

## Cumulatively Considerable Net Increase in Criteria Pollutants

Project criteria pollutant and precursor emissions are calculated and compared to BCAQMD's thresholds. BCAQMD thresholds consider whether a project's individual emissions would result in a cumulatively considerable adverse contribution to the local existing air quality conditions. If a project's emissions would be less than these levels, the project would not be expected to result in a cumulatively considerable contribution to the significant cumulative impact. Accordingly, emissions generated by the proposed project would result in a significant impact if any of the thresholds summarized in Table 4 are exceeded.

**Table 4. Butte County Air Quality Management District Criteria Pollutant Thresholds**

| Source | ROG | $NO_X$ | PM10 |
|---|---|---|---|
| Construction (pounds per day) | 137 | 137 | 80 |
| Construction (tons per year) | 4.5 | 4.5 | -- |
| Operation (pounds per day) | 25 | 25 | 80 |

Source: BCAQMD 2014.
-- = no threshold

## Receptor Exposure to Substantial Pollutant Concentrations

The California Supreme Court's decision in *Sierra Club v. County of Fresno* (6 Cal. 5th 502) (hereafter referred to as the Friant Ranch Decision) reviewed the long-term, regional air quality analysis contained in the Environmental Impact Report (EIR) for the proposed *Community Plan Update* and *Friant Ranch Specific Plan* (Friant Ranch Project). The Friant Ranch Project is a 942-acre master-plan development in unincorporated Fresno County within the San Joaquin Valley Air Basin, an air basin currently in nonattainment under the NAAQS and CAAQS for ozone and PM2.5. The Court found that the EIR's air quality analysis was inadequate because it failed to provide enough detail "for the public to translate the bare [criteria pollutant emissions] numbers provided into adverse health impacts or to understand why such a translation is not possible at this time." The Court's decision clarifies that environmental documents must attempt to connect a project's air quality impacts to specific health effects or explain why it is not technically feasible to perform such an analysis.

All criteria pollutants that would be generated by the proposed project are associated with some form of health risk (e.g., asthma, lower respiratory problems). Criteria pollutants can be classified as either regional or localized pollutants. Regional pollutants can be transported over long distances and affect ambient air quality far from the emissions source. Localized pollutants affect ambient air quality near the emissions source. Ozone is considered a regional criteria pollutant, whereas CO, $NO_2$, $SO_2$, and lead are localized pollutants. PM can be both a local and a regional pollutant, depending on its composition. As discussed above, the primary pollutants of concern generated by the proposed project are ozone precursors (ROG and $NO_X$), CO, PM, NOA, and MSAT (including DPM). The following sections discuss thresholds and analysis considerations for regional and local project-generated criteria pollutants with respect to their human health implications.

#### Regional Project-Generated Criteria Pollutants (Ozone Precursors and Regional Particulate Matter)

Adverse health effects induced by regional criteria pollutant emissions generated by the proposed project (ozone precursors and PM) are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). For these reasons, ozone precursors (ROG and $NO_X$) contribute to the formation of ground-borne ozone on a regional scale. Emissions of ROG and $NO_X$ generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate pollution may be transported over long-distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased ozone or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project. Moreover, exposure to regional air pollution does not guarantee that an individual will experience an adverse health effect —as discussed above, there are large individual differences in the intensity of symptomatic responses to air pollutant. These differences are influenced, in part, by the underlying health condition of an individual, which cannot be known.

Models and tools have been developed to correlate regional criteria pollutant emissions to potential community health impacts. While there are models capable of quantifying ozone and secondary PM formation and associated health effects, these tools were developed to support regional planning and policy analysis and have limited sensitivity to small changes in criteria pollutant concentrations induced by individual projects.

As discussed previously, air districts develop region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. While recognizing that air quality is cumulative problem, air districts typically consider projects that generate criteria pollutant and ozone precursor emissions below these thresholds to be minor in nature and would not adversely affect air quality such that the NAAQS or CAAQS would be exceeded. Emissions generated by the proposed project could increase photochemical reactions and the formation of tropospheric ozone and secondary PM, which at certain concentrations, could lead to increased incidence of specific health consequences, such as various respiratory and cardiovascular ailments. Although these health effects are associated with ozone and particulate pollution, the effects are a result of cumulative and regional emissions. Thus, the proposed project's incremental contribution cannot be traced to specific health outcomes on a regional scale and a quantitative correlation of proposed project-generated regional criteria pollutant emissions to specific human health impacts is not included in this analysis. Please refer to Impact AQ-2 for a discussion of Proposed Project-generated emissions.

### Localized Project-Generated Criteria Pollutants

Localized criteria pollutant generated by a project are deposited and potentially affect population near the emissions source. Because these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts on adjacent sensitive receptors. The localized pollutants of concern that would be generated by the project are CO, PM, NOA, and MSAT. Following are the applicable thresholds for each pollutant.

### Carbon Monoxide

CO emission concentrations at the 20$^{th}$ Street and Notre Dame Boulevard intersection were calculated and combined with existing ambient levels of CO then compared against the CAAQS and NAAQS 1-hour and 8-hour standards to determine if the project would result in a significant CO impact.

### Particulate Matter

As shown in Table 4, BCAQMD has adopted a PM10 threshold of significance to evaluate whether construction-generated PM would result in an air quality impact.

### Asbestos

For projects with ground-disturbing activities where NOA may be present, project applicants should conduct a geologic evaluation and comply with BCAQMD's mitigation measures (BCAQMD 2014).

### Mobile Source Air Toxics

BCAQMD has no adopted thresholds for community health risks, but recommends MSATs be evaluated using the following thresholds:

- An excess cancer risk level of more than 10.0 in 1 million, or a non-cancer (chronic or acute) hazard index greater than 1.0.
- An incremental increase of more than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average diesel PM2.5.

### Odors Emissions

BCAQMD (2014) does not have a quantitative odor threshold but has established recommended odor screening distances. If a proposed project would result in potentially objectionable odors, and if it is located closer than the screening level distances, then the air district recommends a more detailed odor analysis be provided, evaluating the proximity between source and receptor(s), the nature of the odor, local meteorology, and prior odor complaints.

## Impacts and Mitigation Measures

#### AQ-1: Would the project conflict with or obstruct implementation of the applicable air quality plan?

The applicable air quality plan for the project area is the 2015 AQAP, prepared by the BCAQMD. The AQAP control measure commitments are based, in part, on the regional population, housing, and employment projections (and related transportation-source emissions) prepared by the region's cities and counties and adopted by the Butte County Association of Governments (BCAG) (BCAQMD 2015). As such, projects that propose development that is consistent with the population, employment, and VMT growth (and therefore the emissions projections) anticipated in the relevant land use plans that were used in the formulation of the AQAP are therefore considered to be consistent with the AQAP.

The proposed project was included in the regional emissions analysis conducted by BCAG for the conforming 2020 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) (BCAG 2020). As such, the proposed project is considered consistent with the region's AQAP. Furthermore, many of BCAQMD's rules are intended to meet the attainment goals of the AQAP. The project would be consistent with applicable rules that would limit ROG and PM emissions (e.g., Rules 205, 230, 231) during construction. Accordingly, the proposed project would not exacerbate nonattainment conditions within the County or conflict with air quality plans adopted to attain and maintain the CAAQS and NAAQS. This impact is considered **less than significant**. No mitigation is required.

#### AQ-2: Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

As shown in Table 3 above, the USEPA has classified the Butte County as nonattainment for the federal 8-hour $O_3$ standard and a partial maintenance area for the federal PM2.5 standard. CARB has classified the area as nonattainment for the state 8-hour $O_3$, 24-hour PM10, and annual PM2.5 standards. As shown in Table 4 above, BCAQMD has promulgated separate construction- and operation-period significance thresholds to help the Basin attain federal and state air quality standards and protect public health.

### Construction

Construction of the proposed project would result in the short-term generation of criteria pollutant emissions. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather. An estimate of maximum daily unmitigated construction-related emissions and comparison to BCAQMD thresholds is shown in Table 5. An estimate of annual unmitigated construction-related emissions and comparison to BCAQMD thresholds is shown in Table 6.

**Table 5. Daily Criteria Pollutant Emissions from Project Construction (maximum pounds per day)**

| Construction Activity | ROG | $NO_x$ | PM10 Total | PM10 Exhaust | PM10 Dust | PM2.5 Total | PM2.5 Exhaust | PM2.5 Dust | CO | SOx |
|---|---|---|---|---|---|---|---|---|---|---|
| Bridge Construction (unmitigated) | 14 | 208 | 68 | 8 | 60 | 19 | 6 | 12 | 129 | <1 |
| Bridge Construction (mitigated)[1] | 9 | 84 | 63 | 3 | 60 | 14 | 2 | 12 | 170 | <1 |
| Significance Threshold | 137 | 137 | 80 | -- | -- | -- | -- | -- | -- | -- |
| Exceeds Thresholds after mitigation? | No | Yes | No | -- | -- | -- | -- | -- | -- | -- |

Source: Attachment 1.

[1] Mitigation includes 2010 and newer on-road vehicles and use of Tier 4 equipment.

**Table 6. Annual Criteria Pollutant Emissions from Project Construction (tons per year)**

| Construction Activity | ROG | $NO_x$ | PM10 Total | PM10 Exhaust | PM10 Dust | PM2.5 Total | PM2.5 Exhaust | PM2.5 Dust | CO | SOx |
|---|---|---|---|---|---|---|---|---|---|---|
| **2023** | | | | | | | | | | |
| Bridge Construction (unmitigated) | 0.1 | 1.8 | 0.6 | <0.1 | 0.5 | 0.2 | <0.1 | 0.1 | 1.2 | <0.1 |
| Bridge Construction (mitigated)[1] | <0.1 | 0.7 | 0.5 | <0.1 | 0.5 | 0.1 | <0.1 | 0.1 | 1.5 | <0.1 |
| Significance Threshold | 4.5 | 4.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| Exceeds Thresholds? | No | No | -- | -- | -- | -- | -- | -- | -- | -- |
| **2024** | | | | | | | | | | |
| Bridge Construction (unmitigated) | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Bridge Construction (mitigated)[1] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Significance Threshold | 4.5 | 4.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| Exceeds Thresholds after mitigation? | No | No | -- | -- | -- | -- | -- | -- | -- | -- |

Source: Attachment 1.

[1] Mitigation includes 2010 and newer on-road vehicles and use of Tier 4 equipment.

As shown in Tables 5, project emissions would exceed the BCAQMD NOx construction-period threshold, resulting in a potentially **significant impact**. To mitigate this impact, the project would be required to implement Mitigation Measure AQ-1 and Mitigation Measure AQ-2, which require the use of 2010 and newer on-road vehicles and off-road equipment equipped with Tier 4 final engines. Tables 5 and 6 also present the project construction emissions with these mitigation measures implemented, and, as shown in the tables, emissions would not exceed any BCAQMD threshold with implementation of the mitigation measures.

The BCAQMD thresholds were developed considering existing emissions concentrations and regional attainment designations under the ambient air quality standards (NAAQS and CAAQS). Compliance with BCAQMD Rule 205 (Fugitive Dust Emissions) would further reduce construction emissions. The contribution of emissions by projects that do not exceed project-specific significance thresholds are not considered by the BCAQMD to be cumulatively considerable. Therefore, this impact is considered **less than significant with mitigation**.

**Mitigation Measure AQ–1: Use Newer On-road Engines During Construction**

The project proponent shall ensure that all on-road vehicles used during construction have 2010 model year engines or newer.

**Mitigation Measure AQ–2: Use Tier 4 Emission Off-road Engines During Construction**

The project proponent shall ensure that all off-road diesel-powered equipment used during construction is equipped with engines that meet the California Air Resources Board Tier 4 final emission standards.

### Operation

Operation of the proposed project would result in the long-term generation of criteria pollutant emissions from an increase in vehicles traveling within the project area. Table 7 presents estimates of the maximum daily operation-related emissions for existing conditions and the opening year. Table 7 also compares the project emissions to the no project baseline emissions and then compares the difference between them (i.e., net emissions) to BCAQMD thresholds.

**Table 7. Estimated Operational Criteria Pollutant Emissions (pounds per day)**

| Operation Scenario | Daily VMT | ROG | $NO_X$ | PM10 | PM2.5 Total | CO |
|---|---|---|---|---|---|---|
| Existing Conditions (2019) | | | | | | |
| No Project | 1,357 | 0.20 | 1.89 | 0.12 | 0.06 | 5.29 |
| Proposed Project | 2,009 | 0.30 | 2.80 | 0.18 | 0.09 | 7.83 |
| Net | 652 | <1 | <1 | <1 | <1 | 3 |
| Significance Threshold | | 25 | 25 | 80 | -- | -- |
| Exceeds Thresholds? | | No | No | No | -- | -- |

| Operation Scenario | Daily VMT | ROG | $NO_X$ | PM10 | PM2.5 Total | CO |
|---|---|---|---|---|---|---|
| Opening Year (2025) | | | | | | |
| No Project | 1,677 | 0.11 | 1.05 | 0.12 | 0.05 | 3.63 |
| Proposed Project | 2,483 | 0.17 | 1.56 | 0.18 | 0.07 | 5.38 |
| Net | 806 | <1 | <1 | <1 | <1 | 1 |
| Significance Threshold | | 25 | 25 | 80 | -- | -- |
| Exceeds Thresholds? | | No | No | No | -- | -- |

Source: Attachment 2 and Headway Transportation 2022.
Notes: Values are rounded to the nearest whole number.
Negative emissions denote a decrease in emissions (i.e., emissions benefit).
BCAQMD = Butte County Air Quality Management District; NOx = nitrogen oxides; PM10 = particulate matter 10 micrometers in diameter; ROG = reactive organic gas; CO = carbon monoxide

As shown in Table 7, the proposed project's operational emissions would not exceed any of the BCAQMD thresholds for either the existing conditions or opening year. Given the small quantity of additional VMT that the project would result in, the net emissions in the existing conditions and opening year would be substantially below the BCAQMD thresholds and therefore would not be expected to contribute a significant level of air pollution such that regional air quality within the NSVAB would be degraded. This impact would be **less than significant**. No mitigation is required.

### AQ-3: Would the project expose sensitive receptors to substantial pollutant concentrations?

#### Regional Criteria Pollutants

BCAQMD develops region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment or nonattainment designations under the NAAQS and CAAQS. Recognizing that air quality is a cumulative problem, BCAQMD typically considers projects that generate criteria pollutants and ozone precursor emissions that are below the thresholds to be minor in nature. Such projects would not adversely affect air quality or exceed the NAAQS or CAAQS. As described under Impact AQ-2, the proposed project would exceed BCAQMD's emissions thresholds, a potentially **significant impact**. Implementation of Mitigation Measures AQ-1 and AQ-2 would reduce the levels of criteria pollutants associated with the proposed project so that it would not contribute a significant level of air pollution that could degrade regional air quality within the basin. This impact would be **less than significant with mitigation**.

**Mitigation Measure AQ–1: Use Newer On-road Engines During Construction**

The full text of this measure is included above.

**Mitigation Measure AQ–2: Use Tier 4 Emission Off-road Engines During Construction**

The full text of this measure is included above.

#### Localized Particulate Matter

During earthmoving activities required for construction, localized fugitive dust would be generated. The amount of dust generated by a project is highly variable and dependent on the size of the disturbed area at any given time, the amount of activity, soil conditions, and meteorological conditions. Fugitive dust would also be limited with compliance with BCAQMD Rule 205. Furthermore, PM10 emissions would not exceed BCAQMD's thresholds of significance (see Table 5). Accordingly, localized particulate matter emissions would be **less than significant** and would not expose receptors to substantial pollutant concentrations or risks. No mitigation is required.

### Mobile Source Air Toxics/Diesel Particulate Matter

#### *Construction*

Heavy-duty equipment would generate DPM during roadway-widening activities. As shown in Table 5, PM exhaust emissions (from both gasoline- and diesel-powered vehicles) would be potentially **significant** but would only occur over a period of approximately 3 months. With implementation of Mitigation Measures AQ-1 and AQ-2 emissions would be reduced to less-than-significant levels (a maximum of 3 pounds per day). The short-term construction period is well below the 30-year exposure period typically associated with increased cancer risks. Moreover, DPM from construction equipment would be transitory and spread throughout the entire bridge alignment, as opposed to concentrated at a single location. Accordingly, with mitigation, construction of the proposed project would not expose sensitive populations to substantial pollutant concentrations. This impact is **less than significant with mitigation**.

**Mitigation Measure AQ–1: Use Newer On-road Engines During Construction**

The full text of this measure is included above.

**Mitigation Measure AQ–2: Use Tier 4 Emission Off-road Engines During Construction**

The full text of this measure is included above.

#### *Operation*

As discussed above, FHWA has issued an updated interim guidance using a tiered approach on how MSAT for transportation projects should be evaluated. Based on the three project categories outlined in FHWA's guidance, the proposed project is considered a project with low potential MSAT impacts since average daily traffic (ADT) on Notre Dame Boulevard would be a maximum of approximately 6,000. Consequently, ADT would be below FHWA's MSAT ADT threshold of 140,000 for projects with higher potential for MSAT impacts.

As shown in Table 7, VMT estimated for the proposed project by opening year (2025) is higher than that for the no project because the roadway connection attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the proposed project along Notre Dame Boulevard. The bridge connection that is part of the project would have the effect of increasing traffic nearby homes; therefore, there may be localized areas where ambient concentrations of MSATs could be higher than without the project. However, the affected roadways are neither considered by the CARB (2005) as a high-traffic road nor a roadway with significant diesel volumes.[3] Accordingly, operation of the proposed project would not expose

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[3] The CARB's (2005) *Air Quality and Land Use Handbook* defines high-traffic urban roads as those with greater than 100,000 vehicles per day and high-traffic rural roads as those with greater than 500,000 vehicles per day. ADT in

sensitive populations to substantial pollutant concentrations. This impact is **less than significant**. No mitigation is required.

### Asbestos

#### *Construction*

Because soils or geologic features that contain NOA are not present in the project area, there is no potential for impacts related to NOA emissions during construction activities. This impact is **less than significant**. No mitigation is required.

#### *Operation*

Operation of the project consists of traffic movement along the segment of Notre Dame Boulevard within the project area. Operation of the project would not involve ground-disturbing activities at a site with NOA. This impact is **less than significant**. No mitigation is required.

### Carbon Monoxide Hot Spots

Traffic generated by the proposed project would have the potential to create CO hot spots at nearby roadways and intersections. CO impacts were analyzed at the intersection of 20$^{th}$ Street and Notre Dame Boulevard using the traffic conditions from opening year (2025). Table 8 presents project CO concentrations summed with the background CO levels and compared against the CAAQS and NAAQS.

**Table 8. CO Concentrations at 20th Street and Notre Dame Boulevard Intersection (parts per million)**

| Source | Receptor | 1-Hour | 8-Hour |
|---|---|---|---|
| | | Opening Year with Project (2025) | Opening Year with Project (2025) |
| 20th Street and Notre Dame Blvd | 1 | 10.9 | 7.0 |
| | 2 | 10.6 | 6.8 |
| | 3 | 10.6 | 6.8 |
| | 4 | 10.9 | 7.0 |
| CAAQS | | 20 | 9.0 |
| Exceeds CAAQS? | | No | No |
| NAAQS | | 35 | 9 |
| Exceeds NAAQS? | | No | No |

Source: Attachment 3.

Notes: Receptors are located at each of the four corners of the intersection. All intersections modeled have two intersecting roadways.

The average 1-hour background concentration between 2018 and 2020 was 9.9 ppm. The average 8-hour background concentration between 2018 and 2020 was 6.3 ppm (USEPA 2022b).

As shown in Table 8, the CO concentrations are not expected to contribute to any new localized violations of the 1-hour or 8-hour ambient state or federal air quality standards. Accordingly,

the project area for the project under opening year (2025) conditions will be 4,965. Heavy-duty trucks comprise approximately 2 percent of this ADT, resulting in a truck ADT of approximately 99.

sensitive receptors would not be exposed to substantial concentrations of CO. This impact is **less than significant**. No mitigation is required.

**AQ-4: Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?**

### Construction

BCAQMD (2014) has identified the following common sources for offensive or strong odors: exhaust from heavy equipment, garbage dumpsters, restaurants, animal boarding facilities, feed lots and general agricultural operations, food processing, compost/green waste and wastewater treatment facilities, rendering plants, various industrial processes, landfills, and painting/coating operations.

Construction activities could generate odors from diesel exhaust associated with offroad equipment and haul trucks as well as from ROG associated with architectural coatings and asphalt paving. However, construction activities would be temporary and therefore the exposure of sensitive receptors to these odors would be limited. The project would be consistent with Rules 230 and 231, which limit ROG emissions during construction. In addition, BCAQMD has adopted Rule 200, which prohibits the discharge from non-vehicular sources quantities of air contaminants that cause a nuisance to the public. If public complaints are sufficient to cause the odor source to be considered a public nuisance, then BCAQMD can require the emission source to incorporate mitigation measures to correct the nuisance condition. Potential impacts of odors during construction would be **less than significant**. No mitigation is required.

### Operation

According to the CARB, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (CARB 2005). The proposed project does not involve any of these odor-generating and uses. CARB also provides recommended screening distances for siting new receptors near existing odor sources. The project would not site any new sensitive receptors near an existing odor source, because the project does not propose the construction of any sensitive land uses (e.g. schools or residences). Potential impacts of odors during operation would be **less than significant**. No mitigation is required.

# Greenhouse Gases

This section discusses applicable GHG regulations as they pertain to the proposed project and defines key GHG emissions and their current concentrations within the study area. It also describes the GHG impacts that would result from construction and operation of the proposed project.

# Existing Conditions

## Regulatory Setting

### Federal

There is currently no federal overarching law specifically related to climate change or the reduction of GHG emissions. However, fuel standards have been adopted to reduce GHG emissions from cars and light duty trucks and recent amendments have been proposed. The CAFE standards are discussed above in the *Regulatory Setting* for the air quality section.

### State

#### State Legislative Reduction Targets

Assembly Bill (AB) 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, requires the state to reduce GHG emissions to 1990 levels by 2020. Senate Bill (SB) 32 (2016) requires the state to reduce emissions to 40 percent below the 1990 level by 2030. The state's plan to reach these targets are presented in periodic scoping plans. The CARB (2017) adopted the *2017 Climate Change Scoping Plan* (Scoping Plan) in November 2017 to meet the GHG reduction requirement set forth in SB 32. It proposes continuing the major programs of the previous Scoping Plan, including Cap-and-Trade Regulation; low carbon fuel standards; more efficient cars, trucks, and freight movement; Renewables Portfolio Standard (RPS); and reducing methane emissions from agricultural and other wastes. The current Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state.

#### Executive Order Reduction Targets

In 2005, Executive Order (EO) S-3-05 established goals to reduce California's GHG emissions to (1) 2000 levels by 2010 (achieved); (2) 1990 levels by 2020; and (3) 80 percent below the 1990 levels by 2050. In 2018, EO B-55-18 established a new state goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Executive orders are binding on state government agencies but are not legally binding on cities and counties or on private development.

#### Vehicle Efficiency Standards

AB 1493 (2002) (Pavley I) requires CARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the model year 2009. Additional strengthening of the Pavley standards (referred to previously as Pavley II and now referred to as the Advanced Clean Cars measure) was adopted for vehicle model years 2017–2025 in 2012. Together, the two standards are expected to increase average fuel economy to roughly 54.5 miles per gallon in 2025.

### Low Carbon Fuel Standard

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California in 2007. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

### Regional Land Use and Transportation Planning to Reduce Vehicle Miles Travelled

SB 375 (2009) requires the state's 18 Metropolitan Planning Organizations to develop the sustainable communities strategies (SCSs) as part of their Regional Transportation Plans (RTPs) through integrated land use and transportation planning, and to demonstrate an ability to attain the GHG emissions reduction targets that the CARB established for the region by 2020 and 2035 (CARB 2020). This would be accomplished through either the financially constrained SCS as part of the RTP or an unconstrained alternative planning strategy. A financially constrained SCS refers to an SCS with committed, available or reasonably available revenue sources for implementation. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain CEQA review requirements.

### CEQA Requirements to Assess Vehicle Miles Travelled

SB 743 (2013) requires revisions to the CEQA Guidelines that establish new impact analysis criteria for the assessment of a project's transportation impacts. The intent behind SB 743 and revising the CEQA Guidelines is to integrate and better balance the needs of congestion management, infill development, active transportation, and GHG emissions reduction. The Office of Planning and Research (OPR) recommends that VMT serve as the primary analysis metric, replacing the existing criteria of delay and level of service (LOS). In 2018, OPR released a technical advisory outlining potential VMT significance thresholds for different project types. The new VMT methodology was required as of July 1, 2020.

## Local

### Butte County Air Quality Management District

BCAQMD is responsible for air quality planning within the Butte County portion of the NSVAB, including projects in the City of Chico. BCAQMD's *CEQA Air Quality Handbook (*2014) outlines methods for quantifying GHG emissions as well as potential mitigation measures. BCAQMD does not include emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's GHG emissions, but does recommend that projects comply with applicable GHG reduction strategies and the state's GHG reduction goals.

### Butte County Association of Governments

BCAG is the Metropolitan Planning Organization (MPO) for Butte County, which includes the City of Chico. As described above, SB 375 requires each MPO to prepare an RTP/SCS that presents integrated regional land use and transportation approaches to reduce VMT and its associated GHG emissions. CARB identified the initial goal for BCAG as an increase in per capita passenger vehicle greenhouse gas emissions by 1 percent for 2020 and 2035 compared to 2005 levels. BCAG's 2012 RTP/SCS demonstrated that a 2 percent reduction will be achieved by 2020 and 2035. BCAG's 2016

RTP/SCS expanded on the 2012 plan and demonstrated that a 6 percent reduction will be achieved by 2020 and a 7 percent reduction will be achieved by 2035 (BCAG 2019). This is consistent with CARB's 2018 updates to the per-capita GHG emissions reduction targets, which call for a 6 percent reduction by 2020 and a 7 percent reduction by 2035 (California Air Resources Board 2020). BCAG's 2020 RTP/SCS also demonstrated the ability to meet CARB's 2020 and 2035 reduction targets as well as expanding on BCAG's 2016 RTP/SCS targets and demonstrated that a 14 percent reduction will be achieved by 2020 and a 8 percent reduction will be achieved by 2035 (BCAG 2020).

### City of Chico Climate Action Plan

The City of Chico adopted the 2020 Climate Action Plan (CAP) in 2011, which contains GHG emission reduction targets that exceed AB 32 goals. The CAP established an overall GHG reduction goal of 25 percent (as opposed to 15 percent) below 2005 base-year emission levels to be achieved by 2020. The CAP specifies the objectives and actions to be taken for a number of sectors (e.g., transportation, energy, waste) to achieve the overall emission reduction target. The CAP actions relevant to the proposed project are presented below.

**Action 1.10.2. Pedestrian Connections for New Development.** The City will amend the Municipal Code to require new subdivisions and large-scale developments to include safe pedestrian walkways that provide direct links between streets and major adjacent destinations such as transit stops, schools, parks, shopping centers, and jobs.

**Action 1.11. Expand and Enhance Bicycling and Pedestrian Infrastructure.** Bike racks are essential to encourage bicycle ridership for commuting and daily shopping and errands. The City will identify commercial and public areas that lack appropriate levels of bicycle parking and install the needed facilities, as funding is available. The City also requires the provision of adequate bicycle parking for tenants, employees, and customers in new residential and non-residential development.

**Action 1.12. "Complete Streets" Policy.** As indicated in the 2030 General Plan, the City has a "complete streets" policy to facilitate all modes of travel (public transit, cars, bicyclists, pedestrians) as safely as possible on new, and as funding allows on existing streets. This action will help improve pedestrian infrastructure, such as ensuring that sidewalks are continuous and complete, and improving the Americans with Disabilities Act access at intersections.

**Action 1.13. Corridor Management Measures and Traffic Calming.** The City has an ongoing program of modifying major road corridors to enhance traffic flow and to reduce congestion and vehicle idling. Modifications include, but are not limited to, synchronization and optimization of signal timing, multi-modal roadway enhancements, intersection capacity improvements, and roundabouts. Where practical and cost-effective, the City will continue to implement traffic calming and corridor flow management measures, such as evaluating the use of stop signs where not necessary for safety, along existing roadways and in new development. The GHG emissions reductions for this action has not been quantified as it relates to other transportation related actions.

**Action 1.14. New Bike Paths.** As funding allows and where feasible, the City will continue to enhance the existing network of bike paths, and require new bike paths as part of conditions for new development.

## Environmental Setting

This section describes the environmental setting related to GHGs and climate change. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Thus, GHG impacts are inherently cumulative, and the study area for impacts on GHGs includes the entire state and global atmosphere.

### Climate Change

The process known as the *greenhouse effect* keeps the atmosphere near the Earth's surface warm enough for the successful habitation of humans and other life. Present in the Earth's lower atmosphere, GHGs play a critical role in maintaining the Earth's temperature. Sunlight including infrared, visible, and ultraviolet radiation passes through the atmosphere. Some of the sunlight striking the earth is absorbed and converted to heat, which warms the surface. The surface emits infrared radiation to the atmosphere, where some of it is absorbed by GHGs and re-emitted toward the surface; some of the heat is not trapped by GHGs and escapes into space. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and amplifying the warming of the earth (Center for Climate and Energy Solutions 2019).

Increases in fossil fuel combustion and deforestation have increased concentrations of GHGs in the atmosphere since the Industrial Revolution. Rising atmospheric concentrations of GHGs in excess of natural levels enhance the greenhouse effect, which contributes to global warming of the Earth's lower atmosphere. This warming induces large-scale changes in earth surface temperatures, ocean circulation patterns, precipitation patterns, global ice cover, biological distributions, and other changes to the earth system that are collectively referred to as *climate change*.

### Principal Greenhouse Gases

As defined in AB 32, GHGs include the following gases: $CO_2$, methane ($CH_4$), nitrous oxide ($N_2O$), perfluorinated carbons, sulfur hexafluoride, and hydrofluorocarbons. The state CEQA Guidelines (§ 15364.5) also identify these six gases as GHGs.[4] The primary GHGs of concern associated with the project are $CO_2$, $CH_4$, and $N_2O$. The principal characteristics of these pollutants are discussed in this section.

- **$CO_2$** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and respiration, as well other chemical reactions (e.g., manufacture of cement). $CO_2$ is also removed from the atmosphere (or *sequestered*) when it is absorbed by plants as part of the biological carbon cycle.
- **$CH_4$** is emitted during the production and transport of coal, natural gas, and oil. $CH_4$ emissions also result from livestock and other agricultural practices and the decay of organic waste in municipal solid waste landfills.

[4] Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic (human-made) sources.

- **$N_2O$** is emitted during agricultural and industrial activities as well as during the combustion of fossil fuels and solid waste.

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify reporting and analysis. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) methodology defined in the Intergovernmental Panel on Climate Change (IPCC) reference documents. The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of $CO_2e$, which compares the gas in question to that of the same mass of $CO_2$ ($CO_2$ has a GWP of 1 by definition).

Table 9 lists the GWP of $CO_2$, $CH_4$, and $N_2O$ and their atmospheric lifetimes.

**Table 9. Lifetimes and Global Warming Potentials of Key Greenhouse Gases**

| Greenhouse Gases | Global Warming Potential (100 years) | Lifetime (years) |
|---|---|---|
| $CO_2$ | 1 | 100 |
| $CH_4$ | 25 | 12 |
| $N_2O$ | 298 | 114 |

Sources: Center for Climate and Energy Solutions 2020.

$CH_4$ = methane; $CO_2$ = carbon dioxide; $N_2O$ = nitrous oxide; ppb =parts per billion; ppm = parts per million

## Greenhouse Gas Emission Inventories

A GHG inventory is a quantification of all GHG emissions and sinks[5] within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (e.g., for global and national entities) or on a small scale (e.g., for a particular building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. Table 10 outlines the most recent global, national, statewide, and local GHG inventories to help contextualize the magnitude of potential project-related emissions.

**Table 10. Global, National, State, and Local Greenhouse Gas Emissions Inventories**

| Emissions Inventory | $CO_2e$ (metric tons per year) |
|---|---|
| 2017 Global | 53,500,000,000 |
| 2020 National | 5,215,600,000 |
| 2019 State | 418,200,000 |
| 2006 County of Butte | 991,630 |
| 2005 City of Chico | 610,951 |

Sources: Intergovernmental Panel on Climate Change 2018; USEPA 2022b; CARB 2022b; Butte County 2014; City of Chico 2012.

CARB = Air Resources Board; $CO_2e$ = carbon dioxide equivalent; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; IPCC = Intergovernmental Panel on Climate Change

[5] A GHG sink is a process, activity, or mechanism that removes a GHG from the atmosphere.

## Potential Effects of Climate Change

Climate change is a complex process that has the potential to alter local climatic patterns and meteorology. Although modeling indicates that climate change will result in sea level rise (both globally and regionally) as well as changes in climate and rainfall, among other effects, there remains uncertainty about characterizing precise local climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty, it is widely understood that substantial climate change is expected to occur in the future, although the precise extent will take further research to define. Specifically, significant impacts from global climate change worldwide and in California include the following.

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in atmospheric water vapor, due to the atmosphere's ability to hold more water vapor at higher temperatures (California Natural Resources Agency 2018).
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets (Intergovernmental Panel on Climate Change 2018).
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (Intergovernmental Panel on Climate Change 2013).
- Declining Sierra Mountains snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (California Natural Resources Agency 2018).
- Increasing the number of days conducive to ozone formation (e.g., clear days with intense sun light) by 25 percent to 85 percent (depending on the future temperature scenario) by the end of the Twenty-first Century in high ozone areas, including Southern California (California Natural Resources Agency 2018).
- Increasing the potential for erosion of California's coastlines and seawater intrusion into the Sacramento Delta and associated levee systems due to the rise in sea level (California Natural Resources Agency 2018).
- Exacerbating the severity of drought conditions in California such that durations and intensities are amplified, ultimately increasing the risk of wildfires and consequential damage incurred (California Natural Resources Agency 2018).
- Under changing climate conditions, agriculture is projected to experience lower crop yields due to extreme heat waves, heat stress and increased water needs of crops and livestock (particularly during dry and warm years), and new and changing pest and disease threats (California Natural Resources Agency 2018).
- The impacts of climate change, such as increased heat-related events, droughts, and wildfires, pose direct and indirect risks to public health, as people will experience earlier death and worsening illnesses. Indirect impacts on public health include increased vector-borne diseases,

stress and mental trauma due to extreme events and disasters, economic disruptions, and residential displacement (California Natural Resources Agency 2018).

# Environmental Impacts

This section describes the impact analysis related to GHGs for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant.

## Methods for Analysis

GHG impacts associated with construction and operation of the proposed project were assessed and quantified (where applicable) using standard and accepted software tools, techniques, and emission factors. A summary of the methodology is provided below.

### Construction

The methodology used to calculate GHG emissions generated during construction is the same as described above for air quality. Construction of the proposed project would generate emissions of $CO_2$, $CH_4$, and $N_2O$. Emissions would originate from off-road equipment exhaust and vehicle exhaust (on-road vehicles).

A full list of the assumptions and methods used to quantify construction emissions in RCEM are presented in Attachment 1.

### Operational Mobile Source Emissions

The methodology used to calculate criteria pollutant emissions from motor vehicles within the project area was similarly used to calculate GHG emissions from motor vehicles but for the following exceptions.

- Yearly emissions were calculated by multiplying daily emissions by 347, consistent with CARB methodology to extrapolate yearly traffic emissions from daily emissions (CARB 2008).

A full list of the assumptions and methods used to quantify operation emissions in CT-EMFAC are presented in Attachment 2.

## Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would be considered to have a significant GHG impact if it would result in any of the conditions listed below.

- **GHG-1:** Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- **GHG-2:** Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

BCAQMD currently has no drafted, adopted, or recommended thresholds relevant to the analysis of GHG emissions from transportation projects. Other regional air districts have adopted numeric construction thresholds, such as SMAQMD's 1,100 MT $CO_2e$ threshold (2015) and Placer County Air Pollution Control District's (PCAPCD) 10,000 MT $CO_2e$ threshold (2016). However, these thresholds are reserved for land use development projects, not transportation infrastructure.

The California Supreme Court's decision in *Center for Biological Diversity v. Department of Fish and Wildlife* (62 Cal.4th 204) confirmed that there are multiple potential pathways for evaluating GHG emissions consistent with CEQA. Several air quality management agencies throughout the state have also drafted or adopted varying threshold approaches and guidelines for analyzing GHG emissions in CEQA documents. Common threshold approaches include (1) compliance with a qualified GHG reduction strategy, (2) performance-based reductions, (3) numeric "bright-line" thresholds, (4) efficiency-based thresholds, and (5) compliance with regulatory programs

Impact significance of this project is ultimately determined based on compliance with the state's GHG reduction goals (i.e., SB 32) and associated legislation (e.g., SB 375 and SB 743). This is currently the most applicable approach for analyzing transportation-related GHG emissions. Accordingly, this analysis relies on compliance with regulatory programs to analyze project-level GHG impacts.

## Impacts and Mitigation Measures

**GHG-1: Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

Short-term construction activities would result in GHG emissions from fuel combustion by off- and on-road construction equipment and vehicles. These sources would emit approximately 496 MT $CO_2e$ during the construction period between 2023 and 2024.

Operation of the proposed project would result in the long-term generation of GHG emissions from an increase in vehicles traveling within the project area. Table 11 presents the proposed project's modeled annual GHG emissions.

**Table 11. Estimated Operational GHG Emissions (metric tons per year)**

| Operation Scenario | Daily VMT | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|---|
| Existing Conditions (2019) | | | | | |
| No Project | 1,357 | 229 | <1 | <1 | 234 |
| Proposed Project | 2,009 | 339 | <1 | <1 | 346 |
| Net | 652 | 110 | <1 | <1 | 112 |
| Opening Year (2025) | | | | | |
| No Project | 1,677 | 248 | <1 | <1 | 253 |
| Proposed Project | 2,483 | 368 | <1 | <1 | 375 |
| Net | 806 | 120 | <1 | <1 | 122 |

Source: Attachment 2 and Headway Transportation 2022.

Notes: Values are rounded to the nearest whole number.

Negative emissions denote a decrease in emissions (i.e., emissions benefit).

BCAQMD = Butte County Air Quality Management District; $CO_2$ = carbon dioxide; $CH_4$ = methane; $N_2O$ = nitrous oxide; $CO_2e$ = carbon dioxide-equivalent

As shown in Table 11, under existing conditions and the opening year, project implementation would increase GHG emissions compared to the no project conditions. The negligible emissions (112 MT $CO_2e$ in 2019 and 122 MT $CO_2e$ in 2025) are attributable to the increases in VMT under the proposed project. VMT estimated for the proposed project by opening year is higher than that for the no project because the bridge connection attracts rerouted trips from elsewhere in the transportation network.

The most applicable GHG legislation to transportation projects, including the proposed project, is SB 375. SB 375 was enacted to reduce GHG emissions from automobiles and light trucks through integrated transportation, land use, housing and environmental planning. Under this law, BCAG is tasked with developing an SCS that provides a plan for meeting per capita $CO_2$ emissions levels allocated to BCAG by CARB. As discussed in *Regulatory Setting*, these levels are 6 percent below 2005 emissions levels by 2020 and 7 percent below 2005 levels by 2035. Accordingly, the targets established by SB 375 not only address near-term (2020) emissions, but also long-term (2035) emissions.

BCAG's 2016 RTP/SCS demonstrated that a 6 percent reduction will be achieved by 2020 and a 7 percent reduction will be achieved by 2035 (BCAG 2019). In addition, BCAG's 2020 RTP/SCS expanded on BCAG's 2016 RTP/SCS targets and demonstrated that a 14 percent reduction will be achieved by 2020 and an 8 percent reduction will be achieved by 2035 (BCAG 2020). GHG emissions associated with the RTP/SCS, including those projects identified in the RTP/SCS, would therefore be less than significant.

As discussed in *Air Quality*, the proposed project is listed in the 2020 RTP/SCS. The design concept and scope of the proposed project is consistent with the project description in both documents. Since the proposed project is identified and consistent with BCAG's 2020 MTP/SCS, which was found to have a less-than-significant GHG impact, project-level GHG emissions would be consistent with SB 375.

The project would also promote a pedestrian and bicycle-friendly environment by providing a connected bicycle network and improved streetscapes, which would partially offset some of the VMT increase by increasing walking and bicycle trips. The project is consistent with state climate goals and supporting transportation policies enacted to promote active transportation. Therefore, the project would be consistent with SB 32. This impact would be **less than significant**. No mitigation is required.

**GHG-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?**

While construction would generate short-term GHGs, these emissions would be minor (495 MT $CO_2e$). Similarly, operational GHG emissions would also be minor (122 MT $CO_2e$ per year), and the proposed project includes pedestrian and bicycle infrastructure. The pedestrian and bicycle infrastructure would result in an increase in walking and bicycling trips, which would partially offset the increased VMT emissions. The project would not conflict with the state's climate goals and supporting transportation policies enacted to promote active transportation. Furthermore, the "complete streets" improvements to pedestrian, bicycle, and traffic conditions are also consistent with the City's 2020 CAP (Actions 1.10.2, 1.11, 1.12, 1.13, and 1.14).[6] These city and regional plans have been adopted to support state and local GHG reduction goals (e.g., AB 32 and SB 32). This impact is **less than significant**. No mitigation is required.

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[6] The consistency analysis of the project with the City's CAP actions is provided for informational purposes only and is not used as threshold for determining significance. However, it is likely that these CAP actions will be included in the City's updated CAP for 2030 and beyond.

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# List of Attachments

1. Assumptions and methods used to quantify construction emissions in the roadway construction emissions model

2. CT-EMFAC output results

3. CALINE model output results

## Attachment 1

Unmitigated

The maximum pounds per day in row 11 is summed over overlapping phases, but the maximum tons per phase in row 34 is not summed over overlapping phases.

## Road Construction Emissions Model, Version 9.0.0

| Daily Emission Estimates for -> Notre Dame Blvd Bridge<br>Project Phases (Pounds) | ROG (lbs/day) | CO (lbs/day) | NOx (lbs/day) | Total PM10 (lbs/day) | Exhaust PM10 (lbs/day) | Fugitive Dust PM10 (lbs/day) | Total PM2.5 (lbs/day) | Exhaust PM2.5 (lbs/day) | Fugitive Dust PM2.5 (lbs/day) | SOx (lbs/day) | CO2 (lbs/day) | CH4 (lbs/day) | N2O (lbs/day) | CO2e (lbs/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grubbing/Land Clearing** | 0.88 | 9.66 | 11.68 | 20.49 | 0.49 | 20.00 | 4.54 | 0.38 | 4.16 | 0.04 | 3,752.70 | 0.57 | 0.31 | 3,859.61 |
| **Grading/Excavation** | 8.23 | 72.49 | 141.20 | 25.47 | 5.47 | 20.00 | 8.06 | 3.90 | 4.16 | 0.48 | 49,392.37 | 4.71 | 5.52 | 51,155.88 |
| **Drainage/Utilities/Sub-Grade** | 5.37 | 46.49 | 55.44 | 22.27 | 2.27 | 20.00 | 6.23 | 2.07 | 4.16 | 0.11 | 10,756.17 | 2.71 | 0.18 | 10,876.33 |
| **Paving** | 0.86 | 12.88 | 10.96 | 0.51 | 0.51 | 0.00 | 0.40 | 0.40 | 0.00 | 0.04 | 3,643.49 | 0.56 | 0.29 | 3,744.04 |
| **Maximum (pounds/day)** | 14.48 | 128.64 | 208.32 | 68.24 | 8.24 | 60.00 | 18.83 | 6.35 | 12.48 | 0.63 | 63,901.24 | 7.99 | 6.01 | 65,891.83 |
| **Total (tons/construction project)** | 0.13 | 1.20 | 1.83 | 0.57 | 0.07 | 0.50 | 0.16 | 0.06 | 0.10 | 0.01 | 530.95 | 0.07 | 0.05 | 546.41 |

Notes: Project Start Year -> 2023

Project Length (months) -> 13

Total Project Area (acres) -> 3

Maximum Area Disturbed/Day (acres) -> 2

Water Truck Used? -> Yes

| | Total Material Imported/Exported Volume ($yd^3$/day) | | Daily VMT (miles/day) | | | |
|---|---|---|---|---|---|---|
| Phase | Soil | Asphalt | Soil Hauling | Asphalt Hauling | Worker Commute | Water Truck |
| Grubbing/Land Clearing | 300 | 0 | 450 | 0 | 200 | 40 |
| Grading/Excavation | 6,000 | 0 | 9,000 | 0 | 1,120 | 40 |
| Drainage/Utilities/Sub-Grade | 50 | 0 | 90 | 0 | 720 | 40 |
| Paving | 0 | 280 | 0 | 420 | 320 | 40 |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

| Total Emission Estimates by Phase for -> Notre Dame Blvd Bridge<br>Project Phases<br>(Tons for all except CO2e. Metric tonnes for CO2e) | ROG (tons/phase) | CO (tons/phase) | NOx (tons/phase) | Total PM10 (tons/phase) | Exhaust PM10 (tons/phase) | Fugitive Dust PM10 (tons/phase) | Total PM2.5 (tons/phase) | Exhaust PM2.5 (tons/phase) | Fugitive Dust PM2.5 (tons/phase) | SOx (tons/phase) | CO2 (tons/phase) | CH4 (tons/phase) | N2O (tons/phase) | CO2e (MT/phase) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grubbing/Land Clearing** | 0.00 | 0.05 | 0.06 | 0.10 | 0.00 | 0.10 | 0.02 | 0.00 | 0.02 | 0.00 | 18.76 | 0.00 | 0.00 | 17.51 |
| **Grading/Excavation** | 0.06 | 0.54 | 1.06 | 0.19 | 0.04 | 0.15 | 0.06 | 0.03 | 0.03 | 0.00 | 370.44 | 0.04 | 0.04 | 348.06 |
| **Drainage/Utilities/Sub-Grade** | 0.07 | 0.58 | 0.69 | 0.28 | 0.03 | 0.25 | 0.08 | 0.03 | 0.05 | 0.00 | 134.45 | 0.03 | 0.00 | 123.34 |
| **Paving** | 0.00 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.29 | 0.00 | 0.00 | 6.79 |
| **Maximum (tons/phase)** | 0.07 | 0.58 | 1.06 | 0.28 | 0.04 | 0.25 | 0.08 | 0.03 | 0.05 | 0.00 | 370.44 | 0.04 | 0.04 | 348.06 |
| **Total (tons/construction project)** | 0.13 | 1.20 | 1.83 | 0.57 | 0.07 | 0.50 | 0.16 | 0.06 | 0.10 | 0.01 | 530.95 | 0.07 | 0.05 | 495.70 |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Mitigated using 2010 and Newer On-road and Tier 4 equipment

The maximum pounds per day in row 11 is summed over overlapping phases, but the maximum tons per phase in row 34 is not summed over overlapping phases.

## Road Construction Emissions Model, Version 9.0.0

**Daily Emission Estimates for ->** Notre Dame Blvd Bridge

| Project Phases (Pounds) | ROG (lbs/day) | CO (lbs/day) | NOx (lbs/day) | Total PM10 (lbs/day) | Exhaust PM10 (lbs/day) | Fugitive Dust PM10 (lbs/day) | Total PM2.5 (lbs/day) | Exhaust PM2.5 (lbs/day) | Fugitive Dust PM2.5 (lbs/day) | SOx (lbs/day) | CO2 (lbs/day) | CH4 (lbs/day) | N2O (lbs/day) | CO2e (lbs/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grubbing/Land Clearing** | 0.62 | 12.92 | 4.57 | 20.20 | 0.20 | 20.00 | 4.27 | 0.11 | 4.16 | 0.04 | 3,752.70 | 0.57 | 0.31 | 3,859.61 |
| **Grading/Excavation** | 5.32 | 97.79 | 71.79 | 22.79 | 2.79 | 20.00 | 5.59 | 1.43 | 4.16 | 0.48 | 49,392.37 | 4.71 | 5.52 | 51,155.88 |
| **Drainage/Utilities/Sub-Grade** | 3.12 | 59.34 | 7.38 | 20.42 | 0.42 | 20.00 | 4.50 | 0.34 | 4.16 | 0.11 | 10,756.17 | 2.71 | 0.18 | 10,876.33 |
| **Paving** | 0.61 | 14.43 | 4.39 | 0.20 | 0.20 | 0.00 | 0.11 | 0.11 | 0.00 | 0.04 | 3,643.49 | 0.56 | 0.29 | 3,744.04 |
| **Maximum (pounds/day)** | 9.06 | 170.05 | 83.74 | 63.41 | 3.41 | 60.00 | 14.36 | 1.88 | 12.48 | 0.63 | 63,901.24 | 7.99 | 6.01 | 65,891.83 |
| **Total (tons/construction project)** | 0.08 | 1.57 | 0.66 | 0.53 | 0.03 | 0.50 | 0.12 | 0.02 | 0.10 | 0.01 | 530.95 | 0.07 | 0.05 | 546.41 |

Notes: Project Start Year -> 2023

Project Length (months) -> 13

Total Project Area (acres) -> 3

Maximum Area Disturbed/Day (acres) -> 2

Water Truck Used? -> Yes

| Phase | Total Material Imported/Exported Volume ($yd^3$/day) Soil | Asphalt | Daily VMT (miles/day) Soil Hauling | Asphalt Hauling | Worker Commute | Water Truck |
|---|---|---|---|---|---|---|
| Grubbing/Land Clearing | 300 | 0 | 450 | 0 | 200 | 40 |
| Grading/Excavation | 6,000 | 0 | 9,000 | 0 | 1,120 | 40 |
| Drainage/Utilities/Sub-Grade | 50 | 0 | 90 | 0 | 720 | 40 |
| Paving | 0 | 280 | 0 | 420 | 320 | 40 |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

**Total Emission Estimates by Phase for ->** Notre Dame Blvd Bridge

| Project Phases (Tons for all except CO2e. Metric tonnes for CO2e) | ROG (tons/phase) | CO (tons/phase) | NOx (tons/phase) | Total PM10 (tons/phase) | Exhaust PM10 (tons/phase) | Fugitive Dust PM10 (tons/phase) | Total PM2.5 (tons/phase) | Exhaust PM2.5 (tons/phase) | Fugitive Dust PM2.5 (tons/phase) | SOx (tons/phase) | CO2 (tons/phase) | CH4 (tons/phase) | N2O (tons/phase) | CO2e (MT/phase) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grubbing/Land Clearing** | 0.00 | 0.06 | 0.02 | 0.10 | 0.00 | 0.10 | 0.02 | 0.00 | 0.02 | 0.00 | 18.76 | 0.00 | 0.00 | 17.51 |
| **Grading/Excavation** | 0.04 | 0.73 | 0.54 | 0.17 | 0.02 | 0.15 | 0.04 | 0.01 | 0.03 | 0.00 | 370.44 | 0.04 | 0.04 | 348.06 |
| **Drainage/Utilities/Sub-Grade** | 0.04 | 0.74 | 0.09 | 0.26 | 0.01 | 0.25 | 0.06 | 0.00 | 0.05 | 0.00 | 134.45 | 0.03 | 0.00 | 123.34 |
| **Paving** | 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.29 | 0.00 | 0.00 | 6.79 |
| **Maximum (tons/phase)** | 0.04 | 0.74 | 0.54 | 0.26 | 0.02 | 0.25 | 0.06 | 0.01 | 0.05 | 0.00 | 370.44 | 0.04 | 0.04 | 348.06 |
| **Total (tons/construction project)** | 0.08 | 1.57 | 0.66 | 0.53 | 0.03 | 0.50 | 0.12 | 0.02 | 0.10 | 0.01 | 530.95 | 0.07 | 0.05 | 495.70 |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

| Unmitigated Annual Emission Calculations for Construction Phases | | | | |
|---|---|---|---|---|
| Phase | Start | End | 2023 days | 2024 days |
| Grubbing/Land Clearing | 6/15/2023 | 6/28/2023 | 10 | 0 |
| Grading/Excavation | 6/29/2023 | 7/19/2023 | 15 | 0 |
| Drainage/Utilities/Sub-Grade | 7/20/2023 | 8/23/2023 | 25 | 0 |
| Paving | 7/2/2024 | 7/5/2024 | 0 | 4 |

| **Daily Emission Estimates** | Project Phases | **ROG (lbs/day)** | **CO (lbs/day)** | **NOx (lbs/day)** | **PM10 (lbs/day) Total** | **PM10 (lbs/day) Exhaust** | **PM10 (lbs/day) Fugitive** | **PM2.5 (lbs/day) Total** | **PM2.5 (lbs/day) Exhaust** | **PM2.5 (lbs/day)Fugitive** | **SOx (lbs/day)** | **CO2 (lbs/day)** | **CH4 (lbs/day)** | **N2O (lbs/day)** | **CO2e (lbs/day)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Grubbing/Land Clearing | 0.9 | 9.7 | 11.7 | 20.5 | 0.5 | 20.0 | 4.5 | 0.4 | 4.2 | 0.0 | 3752.7 | 0.6 | 0.3 | 3859.6 |
| | Grading/Excavation | 8.2 | 72.5 | 141.2 | 25.5 | 5.5 | 20.0 | 8.1 | 3.9 | 4.2 | 0.5 | 49392.4 | 4.7 | 5.5 | 51155.9 |
| | Drainage/Utilities/Sub-Grade | 5.4 | 46.5 | 55.4 | 22.3 | 2.3 | 20.0 | 6.2 | 2.1 | 4.2 | 0.1 | 10756.2 | 2.7 | 0.2 | 10876.3 |
| | Paving | 0.9 | 12.9 | 11.0 | 0.5 | 0.5 | 0.0 | 0.4 | 0.4 | 0.0 | 0.0 | 3643.5 | 0.6 | 0.3 | 3744.0 |
| **Annual Emission Estimates (2023)** | | | | | | | | | | | | | | | |
| | Grubbing/Land Clearing | 8.8 | 96.6 | 116.8 | 204.9 | 4.9 | 200.0 | 45.4 | 3.8 | 41.6 | 0.4 | 37527.0 | 5.7 | 3.1 | 38596.1 |
| | Grading/Excavation | 123.5 | 1087.4 | 2118.0 | 382.1 | 82.1 | 300.0 | 121.0 | 58.6 | 62.4 | 7.2 | 740885.6 | 70.6 | 82.8 | 767338.2 |
| | Drainage/Utilities/Sub-Grade | 134.2 | 1162.2 | 1386.0 | 556.7 | 56.7 | 500.0 | 155.6 | 51.6 | 104.0 | 2.8 | 268904.2 | 67.8 | 4.4 | 271908.3 |
| | Paving | 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 |
| | Total Annual for 2023 (pounds) | 266.5 | 2346.1 | 3620.7 | 1143.8 | 143.8 | 1000.0 | 322.0 | 114.0 | 208.0 | 10.4 | 1047316.8 | 144.2 | 90.3 | 1077842.7 |
| | **Total Annual for 2023 (tons)** | **0.1** | **1.2** | **1.8** | **0.6** | **0.1** | **0.5** | **0.2** | **0.1** | **0.1** | **0.0** | **523.7** | **0.1** | **0.0** | **538.9** |
| **Annual Emission Estimates (2024)** | | | | | | | | | | | | | | | |
| | Grubbing/Land Clearing | 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 |
| | Grading/Excavation | 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 |
| | Drainage/Utilities/Sub-Grade | 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 |
| | Paving | 3.4 | 51.5 | 43.9 | 2.1 | 2.1 | 0.0 | 1.6 | 1.6 | 0.0 | 0.1 | 14573.9 | 2.2 | 1.2 | 14976.1 |
| | Total Annual for 2024 (pounds) | 3.4 | 51.5 | 43.9 | 2.1 | 2.1 | 0.0 | 1.6 | 1.6 | 0.0 | 0.1 | 14573.9 | 2.2 | 1.2 | 14976.1 |
| | **Total Annual for 2024 (tons)** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **7.3** | **0.0** | **0.0** | **7.5** |

| **Mitigated Annual Emission Calculations for Construction Phases (2010 and Newer & Tier 4 equipment)** | | | | |
|---|---|---|---|---|
| Phase | Start | End | 2023 days | 2024 days |
| Grubbing/Land Clearing | 6/15/2023 | 6/28/2023 | 10 | 0 |
| Grading/Excavation | 6/29/2023 | 7/19/2023 | 15 | 0 |
| Drainage/Utilities/Sub-Grade | 7/20/2023 | 8/23/2023 | 25 | 0 |
| Paving | 7/2/2024 | 7/5/2024 | 0 | 4 |

| **Daily Emission Estimates** | **Project Phases** | **ROG (lbs/day)** | **CO (lbs/day)** | **NOx (lbs/day)** | **PM10 (lbs/day) Total** | **PM10 (lbs/day) Exhaust** | **PM10 (lbs/day) Fugitive** | **PM2.5 (lbs/day) Total** | **PM2.5 (lbs/day) Exhaust** | **PM2.5 (lbs/day)Fugitive** | **SOx (lbs/day)** | **CO2 (lbs/day)** | **CH4 (lbs/day)** | **N2O (lbs/day)** | **CO2e (lbs/day)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Grubbing/Land Clearing | 0.6 | 12.9 | 4.6 | 20.2 | 0.2 | 20.0 | 4.3 | 0.1 | 4.2 | 0.0 | 3752.7 | 0.6 | 0.3 | 3859.61 |
| | Grading/Excavation | 5.3 | 97.8 | 71.8 | 22.8 | 2.8 | 20.0 | 5.6 | 1.4 | 4.2 | 0.5 | 49392.4 | 4.7 | 5.5 | 51155.88 |
| | Drainage/Utilities/Sub-Grade | 3.1 | 59.3 | 7.4 | 20.4 | 0.4 | 20.0 | 4.5 | 0.3 | 4.2 | 0.1 | 10756.2 | 2.7 | 0.2 | 10876.33 |
| | Paving | 0.6 | 14.4 | 4.4 | 0.2 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 3643.5 | 0.6 | 0.3 | 3744.04 |
| **Annual Emission Estimates (2023)** | | | | | | | | | | | | | | | |
| | Grubbing/Land Clearing | 6.2 | 129.2 | 45.7 | 202.0 | 2.0 | 200.0 | 42.7 | 1.1 | 41.6 | 0.4 | 37527.0 | 5.7 | 3.1 | 38596.1 |
| | Grading/Excavation | 79.8 | 1466.9 | 1076.9 | 341.9 | 41.9 | 300.0 | 83.9 | 21.5 | 62.4 | 7.2 | 740885.6 | 70.7 | 82.8 | 767338.2 |
| | Drainage/Utilities/Sub-Grade | 78.0 | 1483.5 | 184.5 | 510.5 | 10.5 | 500.0 | 112.5 | 8.5 | 104.0 | 2.8 | 268904.3 | 67.8 | 4.5 | 271908.25 |
| | Paving | 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 |
| | Total Annual for 2023 (pounds) | 164.0 | 3079.6 | 1307.1 | 1054.4 | 54.4 | 1000.0 | 239.1 | 31.1 | 208.0 | 10.4 | 1047316.8 | 144.1 | 90.4 | 1077842.6 |
| | **Total Annual for 2023 (tons)** | **0.1** | **1.5** | **0.7** | **0.5** | **0.0** | **0.5** | **0.1** | **0.0** | **0.1** | **0.0** | **523.7** | **0.1** | **0.0** | **538.92128** |
| **Annual Emission Estimates (2024)** | | | | | | | | | | | | | | | |
| | Grubbing/Land Clearing | 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 |
| | Grading/Excavation | 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 |
| | Drainage/Utilities/Sub-Grade | 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 |
| | Paving | 2.4 | 57.7 | 17.6 | 0.8 | 0.8 | 0.0 | 0.4 | 0.4 | 0.0 | 0.2 | 14574.0 | 2.2 | 1.2 | 14976.16 |
| | Total Annual for 2024 (pounds) | 2.4 | 57.7 | 17.6 | 0.8 | 0.8 | 0.0 | 0.4 | 0.4 | 0.0 | 0.2 | 14574.0 | 2.2 | 1.2 | 14976.16 |
| | **Total Annual for 2024 (tons)** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **7.3** | **0.0** | **0.0** | **7.48808** |

## Road Construction Emissions Model Version 9.0.0
## Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

### Input Type

| | | |
|---|---|---|
| Project Name | Notre Dame Blvd Bridge | |
| Construction Start Year | 2023 | Enter a Year between 2014 and 2040 (inclusive) |
| Project Type | 3 | 1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway<br>2) Road Widening : Project to add a new lane to an existing roadway<br>3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane<br>4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction |
| Project Construction Time | 12.50 | months |
| Working Days per Month | 20.00 | days (assume 22 if unknown) |
| Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22) | 2 | 1) Sand Gravel : Use for quaternary deposits (Delta/West County)<br>2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta)<br>3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta) |
| Project Length | 0.10 | miles |
| Total Project Area | 3.00 | acres |
| Maximum Area Disturbed/Day | 2.00 | acres |
| Water Trucks Used? | 1 | 1. Yes<br>2. No |

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

### Material Hauling Quantity Input

| Material Type | Phase | Haul Truck Capacity ($yd^3$) (assume 20 if unknown) | Import Volume ($yd^3$/day) | Export Volume ($yd^3$/day) |
|---|---|---|---|---|
| Soil | Grubbing/Land Clearing | 20.00 | 300.00 | |
| | Grading/Excavation | 20.00 | 6000.00 | |
| | Drainage/Utilities/Sub-Grade | 20.00 | 50.00 | |
| | Paving | 20.00 | 0.00 | |
| Asphalt | Grubbing/Land Clearing | 20.00 | 0.00 | |
| | Grading/Excavation | 20.00 | 0.00 | |
| | Drainage/Utilities/Sub-Grade | 20.00 | 0.00 | |
| | Paving | 20.00 | 280.00 | |

### Mitigation Options

| | |
|---|---|
| On-road Fleet Emissions Mitigation | |
| Off-road Equipment Emissions Mitigation | |

Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation).
Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

**The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optiona**

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

| Construction Periods | User Override of Construction Months | Program Calculated Months | User Override of Phase Starting Date | Program Default Phase Starting Date |
|---|---|---|---|---|
| Grubbing/Land Clearing | 0.50 | 1.25 | 6/15/2023 | 1/1/2023 |
| Grading/Excavation | 0.75 | 5.63 | 6/29/2023 | 1/17/2023 |
| Drainage/Utilities/Sub-Grade | 1.25 | 3.75 | 7/20/2023 | 2/9/2023 |
| Paving | 0.20 | 1.88 | 7/2/2024 | 3/20/2023 |
| **Totals (Months)** | | 3 | | |

Please note: You have entered a different number of months than the project length shown in cell D16.
Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

| Soil Hauling Emissions<br>User Input | User Override of Miles/Round Trip | Program Estimate of Miles/Round Trip | User Override of Truck Round Trips/Day | Default Values Round Trips/Day | Calculated Daily VMT |
|---|---|---|---|---|---|
| Miles/round trip: Grubbing/Land Clearing | | 30.00 | | 15 | 450.00 |
| Miles/round trip: Grading/Excavation | | 30.00 | | 300 | 9000.00 |
| Miles/round trip: Drainage/Utilities/Sub-Grade | | 30.00 | | 3 | 90.00 |
| Miles/round trip: Paving | | 30.00 | | 0 | 0.00 |

| Emission Rates | ROG | CO | NOx | PM10 | PM2.5 | SOx | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|
| Grubbing/Land Clearing (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Grading/Excavation (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |

| | ROG | CO | NOx | PM10 | PM2.5 | SOx | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|
| Draining/Utilities/Sub-Grade (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Paving (grams/mile) | 0.03 | 0.41 | 3.02 | 0.11 | 0.05 | 0.02 | 1,693.55 | 0.00 | 0.27 | 1,772.92 |
| Grubbing/Land Clearing (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Grading/Excavation (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Draining/Utilities/Sub-Grade (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Paving (grams/trip) | 0.00 | 0.00 | 4.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Hauling Emissions** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
| Pounds per day - Grubbing/Land Clearing | 0.03 | 0.40 | 3.11 | 0.11 | 0.05 | 0.02 | 1,701.41 | 0.00 | 0.27 | 1,781.14 |
| Tons per const. Period - Grubbing/Land Clearing | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 8.51 | 0.00 | 0.00 | 8.91 |
| Pounds per day - Grading/Excavation | 0.58 | 8.03 | 62.11 | 2.21 | 0.96 | 0.32 | 34,028.17 | 0.03 | 5.35 | 35,622.77 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.06 | 0.47 | 0.02 | 0.01 | 0.00 | 255.21 | 0.00 | 0.04 | 267.17 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.01 | 0.08 | 0.62 | 0.02 | 0.01 | 0.00 | 340.28 | 0.00 | 0.05 | 356.23 |
| Tons per const. Period - Drainage/Utilities/Sub-Grade | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 4.25 | 0.00 | 0.00 | 4.45 |
| Pounds per day - Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Tons per const. Period - Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total tons per construction project | 0.00 | 0.06 | 0.49 | 0.02 | 0.01 | 0.00 | 267.97 | 0.00 | 0.04 | 280.53 |

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

| **Asphalt Hauling Emissions** | User Override of | Program Estimate of | User Override of Truck | Default Values | Calculated |
|---|---|---|---|---|---|
| **User Input** | Miles/Round Trip | Miles/Round Trip | Round Trips/Day | Round Trips/Day | Daily VMT |
| Miles/round trip: Grubbing/Land Clearing | | 30.00 | | 0 | 0.00 |
| Miles/round trip: Grading/Excavation | | 30.00 | | 0 | 0.00 |
| Miles/round trip: Drainage/Utilities/Sub-Grade | | 30.00 | | 0 | 0.00 |
| Miles/round trip: Paving | | 30.00 | | 14 | 420.00 |

| **Emission Rates** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|
| Grubbing/Land Clearing (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Grading/Excavation (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Draining/Utilities/Sub-Grade (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Paving (grams/mile) | 0.03 | 0.41 | 3.02 | 0.11 | 0.05 | 0.02 | 1,693.55 | 0.00 | 0.27 | 1,772.92 |
| Grubbing/Land Clearing (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Grading/Excavation (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Draining/Utilities/Sub-Grade (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Paving (grams/trip) | 0.00 | 0.00 | 4.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Emissions** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
| Pounds per day - Grubbing/Land Clearing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Tons per const. Period - Grubbing/Land Clearing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pounds per day - Grading/Excavation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Tons per const. Period - Drainage/Utilities/Sub-Grade | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pounds per day - Paving | 0.03 | 0.38 | 2.94 | 0.10 | 0.05 | 0.01 | 1,568.13 | 0.00 | 0.25 | 1,641.62 |
| Tons per const. Period - Paving | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 3.14 | 0.00 | 0.00 | 3.28 |
| Total tons per construction project | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 3.14 | 0.00 | 0.00 | 3.28 |

Note: Worker commute default values can be overridden in cells D121 through D126.

| Worker Commute Emissions | User Override of Worker | | | |
|---|---|---|---|---|
| **User Input** | Commute Default Values | Default Values | | |
| Miles/ one-way trip | | 20 | Calculated | Calculated |
| One-way trips/day | | 2 | Daily Trips | Daily VMT |
| No. of employees: Grubbing/Land Clearing | | 5 | 10 | 200.00 |
| No. of employees: Grading/Excavation | | 28 | 56 | 1,120.00 |
| No. of employees: Drainage/Utilities/Sub-Grade | | 18 | 36 | 720.00 |
| No. of employees: Paving | | 8 | 16 | 320.00 |

| **Emission Rates** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|
| Grubbing/Land Clearing (grams/mile) | 0.02 | 0.91 | 0.07 | 0.05 | 0.02 | 0.00 | 317.66 | 0.00 | 0.01 | 319.68 |
| Grading/Excavation (grams/mile) | 0.02 | 0.91 | 0.07 | 0.05 | 0.02 | 0.00 | 317.66 | 0.00 | 0.01 | 319.68 |
| Draining/Utilities/Sub-Grade (grams/mile) | 0.02 | 0.91 | 0.07 | 0.05 | 0.02 | 0.00 | 317.66 | 0.00 | 0.01 | 319.68 |
| Paving (grams/mile) | 0.01 | 0.84 | 0.06 | 0.05 | 0.02 | 0.00 | 306.70 | 0.00 | 0.01 | 308.54 |
| Grubbing/Land Clearing (grams/trip) | 1.04 | 2.75 | 0.29 | 0.00 | 0.00 | 0.00 | 68.26 | 0.07 | 0.03 | 79.50 |
| Grading/Excavation (grams/trip) | 1.04 | 2.75 | 0.29 | 0.00 | 0.00 | 0.00 | 68.26 | 0.07 | 0.03 | 79.50 |
| Draining/Utilities/Sub-Grade (grams/trip) | 1.04 | 2.75 | 0.29 | 0.00 | 0.00 | 0.00 | 68.26 | 0.07 | 0.03 | 79.50 |
| Paving (grams/trip) | 0.98 | 2.66 | 0.27 | 0.00 | 0.00 | 0.00 | 65.99 | 0.07 | 0.03 | 76.61 |
| **Emissions** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
| Pounds per day - Grubbing/Land Clearing | 0.03 | 0.46 | 0.04 | 0.02 | 0.01 | 0.00 | 141.57 | 0.00 | 0.00 | 142.71 |
| Tons per const. Period - Grubbing/Land Clearing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.71 | 0.00 | 0.00 | 0.71 |
| Pounds per day - Grading/Excavation | 0.17 | 2.59 | 0.22 | 0.11 | 0.05 | 0.01 | 792.79 | 0.02 | 0.02 | 799.17 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 5.95 | 0.00 | 0.00 | 5.99 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.11 | 1.67 | 0.14 | 0.07 | 0.03 | 0.01 | 509.65 | 0.01 | 0.01 | 513.75 |
| Tons per const. Period - Drainage/Utilities/Sub-Grade | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 6.37 | 0.00 | 0.00 | 6.42 |
| Pounds per day - Paving | 0.04 | 0.69 | 0.05 | 0.03 | 0.01 | 0.00 | 218.70 | 0.00 | 0.01 | 220.37 |
| Tons per const. Period - Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.00 | 0.44 |
| Total tons per construction project | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 13.46 | 0.00 | 0.00 | 13.57 |

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

| **Water Truck Emissions** | User Override of | Program Estimate of | User Override of Truck | Default Values | Calculated | User Override of | Default Values | Calculated |
|---|---|---|---|---|---|---|---|---|
| **User Input** | Default # Water Trucks | Number of Water Trucks | Round Trips/Vehicle/Day | Round Trips/Vehicle/Day | Trips/day | Miles/Round Trip | Miles/Round Trip | Daily VMT |
| Grubbing/Land Clearing - Exhaust | | 1 | | 5 | 5 | | 8.00 | 40.00 |
| Grading/Excavation - Exhaust | | 1 | | 5 | 5 | | 8.00 | 40.00 |
| Drainage/Utilities/Subgrade | | 1 | | 5 | 5 | | 8.00 | 40.00 |
| Paving | | 1 | | 5 | 5 | | 8.00 | 40.00 |

| **Emission Rates** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|
| Grubbing/Land Clearing (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Grading/Excavation (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Draining/Utilities/Sub-Grade (grams/mile) | 0.03 | 0.40 | 2.98 | 0.11 | 0.05 | 0.02 | 1,714.99 | 0.00 | 0.27 | 1,795.36 |
| Paving (grams/mile) | 0.03 | 0.41 | 3.02 | 0.11 | 0.05 | 0.02 | 1,693.55 | 0.00 | 0.27 | 1,772.92 |
| Grubbing/Land Clearing (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Grading/Excavation (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Draining/Utilities/Sub-Grade (grams/trip) | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Paving (grams/trip) | 0.00 | 0.00 | 4.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Emissions** | **ROG** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOx** | **CO2** | **CH4** | **N2O** | **CO2e** |
| Pounds per day - Grubbing/Land Clearing | 0.00 | 0.04 | 0.31 | 0.01 | 0.00 | 0.00 | 151.24 | 0.00 | 0.02 | 158.32 |
| Tons per const. Period - Grubbing/Land Clearing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.76 | 0.00 | 0.00 | 0.79 |
| Pounds per day - Grading/Excavation | 0.00 | 0.04 | 0.31 | 0.01 | 0.00 | 0.00 | 151.24 | 0.00 | 0.02 | 158.32 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.13 | 0.00 | 0.00 | 1.19 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.00 | 0.04 | 0.31 | 0.01 | 0.00 | 0.00 | 151.24 | 0.00 | 0.02 | 158.32 |
| Tons per const. Period - Drainage/Utilities/Sub-Grade | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.89 | 0.00 | 0.00 | 1.98 |
| Pounds per day - Paving | 0.00 | 0.04 | 0.32 | 0.01 | 0.00 | 0.00 | 149.35 | 0.00 | 0.02 | 156.34 |
| Tons per const. Period - Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.00 | 0.31 |
| Total tons per construction project | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 4.08 | 0.00 | 0.00 | 4.27 |

Note: Fugitive dust default values can be overridden in cells D183 through D185.

| **Fugitive Dust** | User Override of Max Acreage Disturbed/Day | Default Maximum Acreage/Day | PM10 pounds/day | PM10 tons/per period | PM2.5 pounds/day | PM2.5 tons/per period |
|---|---|---|---|---|---|---|
| Fugitive Dust - Grubbing/Land Clearing | | 2.00 | 20.00 | 0.10 | 4.16 | 0.02 |
| Fugitive Dust - Grading/Excavation | | 2.00 | 20.00 | 0.15 | 4.16 | 0.03 |
| Fugitive Dust - Drainage/Utilities/Subgrade | | 2.00 | 20.00 | 0.25 | 4.16 | 0.05 |

**Off-Road Equipment Emissions**

| Grubbing/Land Clearing<br>Override of Default Number of Vehicles | Default Number of Vehicles<br>*Program-estimate* | Mitigation Option<br>Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected) | Default Equipment Tier | Type | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Model Default Tier | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Crawler Tractors | 0.44 | 2.24 | 5.12 | 0.20 | 0.18 | 0.01 | 758.27 | 0.25 | 0.01 | 766.45 |
| | | | Model Default Tier | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | | Model Default Tier | Excavators | 0.38 | 6.52 | 3.10 | 0.15 | 0.14 | 0.01 | 1,000.21 | 0.32 | 0.01 | 1,010.99 |
| | | | Model Default Tier | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other General Industrial Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Material Handling Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 1 | | Model Default Tier | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**User-Defined Off-road Equipment** If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

| Number of Vehicles | Equipment Tier | Type | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Phase | Units | ROG | CO | NOx | PM10 | PM2.5 | SOx | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Grubbing/Land Clearing | pounds per day | 0.82 | 8.76 | 8.22 | 0.35 | 0.32 | 0.02 | 1,758.48 | 0.57 | 0.02 | 1,777.44 |
| Grubbing/Land Clearing | tons per phase | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 8.79 | 0.00 | 0.00 | 8.89 |

| Grading/Excavation<br>Override of Default Number of Vehicles | Default Number of Vehicles<br>*Program-estimate* | Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected) | Default Equipment Tier | Type | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Model Default Tier | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Cranes | 0.35 | 1.83 | 3.82 | 0.16 | 0.15 | 0.01 | 558.82 | 0.18 | 0.01 | 564.84 |
| | 2 | | Model Default Tier | Crawler Tractors | 0.89 | 4.49 | 10.25 | 0.40 | 0.37 | 0.02 | 1,516.54 | 0.49 | 0.01 | 1,532.90 |
| | | | Model Default Tier | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 4 | | Model Default Tier | Excavators | 0.75 | 13.03 | 6.19 | 0.30 | 0.28 | 0.02 | 2,000.42 | 0.65 | 0.02 | 2,021.99 |
| | | | Model Default Tier | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | | Model Default Tier | Graders | 0.77 | 3.39 | 9.31 | 0.30 | 0.28 | 0.01 | 1,281.71 | 0.41 | 0.01 | 1,295.52 |
| | | | Model Default Tier | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other General Industrial Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Material Handling Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 3 | | Model Default Tier | Rollers | 0.46 | 5.56 | 4.83 | 0.27 | 0.24 | 0.01 | 762.32 | 0.25 | 0.01 | 770.54 |
| | | | Model Default Tier | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 3 | | Model Default Tier | Rubber Tired Loaders | 0.81 | 4.53 | 7.96 | 0.27 | 0.25 | 0.02 | 1,816.68 | 0.59 | 0.02 | 1,836.30 |
| | 4 | | Model Default Tier | Scrapers | 3.15 | 24.55 | 33.13 | 1.30 | 1.20 | 0.06 | 5,880.52 | 1.90 | 0.05 | 5,943.88 |
| 0.00 | 1 | | Model Default Tier | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | | Model Default Tier | Tractors/Loaders/Backhoes | 0.30 | 4.46 | 3.07 | 0.15 | 0.14 | 0.01 | 603.15 | 0.20 | 0.01 | 609.64 |
| | | | Model Default Tier | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**User-Defined Off-road Equipment**

If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

| Number of Vehicles | Equipment Tier | Type | | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | ROG | CO | NOx | PM10 | PM2.5 | SOx | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Grading/Excavation | pounds per day | 7.48 | 61.83 | 78.56 | 3.14 | 2.89 | 0.15 | 14,420.18 | 4.66 | 0.13 | 14,575.62 |
| Grading/Excavation | tons per phase | 0.06 | 0.46 | 0.59 | 0.02 | 0.02 | 0.00 | 108.15 | 0.03 | 0.00 | 109.32 |

| Drainage/Utilities/Subgrade<br>Override of Default Number of Vehicles | Default Number of Vehicles<br>*Program-estimate* | Mitigation Option<br>Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected) | Default Equipment Tier | | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Model Default Tier | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Air Compressors | 0.26 | 2.41 | 1.74 | 0.09 | 0.09 | 0.00 | 375.26 | 0.02 | 0.00 | 376.67 |
| | | | Model Default Tier | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Generator Sets | 0.31 | 3.67 | 2.72 | 0.13 | 0.13 | 0.01 | 623.04 | 0.03 | 0.00 | 625.12 |
| | 2 | | Model Default Tier | Graders | 0.77 | 3.39 | 9.31 | 0.30 | 0.28 | 0.01 | 1,281.71 | 0.41 | 0.01 | 1,295.52 |
| | | | Model Default Tier | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other General Industrial Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Material Handling Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Plate Compactors | 0.04 | 0.21 | 0.25 | 0.01 | 0.01 | 0.00 | 34.48 | 0.00 | 0.00 | 34.65 |
| | | | Model Default Tier | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Pumps | 0.33 | 3.73 | 2.75 | 0.13 | 0.13 | 0.01 | 623.04 | 0.03 | 0.00 | 625.14 |
| | | | Model Default Tier | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Rough Terrain Forklifts | 0.11 | 2.29 | 1.40 | 0.04 | 0.04 | 0.00 | 333.80 | 0.11 | 0.00 | 337.40 |
| | | | Model Default Tier | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 4 | | Model Default Tier | Scrapers | 3.15 | 24.55 | 33.13 | 1.30 | 1.20 | 0.06 | 5,880.52 | 1.90 | 0.05 | 5,943.88 |
| 0.00 | 1 | | Model Default Tier | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | | Model Default Tier | Tractors/Loaders/Backhoes | 0.30 | 4.46 | 3.07 | 0.15 | 0.14 | 0.01 | 603.15 | 0.20 | 0.01 | 609.64 |
| | | | Model Default Tier | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**User-Defined Off-road Equipment** If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

| Number of Vehicles | Equipment Tier | Type | | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | ROG | CO | NOx | PM10 | PM2.5 | SOx | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Drainage/Utilities/Sub-Grade | pounds per day | 5.25 | 44.70 | 54.37 | 2.16 | 2.02 | 0.10 | 9,755.00 | 2.70 | 0.09 | 9,848.03 |
| Drainage/Utilities/Sub-Grade | tons per phase | 0.07 | 0.56 | 0.68 | 0.03 | 0.03 | 0.00 | 121.94 | 0.03 | 0.00 | 123.10 |

| Paving<br>Override of Default Number of Vehicles | Default Number of Vehicles<br>*Program-estimate* | Mitigation Option<br>Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected) | Default Equipment Tier | Type | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Model Default Tier | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Construction Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other General Industrial Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Other Material Handling Equipn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Pavers | 0.18 | 2.89 | 1.74 | 0.08 | 0.07 | 0.00 | 455.16 | 0.15 | 0.00 | 460.07 |
| | 1 | | Model Default Tier | Paving Equipment | 0.16 | 2.57 | 1.50 | 0.07 | 0.07 | 0.00 | 394.47 | 0.13 | 0.00 | 398.72 |
| | | | Model Default Tier | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Model Default Tier | Rollers | 0.15 | 1.85 | 1.52 | 0.08 | 0.07 | 0.00 | 254.15 | 0.08 | 0.00 | 256.88 |
| | | | Model Default Tier | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 1 | | Model Default Tier | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2 | | Model Default Tier | Tractors/Loaders/Backhoes | 0.29 | 4.47 | 2.90 | 0.13 | 0.12 | 0.01 | 603.53 | 0.20 | 0.01 | 610.03 |
| | | | Model Default Tier | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Model Default Tier | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**User-Defined Off-road Equipment** If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

| Number of Vehicles | Equipment Tier | Type | | ROG pounds/day | CO pounds/day | NOx pounds/day | PM10 pounds/day | PM2.5 pounds/day | SOx pounds/day | CO2 pounds/day | CH4 pounds/day | N2O pounds/day | CO2e pounds/day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | N/A | | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | ROG | CO | NOx | PM10 | PM2.5 | SOx | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Paving | pounds per day | 0.78 | 11.78 | 7.66 | 0.37 | 0.34 | 0.02 | 1,707.31 | 0.55 | 0.02 | 1,725.70 |
| Paving | tons per phase | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | 3.41 | 0.00 | 0.00 | 3.45 |
| **Total Emissions all Phases (tons per construction period) =>** | | 0.13 | 1.09 | 1.33 | 0.05 | 0.05 | 0.00 | 242.30 | 0.07 | 0.00 | 244.76 |

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

| **Equipment** | User Override of Horsepower | Default Values Horsepower | User Override of Hours/day | Default Values Hours/day | Horsepower | Load Factor adjustment |
|---|---|---|---|---|---|---|
| Aerial Lifts | | 63 | | 8 | 63.00 | 0.31 |
| Air Compressors | | 78 | | 8 | 78.00 | 0.48 |
| Bore/Drill Rigs | | 221 | | 8 | 221.00 | 0.50 |
| Cement and Mortar Mixers | | 9 | | 8 | 9.00 | 0.56 |
| Concrete/Industrial Saws | | 81 | | 8 | 81.00 | 0.73 |
| Cranes | | 231 | | 8 | 231.00 | 0.29 |
| Crawler Tractors | | 212 | | 8 | 212.00 | 0.43 |
| Crushing/Proc. Equipment | | 85 | | 8 | 85.00 | 0.78 |
| Excavators | | 158 | | 8 | 158.00 | 0.38 |
| Forklifts | | 89 | | 8 | 89.00 | 0.20 |
| Generator Sets | | 84 | | 8 | 84.00 | 0.74 |
| Graders | | 187 | | 8 | 187.00 | 0.41 |
| Off-Highway Tractors | | 124 | | 8 | 124.00 | 0.44 |
| Off-Highway Trucks | | 402 | | 8 | 402.00 | 0.38 |
| Other Construction Equipment | | 172 | | 8 | 172.00 | 0.42 |
| Other General Industrial Equipment | | 88 | | 8 | 88.00 | 0.34 |
| Other Material Handling Equipment | | 168 | | 8 | 168.00 | 0.40 |
| Pavers | | 130 | | 8 | 130.00 | 0.42 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Paving Equipment | | 132 | | 8 | 132.00 | 0.36 |
| Plate Compactors | | 8 | | 8 | 8.00 | 0.43 |
| Pressure Washers | | 13 | | 8 | 13.00 | 0.30 |
| Pumps | | 84 | | 8 | 84.00 | 0.74 |
| Rollers | | 80 | | 8 | 80.00 | 0.38 |
| Rough Terrain Forklifts | | 100 | | 8 | 100.00 | 0.40 |
| Rubber Tired Dozers | | 247 | | 8 | 247.00 | 0.40 |
| Rubber Tired Loaders | | 203 | | 8 | 203.00 | 0.36 |
| Scrapers | | 367 | | 8 | 367.00 | 0.48 |
| Signal Boards | | 6 | | 8 | 6.00 | 0.82 |
| Skid Steer Loaders | | 65 | | 8 | 65.00 | 0.37 |
| Surfacing Equipment | | 263 | | 8 | 263.00 | 0.30 |
| Sweepers/Scrubbers | | 64 | | 8 | 64.00 | 0.46 |
| Tractors/Loaders/Backhoes | | 97 | | 8 | 97.00 | 0.37 |
| Trenchers | | 78 | | 8 | 78.00 | 0.50 |
| Welders | | 46 | | 8 | 46.00 | 0.45 |

**END OF DATA ENTRY SHEET**

**Attachment 2**

| | | *J* | *K* | *L* | *M* | *N* | *O* | *P* | *Q* | *R* | *S* | *T* | *U* | *V* | *W* | *X* | *Y* | *Z* | *AA* | *AB* | *AC* | *AD* | *AE* | *AF* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Year | Running (RUNEX, PMTW, PMBW) grams per mile | | | | | | | | | | | | Process (IDLEX, STREX, TOTEX, DIURN, HTSK, RUNLS) grams per trip | | | | | | | | | | Fuel |
| | | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 Ex | PM10 D | PM2.5 Ex | PM2.5 D | SOX | N2O | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 | PM2.5 | SOX | N2O | gal/mi |
| Butte | 2019 | 0.07 | 0.09 | 1.77 | 0.63 | 486.20 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.03 | 1.60 | 1.66 | 5.10 | 0.80 | 113.54 | 0.10 | 0.00 | 0.00 | 0.00 | 0.04 | 0.06 |
| Butte | 2025 | 0.03 | 0.04 | 0.98 | 0.28 | 426.82 | 0.01 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 | 0.03 | 1.22 | 1.26 | 3.52 | 0.72 | 110 | 0.07 | 0.00 | 0.00 | 0.00 | 0.04 | 0.05 |

Final Weighted

Converted

grams per ton 907185

| | | | | | | | | | Running (RUNEX, PMTW, PMBW) grams per mile | | | | | | | | | | | | Process (IDLEX, STREX, TOTEX, DIURN, HTSK, RUNLS, RESTL) grams per trip | | | | | | | | | | Fuel | Running (RUNEX, PMTW, PMBW) grams per mile | | | | | | | | | | | | Process (IDLEX, STREX, TOTEX, DIURN | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | VMT/yr | Trips/yr | Lookup | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 Ex | PM10 D | PM2.5 Ex | PM2.5 D | SOX | N2O | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 | PM2.5 | SOX | N2O | gal/mi | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 Ex | PM10 D | PM2.5 Ex | PM2.5 D | SOX | N2O | ROG | TOG | CO | NOx | CO2 |
| Butte | 2019 | HHDT | Aggregate | Aggregate | Gasoline | 43,595 | 34,571 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.32 | 6.96 | 169.62 | 18.55 | 2522.59 | 0.73 | 0.01 | 0.14 | 0.01 | 0.05 | 0.02 | 0.44 | 2.27 | 2.27 | 0.97 | 1.62 | 79.97 |
| Butte | 2019 | HHDT | Aggregate | Aggregate | Diesel | 102,702,538 | 10,904,015 | Butte2019 | 0 | 0 | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0.13 | 0.15 | 0.50 | 4.37 | 1665.61 | 0.01 | 0.09 | 0.12 | 0.09 | 0.04 | 0.02 | 0.26 | 0.43 | 0.49 | 5.05 | 7.31 | 1006.12 |
| Butte | 2019 | HHDT | Aggregate | Aggregate | Natural Gas | 450,381 | 38,338 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 3.14 | 18.23 | 1.17 | 1526.79 | 3.07 | 0.00 | 0.22 | 0.00 | 0.07 | 0.00 | 0.31 | 0.05 | 3.35 | 10.00 | 1.30 | 1356.90 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Gasoline | 753,722,273 | 105,315,615 | Butte2019 | 0 | 0 | 1 | 0 | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.04 | 1.43 | 0.11 | 311.27 | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 1.54 | 1.59 | 5.14 | 0.39 | 80.07 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Diesel | 5,393,945 | 790,050 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.05 | 0.46 | 0.46 | 247.16 | 0.00 | 0.03 | 0.02 | 0.03 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Electricity | 5,456,372 | 829,568 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Plug-in Hybrid | 10,494,499 | 1,012,894 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.26 | 0.00 | 154.76 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.40 | 1.31 | 0.11 | 68.84 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Gasoline | 122,919,518 | 19,011,299 | Butte2019 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.09 | 0.12 | 3.64 | 0.36 | 368.50 | 0.02 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.02 | 3.76 | 3.87 | 11.17 | 0.69 | 104.81 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Diesel | 74,954 | 17,910 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.29 | 0.33 | 1.59 | 1.67 | 424.15 | 0.01 | 0.26 | 0.02 | 0.25 | 0.01 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Electricity | 81,895 | 17,954 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Plug-in Hybrid | 1,242 | 116 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.26 | 0.00 | 155.31 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.38 | 1.31 | 0.11 | 78.64 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Gasoline | 414,295,510 | 56,833,493 | Butte2019 | 0 | 0 | 0 | 0 | 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.04 | 1.67 | 0.18 | 393.49 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 1.59 | 1.65 | 5.99 | 0.60 | 102.39 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Diesel | 1,156,470 | 148,302 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.03 | 0.23 | 0.19 | 341.94 | 0.00 | 0.02 | 0.02 | 0.02 | 0.01 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Electricity | 4,533 | 695 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Plug-in Hybrid | 555,672 | 49,172 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.25 | 0.00 | 152.33 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.36 | 1.31 | 0.11 | 82.62 |
| Butte | 2019 | LHDT1 | Aggregate | Aggregate | Gasoline | 52,517,111 | 24,698,804 | Butte2019 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.12 | 0.16 | 2.41 | 0.45 | 981.78 | 0.02 | 0.00 | 0.09 | 0.00 | 0.03 | 0.01 | 0.02 | 1.04 | 1.08 | 3.37 | 0.72 | 33.69 |
| Butte | 2019 | LHDT1 | Aggregate | Aggregate | Diesel | 86,612,687 | 30,898,925 | Butte2019 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.26 | 0.29 | 0.79 | 3.27 | 637.07 | 0.01 | 0.06 | 0.09 | 0.06 | 0.03 | 0.01 | 0.10 | 0.01 | 0.01 | 0.07 | 0.20 | 11.10 |
| Butte | 2019 | LHDT2 | Aggregate | Aggregate | Gasoline | 5,554,158 | 2,380,411 | Butte2019 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0.11 | 1.71 | 0.33 | 1061.45 | 0.02 | 0.00 | 0.10 | 0.00 | 0.03 | 0.01 | 0.02 | 0.82 | 0.86 | 3.54 | 0.69 | 36.24 |
| Butte | 2019 | LHDT2 | Aggregate | Aggregate | Diesel | 23,090,774 | 7,461,568 | Butte2019 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.21 | 0.24 | 0.56 | 2.08 | 786.15 | 0.01 | 0.05 | 0.10 | 0.04 | 0.03 | 0.01 | 0.12 | 0.01 | 0.01 | 0.07 | 0.19 | 17.62 |
| Butte | 2019 | MCY | Aggregate | Aggregate | Gasoline | 11,073,185 | 4,059,869 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.56 | 1.81 | 17.56 | 0.74 | 194.49 | 0.22 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.05 | 11.99 | 12.15 | 8.63 | 0.20 | 60.32 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Gasoline | 361,108,389 | 51,495,889 | Butte2019 | 0 | 0 | 0 | 0 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 | 0.07 | 2.05 | 0.24 | 469.07 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 2.12 | 2.22 | 7.02 | 0.79 | 124.04 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Diesel | 9,549,174 | 1,116,065 | Butte2019 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.02 | 0.23 | 0.10 | 429.39 | 0.00 | 0.01 | 0.02 | 0.01 | 0.01 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Electricity | 77,706 | 14,627 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Plug-in Hybrid | 1,239,001 | 102,317 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.26 | 0.00 | 154.83 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.37 | 1.31 | 0.11 | 102.85 |
| Butte | 2019 | MH | Aggregate | Aggregate | Gasoline | 2,664,375 | 34,869 | Butte2019 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.18 | 0.26 | 5.00 | 0.88 | 1896.88 | 0.04 | 0.00 | 0.06 | 0.00 | 0.02 | 0.02 | 0.04 | 90.42 | 90.44 | 4.36 | 0.38 | 34.36 |
| Butte | 2019 | MH | Aggregate | Aggregate | Diesel | 1,076,114 | 12,000 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.15 | 0.17 | 0.56 | 5.84 | 1089.92 | 0.01 | 0.15 | 0.06 | 0.14 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | MHDT | Aggregate | Aggregate | Gasoline | 4,165,562 | 2,192,752 | Butte2019 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.36 | 0.49 | 8.62 | 1.36 | 1835.32 | 0.06 | 0.00 | 0.06 | 0.00 | 0.02 | 0.02 | 0.06 | 1.76 | 1.83 | 8.12 | 0.50 | 87.83 |
| Butte | 2019 | MHDT | Aggregate | Aggregate | Diesel | 22,516,797 | 6,393,822 | Butte2019 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.32 | 0.36 | 0.87 | 5.41 | 1186.18 | 0.01 | 0.17 | 0.06 | 0.16 | 0.02 | 0.01 | 0.19 | 0.09 | 0.10 | 0.81 | 3.36 | 218.35 |
| Butte | 2019 | OBUS | Aggregate | Aggregate | Gasoline | 1,844,422 | 832,787 | Butte2019 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.15 | 0.23 | 3.61 | 1.14 | 1864.32 | 0.03 | 0.00 | 0.06 | 0.00 | 0.02 | 0.02 | 0.05 | 0.70 | 0.74 | 5.63 | 0.45 | 54.16 |
| Butte | 2019 | OBUS | Aggregate | Aggregate | Diesel | 1,100,936 | 194,646 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.71 | 0.81 | 1.79 | 6.65 | 1373.45 | 0.03 | 0.30 | 0.07 | 0.29 | 0.02 | 0.01 | 0.22 | 0.11 | 0.13 | 0.91 | 2.48 | 183.14 |
| Butte | 2019 | SBUS | Aggregate | Aggregate | Gasoline | 653,660 | 53,792 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.87 | 1.16 | 21.01 | 2.52 | 883.92 | 0.14 | 0.01 | 0.05 | 0.01 | 0.02 | 0.01 | 0.10 | 8.05 | 9.22 | 37.10 | 0.86 | 749.32 |
| Butte | 2019 | SBUS | Aggregate | Aggregate | Diesel | 1,191,091 | 808,567 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.11 | 0.13 | 0.32 | 8.75 | 1184.04 | 0.01 | 0.05 | 0.06 | 0.05 | 0.02 | 0.01 | 0.19 | 0.02 | 0.02 | 0.21 | 2.30 | 156.27 |
| Butte | 2019 | UBUS | Aggregate | Aggregate | Gasoline | 485,894 | 34,326 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.02 | 0.31 | 0.26 | 1822.88 | 0.00 | 0.00 | 0.12 | 0.00 | 0.04 | 0.02 | 0.02 | 0.98 | 1.04 | 10.41 | 1.04 | 123.32 |
| Butte | 2019 | UBUS | Aggregate | Aggregate | Diesel | 1,067,935 | 33,006 | Butte2019 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.07 | 0.07 | 0.33 | 1270.83 | 0.00 | 0.01 | 0.14 | 0.01 | 0.05 | 0.01 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2019 | UBUS | Aggregate | Aggregate | Natural Gas | 155,822 | 9,242 | Butte2019 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 1.29 | 23.64 | 0.52 | 1574.74 | 1.26 | 0.00 | 0.15 | 0.00 | 0.05 | 0.00 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Gasoline | 10,478 | 3,283 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.53 | 2.24 | 35.72 | 6.91 | 2111.75 | 0.27 | 0.00 | 0.13 | 0.00 | 0.04 | 0.02 | 0.23 | 0.95 | 0.95 | 3.62 | 0.08 | 53.69 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Diesel | 119,234,333 | 13,326,974 | Butte2025 | 0 | 0 | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.02 | 0.07 | 1.71 | 1554.73 | 0.00 | 0.03 | 0.11 | 0.03 | 0.04 | 0.01 | 0.24 | 0.42 | 0.47 | 6.10 | 7.80 | 946.61 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Electricity | 657,503 | 81,092 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Natural Gas | 689,966 | 63,191 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 2.11 | 14.77 | 0.79 | 1453.69 | 2.06 | 0.00 | 0.23 | 0.00 | 0.08 | 0.00 | 0.30 | 0.04 | 2.65 | 8.94 | 0.99 | 1324.23 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Gasoline | 853,287,419 | 108,164,489 | Butte2025 | 0 | 0 | 0 | 0 | 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.01 | 0.82 | 0.05 | 281.79 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 1.08 | 1.11 | 3.21 | 0.26 | 69.91 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Diesel | 3,624,704 | 537,933 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.03 | 0.38 | 0.26 | 237.97 | 0.00 | 0.02 | 0.02 | 0.02 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Electricity | 59,599,344 | 5,983,815 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Plug-in Hybrid | 29,598,483 | 2,777,722 | Butte2025 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.23 | 0.00 | 137.53 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.38 | 1.31 | 0.11 | 64.63 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Gasoline | 94,939,915 | 13,684,622 | Butte2025 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 | 0.07 | 2.29 | 0.22 | 345.14 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 2.98 | 3.06 | 7.74 | 0.52 | 93.80 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Diesel | 34,795 | 8,343 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.29 | 0.32 | 1.58 | 1.67 | 424.32 | 0.01 | 0.26 | 0.02 | 0.25 | 0.01 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Electricity | 240,479 | 27,134 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Plug-in Hybrid | 179,340 | 15,200 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.21 | 0.00 | 124.47 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.30 | 1.31 | 0.11 | 70.39 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Gasoline | 470,795,862 | 59,470,237 | Butte2025 | 0 | 0 | 0 | 0 | 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.02 | 1.01 | 0.09 | 351.69 | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 1.24 | 1.28 | 3.99 | 0.38 | 89.22 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Diesel | 1,561,322 | 190,882 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.02 | 0.17 | 0.08 | 313.56 | 0.00 | 0.01 | 0.02 | 0.01 | 0.01 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Electricity | 2,892,295 | 406,111 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Plug-in Hybrid | 4,679,098 | 416,654 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.22 | 0.00 | 131.19 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.32 | 1.31 | 0.11 | 77.28 |
| Butte | 2025 | LHDT1 | Aggregate | Aggregate | Gasoline | 42,693,887 | 18,992,616 | Butte2025 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.07 | 0.10 | 1.63 | 0.30 | 908.67 | 0.01 | 0.00 | 0.09 | 0.00 | 0.03 | 0.01 | 0.02 | 0.97 | 1.00 | 3.36 | 0.68 | 33.54 |
| Butte | 2025 | LHDT1 | Aggregate | Aggregate | Diesel | 63,194,585 | 24,157,511 | Butte2025 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.24 | 0.27 | 0.73 | 2.65 | 636.84 | 0.01 | 0.05 | 0.09 | 0.05 | 0.03 | 0.01 | 0.10 | 0.01 | 0.01 | 0.07 | 0.18 | 10.87 |
| Butte | 2025 | LHDT1 | Aggregate | Aggregate | Electricity | 454,659 | 90,353 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | LHDT2 | Aggregate | Aggregate | Gasoline | 4,845,378 | 2,035,664 | Butte2025 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.06 | 1.07 | 0.19 | 992.30 | 0.01 | 0.00 | 0.10 | 0.00 | 0.03 | 0.01 | 0.01 | 0.71 | 0.74 | 3.39 | 0.64 | 35.03 |
| Butte | 2025 | LHDT2 | Aggregate | Aggregate | Diesel | 19,307,127 | 6,799,407 | Butte2025 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.19 | 0.22 | 0.53 | 1.66 | 773.20 | 0.01 | 0.04 | 0.10 | 0.04 | 0.03 | 0.01 | 0.12 | 0.01 | 0.01 | 0.07 | 0.17 | 17.16 |
| Butte | 2025 | LHDT2 | Aggregate | Aggregate | Electricity | 110,710 | 21,946 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | MCY | Aggregate | Aggregate | Gasoline | 9,681,026 | 3,799,477 | Butte2025 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1.37 | 1.62 | 15.88 | 0.68 | 193.08 | 0.20 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.04 | 12.20 | 12.34 | 8.56 | 0.17 | 55.76 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Gasoline | 336,696,246 | 45,150,171 | Butte2025 | 0 | 0 | 0 | 0 | 67 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.03 | 1.19 | 0.12 | 428.89 | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 1.77 | 1.83 | 4.76 | 0.52 | 111.28 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Diesel | 7,890,006 | 1,021,049 | Butte2025 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.02 | 0.26 | 0.08 | 417.81 | 0.00 | 0.01 | 0.02 | 0.01 | 0.01 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Electricity | 3,181,713 | 450,229 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Plug-in Hybrid | 3,249,762 | 280,468 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.22 | 0.00 | 134.42 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.34 | 1.31 | 0.11 | 96.13 |
| Butte | 2025 | MH | Aggregate | Aggregate | Gasoline | 1,718,835 | 21,463 | Butte2025 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0.12 | 1.93 | 0.57 | 1893.44 | 0.02 | 0.00 | 0.06 | 0.00 | 0.02 | 0.02 | 0.03 | 78.43 | 78.45 | 3.67 | 0.42 | 31.97 |
| Butte | 2025 | MH | Aggregate | Aggregate | Diesel | 908,913 | 10,729 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.15 | 0.17 | 0.54 | 5.39 | 1089.58 | 0.01 | 0.13 | 0.06 | 0.13 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | MHDT | Aggregate | Aggregate | Gasoline | 3,625,587 | 1,472,610 | Butte2025 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0.12 | 1.86 | 0.51 | 1724.25 | 0.02 | 0.00 | 0.06 | 0.00 | 0.02 | 0.02 | 0.02 | 0.91 | 0.96 | 6.85 | 0.44 | 73.58 |
| Butte | 2025 | MHDT | Aggregate | Aggregate | Diesel | 24,763,659 | 6,517,462 | Butte2025 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.04 | 0.12 | 1.26 | 1129.20 | 0.00 | 0.02 | 0.06 | 0.02 | 0.02 | 0.01 | 0.18 | 0.02 | 0.03 | 0.67 | 2.84 | 198.19 |
| Butte | 2025 | MHDT | Aggregate | Aggregate | Electricity | 261,789 | 58,286 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | OBUS | Aggregate | Aggregate | Gasoline | 1,174,824 | 617,947 | Butte2025 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.12 | 0.17 | 2.63 | 0.90 | 1804.61 | 0.02 | 0.00 | 0.06 | 0.00 | 0.02 | 0.02 | 0.04 | 0.81 | 0.84 | 5.36 | 0.46 | 53.05 |
| Butte | 2025 | OBUS | Aggregate | Aggregate | Diesel | 1,156,692 | 199,878 | Butte2025 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.11 | 0.13 | 0.33 | 1.98 | 1306.94 | 0.01 | 0.04 | 0.07 | 0.04 | 0.02 | 0.01 | 0.21 | 0.05 | 0.06 | 0.85 | 2.32 | 169.41 |
| Butte | 2025 | OBUS | Aggregate | Aggregate | Electricity | 7,694 | 1,753 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | SBUS | Aggregate | Aggregate | Gasoline | 453,280 | 34,535 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.15 | 0.22 | 3.71 | 1.30 | 829.57 | 0.03 | 0.00 | 0.05 | 0.00 | 0.02 | 0.01 | 0.06 | 5.43 | 6.68 | 35.34 | 0.88 | 724.56 |
| Butte | 2025 | SBUS | Aggregate | Aggregate | Diesel | 1,180,589 | 787,437 | Butte2025 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.07 | 0.09 | 0.22 | 5.50 | 1133.89 | 0.00 | 0.03 | 0.06 | 0.03 | 0.02 | 0.01 | 0.18 | 0.01 | 0.01 | 0.28 | 2.14 | 152.33 |
| Butte | 2025 | SBUS | Aggregate | Aggregate | Electricity | 12,734 | 6,060 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | UBUS | Aggregate | Aggregate | Gasoline | 493,968 | 34,896 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.02 | 0.25 | 0.18 | 1824.54 | 0.00 | 0.00 | 0.12 | 0.00 | 0.04 | 0.02 | 0.02 | 0.77 | 0.83 | 10.41 | 0.92 | 123.16 |
| Butte | 2025 | UBUS | Aggregate | Aggregate | Diesel | 1,126,654 | 36,320 | Butte2025 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.07 | 0.07 | 0.34 | 1268.23 | 0.00 | 0.01 | 0.14 | 0.01 | 0.05 | 0.01 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Butte | 2025 | UBUS | Aggregate | Aggregate | Natural Gas | 117,438 | 6,629 | Butte2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 4.55 | 52.76 | 0.06 | 1352.53 | 4.46 | 0.00 | 0.15 | 0.00 | 0.05 | 0.00 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

EMFAC Summary

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Butte
Calendar Year: 2019, 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units:  miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumption

| HTSK, RUNLS, RESTL) grams per trip | | | | | Fuel | Running (RUNEX, PMTW, PMBW) Tons per Year | | | | | | | | | | | | Process (IDLEX, STREX, TOTEX, DIURN, HTSK, RUNLS, RESTL) Tons per Year | | | | | | | | | | Fuel | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CH4 | PM10 | PM2.5 | SOX | N2O | gal/mi | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 Ex | PM10 D | PM2.5 Ex | PM2.5 D | SOX | N2O | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 | PM2.5 | SOX | N2O | gal/yr | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_TOTEX | ROG_DIURN | ROG_HTSK | ROG_RUNLS | ROG_TOTAL | TOG_RUNEX | TOG_IDLEX | TOG_STREX | TOG_TOTEX | TOG_DIURN | TOG_HTSK | TOG_RUNLS | TOG_TOTAL | CO_RUNEX | CO_IDLEX | CO_STREX | CO_TOTEX | NOx_RUNEX | NOx_IDLEX |
| 0.00 | 0.01 | 0.01 | 0.00 | 0.03 | 0.30 | 0 | 0 | 8 | 1 | 121 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 13,117 | 0.26 | 0.00 | 0.00 | 0.26 | 0.02 | 0.01 | 0.05 | 0.34 | 0.33 | 0.00 | 0.00 | 0.33 | 0.02 | 0.01 | 0.05 | 0.42 | 8.15 | 0.00 | 0.04 | 8.19 | 0.89 | 0.00 |
| 0.02 | 0.02 | 0.02 | 0.01 | 0.16 | 0.17 | 15 | 17 | 56 | 495 | 188564 | 1 | 10 | 13 | 10 | 4 | 2 | 30 | 5 | 6 | 61 | 88 | 12093 | 0 | 0 | 0 | 0 | 2 | 17,908,520 | 14.92 | 5.20 | 0.00 | 20.11 | 0.00 | 0.00 | 0.00 | 20.11 | 16.98 | 5.92 | 0.00 | 22.90 | 0.00 | 0.00 | 0.00 | 22.90 | 56.11 | 60.68 | 0.00 | 116.79 | 494.62 | 66.30 |
| 3.29 | 0.00 | 0.00 | 0.00 | 0.28 | 0.21 | 0 | 2 | 9 | 1 | 758 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 | 0 | 94,240 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.02 | 1.56 | 0.14 | 0.00 | 1.70 | 0.00 | 0.00 | 0.00 | 1.70 | 9.05 | 0.42 | 0.00 | 9.47 | 0.58 | 0.05 |
| 0.11 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 21 | 31 | 1190 | 89 | 258614 | 5 | 1 | 13 | 1 | 4 | 3 | 7 | 179 | 185 | 597 | 45 | 9296 | 13 | 0 | 0 | 0 | 5 | 28,278,176 | 21.01 | 0.00 | 65.09 | 86.11 | 55.95 | 16.25 | 41.34 | 199.65 | 30.62 | 0.00 | 71.27 | 101.89 | 55.95 | 16.25 | 41.34 | 215.43 | 1190.25 | 0.00 | 596.92 | 1787.17 | 89.40 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0 | 0 | 3 | 3 | 1470 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 131,155 | 0.27 | 0.00 | 0.00 | 0.27 | 0.00 | 0.00 | 0.00 | 0.27 | 0.30 | 0.00 | 0.00 | 0.30 | 0.00 | 0.00 | 0.00 | 0.30 | 2.73 | 0.00 | 0.00 | 2.73 | 2.74 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 3 | 0 | 1790 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 77 | 0 | 0 | 0 | 0 | 0 | 197,081 | 0.02 | 0.00 | 0.19 | 0.21 | 0.16 | 0.05 | 0.04 | 0.45 | 0.03 | 0.00 | 0.21 | 0.24 | 0.16 | 0.05 | 0.04 | 0.48 | 2.95 | 0.00 | 1.47 | 4.42 | 0.04 | 0.00 |
| 0.19 | 0.01 | 0.00 | 0.00 | 0.05 | 0.04 | 12 | 17 | 493 | 49 | 49929 | 2 | 0 | 2 | 0 | 1 | 0 | 3 | 79 | 81 | 234 | 14 | 2197 | 4 | 0 | 0 | 0 | 1 | 5,501,952 | 11.63 | 0.00 | 23.55 | 35.18 | 26.46 | 7.20 | 21.62 | 90.45 | 16.81 | 0.00 | 25.78 | 42.59 | 26.46 | 7.20 | 21.62 | 97.87 | 492.83 | 0.00 | 233.98 | 726.81 | 49.08 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,128 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 0.13 | 0.00 | 0.00 | 0.13 | 0.14 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.13 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 14 | 20 | 765 | 84 | 179702 | 3 | 1 | 8 | 1 | 2 | 2 | 5 | 100 | 103 | 375 | 38 | 6415 | 8 | 0 | 0 | 0 | 3 | 19,644,788 | 13.89 | 0.00 | 41.40 | 55.29 | 28.75 | 8.24 | 21.17 | 113.45 | 20.05 | 0.00 | 45.33 | 65.38 | 28.75 | 8.24 | 21.17 | 123.54 | 764.60 | 0.00 | 375.25 | 1139.85 | 83.66 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0 | 0 | 0 | 0 | 436 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38,904 | 0.04 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 0.29 | 0.00 | 0.00 | 0.29 | 0.24 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 10,321 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 0.15 | 0.00 | 0.07 | 0.23 | 0.00 | 0.00 |
| 0.05 | 0.00 | 0.00 | 0.00 | 0.05 | 0.12 | 7 | 10 | 139 | 26 | 56836 | 1 | 0 | 5 | 0 | 2 | 1 | 1 | 28 | 29 | 92 | 19 | 917 | 1 | 0 | 0 | 0 | 1 | 6,095,861 | 6.69 | 0.86 | 6.43 | 13.98 | 7.84 | 2.19 | 11.10 | 35.12 | 9.51 | 1.25 | 7.04 | 17.81 | 7.84 | 2.19 | 11.10 | 38.94 | 139.43 | 6.79 | 84.88 | 231.10 | 26.26 | 0.08 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 25 | 28 | 76 | 312 | 60824 | 1 | 6 | 9 | 5 | 3 | 1 | 10 | 0 | 0 | 2 | 7 | 378 | 0 | 0 | 0 | 0 | 0 | 5,462,233 | 24.67 | 0.30 | 0.00 | 24.97 | 0.00 | 0.00 | 0.00 | 24.97 | 28.09 | 0.34 | 0.00 | 28.43 | 0.00 | 0.00 | 0.00 | 28.43 | 75.76 | 2.46 | 0.00 | 78.23 | 312.36 | 6.65 |
| 0.05 | 0.00 | 0.00 | 0.00 | 0.05 | 0.13 | 0 | 1 | 10 | 2 | 6499 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 9 | 2 | 95 | 0 | 0 | 0 | 0 | 0 | 695,976 | 0.46 | 0.08 | 0.53 | 1.07 | 0.57 | 0.16 | 0.82 | 2.63 | 0.68 | 0.12 | 0.58 | 1.37 | 0.57 | 0.16 | 0.82 | 2.93 | 10.47 | 0.66 | 8.64 | 19.77 | 2.04 | 0.01 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 5 | 6 | 14 | 53 | 20010 | 0 | 1 | 3 | 1 | 1 | 0 | 3 | 0 | 0 | 1 | 2 | 145 | 0 | 0 | 0 | 0 | 0 | 1,798,810 | 5.26 | 0.07 | 0.00 | 5.33 | 0.00 | 0.00 | 0.00 | 5.33 | 5.98 | 0.08 | 0.00 | 6.06 | 0.00 | 0.00 | 0.00 | 6.06 | 14.27 | 0.59 | 0.00 | 14.86 | 52.91 | 1.56 |
| 0.23 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 19 | 22 | 214 | 9 | 2374 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 54 | 54 | 39 | 1 | 270 | 1 | 0 | 0 | 0 | 0 | 279,070 | 18.99 | 0.00 | 8.11 | 27.10 | 12.16 | 16.20 | 17.19 | 72.64 | 22.11 | 0.00 | 8.81 | 30.93 | 12.16 | 16.20 | 17.19 | 76.47 | 214.29 | 0.00 | 38.64 | 252.93 | 8.98 | 0.00 |
| 0.17 | 0.00 | 0.00 | 0.00 | 0.06 | 0.06 | 19 | 26 | 816 | 97 | 186714 | 4 | 1 | 7 | 1 | 2 | 2 | 6 | 121 | 126 | 399 | 45 | 7041 | 10 | 0 | 0 | 0 | 3 | 20,451,052 | 18.81 | 0.00 | 54.66 | 73.47 | 32.03 | 9.40 | 24.50 | 139.41 | 26.19 | 0.00 | 59.83 | 86.02 | 32.03 | 9.40 | 24.50 | 151.95 | 815.72 | 0.00 | 398.71 | 1214.43 | 97.28 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0 | 0 | 2 | 1 | 4520 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 403,390 | 0.18 | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.18 | 0.20 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.20 | 2.45 | 0.00 | 0.00 | 2.45 | 1.09 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 211 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 23,545 | 0.00 | 0.00 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.04 | 0.35 | 0.00 | 0.15 | 0.50 | 0.00 | 0.00 |
| 0.05 | 0.00 | 0.00 | 0.00 | 0.03 | 0.22 | 1 | 1 | 15 | 3 | 5571 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 588,172 | 0.54 | 0.00 | 0.01 | 0.55 | 2.67 | 0.78 | 0.02 | 4.02 | 0.75 | 0.00 | 0.01 | 0.76 | 2.67 | 0.78 | 0.02 | 4.23 | 14.67 | 0.00 | 0.17 | 14.84 | 2.57 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0 | 0 | 1 | 7 | 1293 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 115,388 | 0.18 | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.18 | 0.20 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.20 | 0.67 | 0.00 | 0.00 | 0.67 | 6.93 | 0.00 |
| 0.09 | 0.00 | 0.00 | 0.00 | 0.03 | 0.22 | 2 | 2 | 40 | 6 | 8427 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 20 | 1 | 212 | 0 | 0 | 0 | 0 | 0 | 911,921 | 1.65 | 0.12 | 1.39 | 3.16 | 0.79 | 0.28 | 1.66 | 5.90 | 2.24 | 0.17 | 1.52 | 3.92 | 0.79 | 0.28 | 1.66 | 6.66 | 39.60 | 1.76 | 17.85 | 59.21 | 6.26 | 0.01 |
| 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.12 | 8 | 9 | 22 | 134 | 29442 | 0 | 4 | 1 | 4 | 0 | 0 | 5 | 1 | 1 | 6 | 24 | 1539 | 0 | 0 | 0 | 0 | 0 | 2,765,001 | 7.85 | 0.61 | 0.00 | 8.45 | 0.00 | 0.00 | 0.00 | 8.45 | 8.93 | 0.69 | 0.00 | 9.63 | 0.00 | 0.00 | 0.00 | 9.63 | 21.60 | 5.70 | 0.00 | 27.29 | 134.33 | 18.91 |
| 0.05 | 0.00 | 0.00 | 0.00 | 0.03 | 0.22 | 0 | 0 | 7 | 2 | 3790 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 405,329 | 0.31 | 0.03 | 0.23 | 0.58 | 0.16 | 0.04 | 0.18 | 0.95 | 0.46 | 0.05 | 0.25 | 0.76 | 0.16 | 0.04 | 0.18 | 1.14 | 7.34 | 0.26 | 4.90 | 12.51 | 2.32 | 0.00 |
| 0.01 | 0.02 | 0.02 | 0.00 | 0.03 | 0.14 | 1 | 1 | 2 | 8 | 1667 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 39 | 0 | 0 | 0 | 0 | 0 | 152,266 | 0.86 | 0.02 | 0.00 | 0.89 | 0.00 | 0.00 | 0.00 | 0.89 | 0.98 | 0.03 | 0.00 | 1.01 | 0.00 | 0.00 | 0.00 | 1.01 | 2.17 | 0.19 | 0.00 | 2.37 | 8.07 | 0.39 |
| 0.65 | 0.00 | 0.00 | 0.01 | 0.05 | 0.11 | 1 | 1 | 15 | 2 | 637 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 71,915 | 0.62 | 0.15 | 0.06 | 0.83 | 0.13 | 0.04 | 0.10 | 1.10 | 0.84 | 0.21 | 0.06 | 1.11 | 0.13 | 0.04 | 0.10 | 1.38 | 15.14 | 1.14 | 1.06 | 17.34 | 1.82 | 0.01 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.13 | 0 | 0 | 0 | 11 | 1555 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 139 | 0 | 0 | 0 | 0 | 0 | 151,177 | 0.15 | 0.01 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 | 0.16 | 0.17 | 0.02 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 | 0.19 | 0.42 | 0.19 | 0.00 | 0.61 | 11.49 | 1.85 |
| 0.14 | 0.00 | 0.00 | 0.00 | 0.09 | 0.21 | 0 | 0 | 0 | 0 | 976 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 103,547 | 0.01 | 0.00 | 0.02 | 0.03 | 0.01 | 0.00 | 0.00 | 0.04 | 0.01 | 0.00 | 0.03 | 0.04 | 0.01 | 0.00 | 0.00 | 0.05 | 0.17 | 0.00 | 0.39 | 0.56 | 0.14 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0 | 0 | 0 | 0 | 1496 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 133,518 | 0.07 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.07 | 0.08 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.08 | 0.08 | 0.00 | 0.00 | 0.08 | 0.39 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0 | 0 | 4 | 0 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31,264 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.00 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 | 0.22 | 4.06 | 0.00 | 0.00 | 4.06 | 0.09 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,593 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 0.41 | 0.00 | 0.01 | 0.43 | 0.08 | 0.00 |
| 0.02 | 0.00 | 0.00 | 0.01 | 0.15 | 0.16 | 2 | 2 | 9 | 225 | 204344 | 0 | 4 | 15 | 4 | 5 | 2 | 32 | 6 | 7 | 90 | 115 | 13906 | 0 | 0 | 0 | 0 | 2 | 19,496,189 | 1.96 | 6.12 | 0.00 | 8.08 | 0.00 | 0.00 | 0.00 | 8.08 | 2.23 | 6.96 | 0.00 | 9.20 | 0.00 | 0.00 | 0.00 | 9.20 | 8.59 | 89.59 | 0.00 | 98.18 | 225.11 | 74.10 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.60 | 0.00 | 0.00 | 0.00 | 0.27 | 0.20 | 0 | 2 | 11 | 1 | 1106 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 92 | 0 | 0 | 0 | 0 | 0 | 138,454 | 0.02 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 1.60 | 0.18 | 0.00 | 1.79 | 0.00 | 0.00 | 0.00 | 1.79 | 11.23 | 0.62 | 0.00 | 11.85 | 0.60 | 0.07 |
| 0.07 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 9 | 14 | 771 | 43 | 265051 | 2 | 1 | 15 | 1 | 4 | 3 | 5 | 128 | 132 | 383 | 31 | 8336 | 8 | 0 | 0 | 0 | 4 | 28,828,304 | 9.26 | 0.00 | 39.20 | 48.46 | 45.07 | 11.94 | 32.16 | 137.63 | 13.51 | 0.00 | 42.92 | 56.43 | 45.07 | 11.94 | 32.16 | 145.60 | 771.31 | 0.00 | 383.29 | 1154.60 | 42.67 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0 | 0 | 2 | 1 | 951 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84,936 | 0.12 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.12 | 0.14 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.14 | 1.53 | 0.00 | 0.00 | 1.53 | 1.03 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 7 | 0 | 4487 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 198 | 0 | 0 | 0 | 0 | 0 | 494,018 | 0.05 | 0.00 | 0.52 | 0.57 | 0.35 | 0.12 | 0.11 | 1.16 | 0.07 | 0.00 | 0.57 | 0.64 | 0.35 | 0.12 | 0.11 | 1.23 | 7.39 | 0.00 | 4.02 | 11.41 | 0.10 | 0.00 |
| 0.14 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 5 | 7 | 239 | 23 | 36120 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 45 | 46 | 117 | 8 | 1415 | 2 | 0 | 0 | 0 | 1 | 3,958,035 | 4.99 | 0.00 | 11.91 | 16.90 | 16.52 | 4.19 | 12.34 | 49.95 | 7.29 | 0.00 | 13.04 | 20.32 | 16.52 | 4.19 | 12.34 | 53.37 | 239.40 | 0.00 | 116.74 | 356.14 | 22.72 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,454 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.00 | 0.00 | 0.06 | 0.06 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2,719 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.00 | 0.02 | 0.06 | 0.00 | 0.00 |
| 0.09 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 7 | 11 | 524 | 45 | 182513 | 2 | 1 | 9 | 1 | 3 | 2 | 4 | 82 | 84 | 261 | 25 | 5849 | 6 | 0 | 0 | 0 | 3 | 19,862,570 | 7.29 | 0.00 | 27.89 | 35.18 | 27.32 | 6.82 | 19.55 | 88.87 | 10.63 | 0.00 | 30.54 | 41.17 | 27.32 | 6.82 | 19.55 | 94.86 | 523.93 | 0.00 | 261.45 | 785.38 | 44.56 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0 | 0 | 0 | 0 | 540 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48,208 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 0.04 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 0.29 | 0.00 | 0.00 | 0.29 | 0.15 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 1 | 0 | 677 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 75,093 | 0.01 | 0.00 | 0.08 | 0.09 | 0.04 | 0.01 | 0.01 | 0.15 | 0.01 | 0.00 | 0.09 | 0.10 | 0.04 | 0.01 | 0.01 | 0.16 | 1.11 | 0.00 | 0.60 | 1.72 | 0.02 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.05 | 0.11 | 3 | 5 | 77 | 14 | 42764 | 1 | 0 | 4 | 0 | 1 | 0 | 1 | 20 | 21 | 70 | 14 | 702 | 1 | 0 | 0 | 0 | 1 | 4,583,447 | 3.29 | 0.61 | 4.04 | 7.94 | 6.02 | 1.44 | 8.26 | 23.65 | 4.80 | 0.89 | 4.42 | 10.11 | 6.02 | 1.44 | 8.26 | 25.83 | 76.78 | 5.25 | 65.08 | 147.11 | 14.02 | 0.05 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 17 | 19 | 51 | 185 | 44362 | 1 | 4 | 6 | 4 | 2 | 0 | 7 | 0 | 0 | 2 | 5 | 290 | 0 | 0 | 0 | 0 | 0 | 3,988,738 | 16.76 | 0.23 | 0.00 | 16.99 | 0.00 | 0.00 | 0.00 | 16.99 | 19.08 | 0.26 | 0.00 | 19.34 | 0.00 | 0.00 | 0.00 | 19.34 | 50.97 | 1.93 | 0.00 | 52.90 | 184.63 | 4.87 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.05 | 0.12 | 0 | 0 | 6 | 1 | 5300 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 8 | 1 | 79 | 0 | 0 | 0 | 0 | 0 | 567,166 | 0.20 | 0.06 | 0.37 | 0.63 | 0.45 | 0.11 | 0.60 | 1.80 | 0.29 | 0.09 | 0.40 | 0.79 | 0.45 | 0.11 | 0.60 | 1.96 | 5.74 | 0.57 | 7.03 | 13.33 | 1.04 | 0.01 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 4 | 5 | 11 | 35 | 16456 | 0 | 1 | 2 | 1 | 1 | 0 | 3 | 0 | 0 | 1 | 1 | 129 | 0 | 0 | 0 | 0 | 0 | 1,481,466 | 4.07 | 0.07 | 0.00 | 4.14 | 0.00 | 0.00 | 0.00 | 4.14 | 4.63 | 0.07 | 0.00 | 4.71 | 0.00 | 0.00 | 0.00 | 4.71 | 11.30 | 0.54 | 0.00 | 11.84 | 35.31 | 1.29 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.21 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 15 | 17 | 170 | 7 | 2060 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 52 | 36 | 1 | 234 | 1 | 0 | 0 | 0 | 0 | 241,904 | 14.62 | 0.00 | 6.78 | 21.40 | 12.32 | 15.23 | 16.77 | 65.72 | 17.29 | 0.00 | 7.37 | 24.65 | 12.32 | 15.23 | 16.77 | 68.97 | 169.51 | 0.00 | 35.85 | 205.36 | 7.24 | 0.00 |
| 0.12 | 0.00 | 0.00 | 0.00 | 0.04 | 0.05 | 8 | 11 | 442 | 45 | 159179 | 2 | 1 | 6 | 0 | 2 | 2 | 3 | 88 | 91 | 237 | 26 | 5538 | 6 | 0 | 0 | 0 | 2 | 17,369,211 | 7.62 | 0.00 | 31.16 | 38.78 | 28.78 | 7.02 | 21.14 | 95.72 | 11.12 | 0.00 | 34.12 | 45.24 | 28.78 | 7.02 | 21.14 | 102.17 | 441.60 | 0.00 | 236.89 | 678.49 | 44.78 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0 | 0 | 2 | 1 | 3634 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 324,606 | 0.14 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.14 | 0.16 | 0.00 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 | 0.16 | 2.26 | 0.00 | 0.00 | 2.26 | 0.66 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0 | 0 | 1 | 0 | 482 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 53,909 | 0.00 | 0.00 | 0.05 | 0.06 | 0.03 | 0.01 | 0.01 | 0.10 | 0.01 | 0.00 | 0.06 | 0.06 | 0.03 | 0.01 | 0.01 | 0.11 | 0.79 | 0.00 | 0.41 | 1.20 | 0.01 | 0.00 |
| 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 0.22 | 0 | 0 | 4 | 1 | 3587 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 378,376 | 0.15 | 0.00 | 0.00 | 0.16 | 1.48 | 0.36 | 0.01 | 2.01 | 0.22 | 0.00 | 0.00 | 0.23 | 1.48 | 0.36 | 0.01 | 2.08 | 3.66 | 0.00 | 0.09 | 3.75 | 1.07 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0 | 0 | 1 | 5 | 1092 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 97,517 | 0.15 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.15 | 0.17 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.17 | 0.55 | 0.00 | 0.00 | 0.55 | 5.40 | 0.00 |
| 0.06 | 0.00 | 0.00 | 0.00 | 0.03 | 0.20 | 0 | 0 | 7 | 2 | 6891 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 11 | 1 | 119 | 0 | 0 | 0 | 0 | 0 | 739,246 | 0.32 | 0.08 | 0.45 | 0.86 | 0.30 | 0.07 | 0.58 | 1.80 | 0.47 | 0.12 | 0.50 | 1.09 | 0.30 | 0.07 | 0.58 | 2.03 | 7.43 | 1.22 | 9.90 | 18.55 | 2.05 | 0.01 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.12 | 1 | 1 | 3 | 34 | 30824 | 0 | 0 | 2 | 0 | 1 | 0 | 5 | 0 | 0 | 5 | 20 | 1424 | 0 | 0 | 0 | 0 | 0 | 2,880,691 | 0.89 | 0.17 | 0.00 | 1.06 | 0.00 | 0.00 | 0.00 | 1.06 | 1.01 | 0.20 | 0.00 | 1.21 | 0.00 | 0.00 | 0.00 | 1.21 | 3.21 | 4.83 | 0.00 | 8.04 | 34.49 | 8.54 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.05 | 0.00 | 0.00 | 0.00 | 0.03 | 0.21 | 0 | 0 | 3 | 1 | 2337 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 250,245 | 0.15 | 0.03 | 0.16 | 0.34 | 0.16 | 0.04 | 0.17 | 0.70 | 0.22 | 0.04 | 0.17 | 0.43 | 0.16 | 0.04 | 0.17 | 0.80 | 3.41 | 0.19 | 3.46 | 7.06 | 1.16 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.13 | 0 | 0 | 0 | 3 | 1666 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 37 | 0 | 0 | 0 | 0 | 0 | 152,192 | 0.14 | 0.01 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.15 | 0.16 | 0.01 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.17 | 0.42 | 0.19 | 0.00 | 0.61 | 2.53 | 0.19 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.69 | 0.00 | 0.00 | 0.01 | 0.07 | 0.10 | 0 | 0 | 2 | 1 | 414 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 46,617 | 0.07 | 0.10 | 0.02 | 0.20 | 0.05 | 0.01 | 0.03 | 0.28 | 0.11 | 0.14 | 0.02 | 0.28 | 0.05 | 0.01 | 0.03 | 0.36 | 1.85 | 0.77 | 0.58 | 3.20 | 0.65 | 0.01 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.12 | 0 | 0 | 0 | 7 | 1476 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 132 | 0 | 0 | 0 | 0 | 0 | 143,628 | 0.10 | 0.01 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.11 | 0.11 | 0.01 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.12 | 0.29 | 0.25 | 0.00 | 0.54 | 7.16 | 1.49 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.12 | 0.00 | 0.00 | 0.00 | 0.08 | 0.21 | 0 | 0 | 0 | 0 | 993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 105,260 | 0.01 | 0.00 | 0.02 | 0.03 | 0.00 | 0.00 | 0.00 | 0.04 | 0.01 | 0.00 | 0.02 | 0.03 | 0.00 | 0.00 | 0.00 | 0.04 | 0.13 | 0.00 | 0.40 | 0.53 | 0.10 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0 | 0 | 0 | 0 | 1575 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140,698 | 0.08 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.08 | 0.09 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.09 | 0.09 | 0.00 | 0.00 | 0.09 | 0.42 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0 | 1 | 7 | 0 | 175 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20,238 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.59 | 0.00 | 0.00 | 0.59 | 0.00 | 0.00 | 0.00 | 0.59 | 6.83 | 0.00 | 0.00 | 6.83 | 0.01 | 0.00 |

| NOx_STREX | NOx_TOTEX | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CO2_TOTEX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | CH4_TOTEX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_TOTEX | PM10_PMTW | PM10_PMBW | PM10_TOTAL | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_TOTEX | PM2.5_PMTW | PM2.5_PMBW | PM2.5_TOTAL | SOx_RUNEX | SOx_IDLEX | SOx_STREX | SOx_TOTEX | N2O_RUNEX | N2O_IDLEX | N2O_STREX | N2O_TOTEX | Fuel Consumption |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.06 | 0.95 | 121.23 | 0.00 | 3.05 | 124.27 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 13.12 |
| 21.52 | 582.45 | 188564.17 | 12093.14 | 0.00 | 200657.31 | 0.69 | 0.24 | 0.00 | 0.93 | 10.29 | 0.19 | 0.00 | 10.48 | 4.03 | 9.23 | 23.74 | 9.84 | 0.18 | 0.00 | 10.03 | 1.01 | 3.23 | 14.27 | 1.78 | 0.11 | 0.00 | 1.90 | 29.68 | 1.90 | 0.00 | 31.59 | 17908.52 |
| 0.00 | 0.64 | 757.99 | 57.34 | 0.00 | 815.33 | 1.53 | 0.14 | 0.00 | 1.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.09 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.01 | 0.00 | 0.17 | 94.24 |
| 45.30 | 134.70 | 258614.16 | 0.00 | 9295.74 | 267909.90 | 4.78 | 0.00 | 12.69 | 17.47 | 1.34 | 0.00 | 0.31 | 1.65 | 6.65 | 6.70 | 15.00 | 1.23 | 0.00 | 0.28 | 1.51 | 1.66 | 2.35 | 5.52 | 2.56 | 0.00 | 0.09 | 2.65 | 7.19 | 0.00 | 4.60 | 11.79 | 28278.18 |
| 0.00 | 2.74 | 1469.54 | 0.00 | 0.00 | 1469.54 | 0.01 | 0.00 | 0.00 | 0.01 | 0.17 | 0.00 | 0.00 | 0.17 | 0.05 | 0.05 | 0.27 | 0.16 | 0.00 | 0.00 | 0.16 | 0.01 | 0.02 | 0.19 | 0.01 | 0.00 | 0.00 | 0.01 | 0.23 | 0.00 | 0.00 | 0.23 | 131.16 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.03 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.13 | 0.17 | 1790.30 | 0.00 | 76.86 | 1867.16 | 0.01 | 0.00 | 0.05 | 0.05 | 0.01 | 0.00 | 0.00 | 0.01 | 0.09 | 0.05 | 0.15 | 0.01 | 0.00 | 0.00 | 0.01 | 0.02 | 0.02 | 0.05 | 0.02 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | 0.02 | 0.03 | 197.08 |
| 14.46 | 63.55 | 49929.44 | 0.00 | 2196.53 | 52125.97 | 2.40 | 0.00 | 4.07 | 6.48 | 0.49 | 0.00 | 0.11 | 0.60 | 1.08 | 1.34 | 3.02 | 0.45 | 0.00 | 0.10 | 0.55 | 0.27 | 0.47 | 1.29 | 0.49 | 0.00 | 0.02 | 0.52 | 2.97 | 0.00 | 1.07 | 4.04 | 5501.95 |
| 0.00 | 0.14 | 35.04 | 0.00 | 0.00 | 35.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 3.13 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.21 | 0.00 | 0.01 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 |
| 37.71 | 121.37 | 179701.82 | 0.00 | 6414.60 | 186116.43 | 3.06 | 0.00 | 7.98 | 11.04 | 0.78 | 0.00 | 0.17 | 0.94 | 3.65 | 4.28 | 8.87 | 0.72 | 0.00 | 0.15 | 0.87 | 0.91 | 1.50 | 3.28 | 1.78 | 0.00 | 0.06 | 1.84 | 5.43 | 0.00 | 3.12 | 8.55 | 19644.79 |
| 0.00 | 0.24 | 435.90 | 0.00 | 0.00 | 435.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.01 | 0.01 | 0.04 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 | 38.90 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.01 | 0.01 | 93.31 | 0.00 | 4.48 | 97.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.32 |
| 19.40 | 45.73 | 56835.56 | 226.84 | 690.32 | 57752.72 | 1.26 | 0.22 | 1.20 | 2.67 | 0.16 | 0.00 | 0.02 | 0.18 | 0.46 | 4.52 | 5.16 | 0.15 | 0.00 | 0.02 | 0.17 | 0.12 | 1.58 | 1.86 | 0.56 | 0.00 | 0.01 | 0.57 | 1.38 | 0.01 | 1.37 | 2.76 | 6095.86 |
| 0.00 | 319.01 | 60823.95 | 378.04 | 0.00 | 61201.99 | 1.15 | 0.01 | 0.00 | 1.16 | 5.56 | 0.08 | 0.00 | 5.64 | 1.15 | 7.45 | 14.24 | 5.32 | 0.08 | 0.00 | 5.40 | 0.29 | 2.61 | 8.29 | 0.58 | 0.00 | 0.00 | 0.58 | 9.57 | 0.06 | 0.00 | 9.63 | 5462.23 |
| 1.80 | 3.85 | 6498.65 | 25.11 | 69.99 | 6593.74 | 0.09 | 0.02 | 0.10 | 0.22 | 0.01 | 0.00 | 0.00 | 0.01 | 0.05 | 0.56 | 0.62 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.19 | 0.22 | 0.06 | 0.00 | 0.00 | 0.07 | 0.11 | 0.00 | 0.14 | 0.25 | 695.98 |
| 0.00 | 54.47 | 20009.98 | 144.92 | 0.00 | 20154.90 | 0.24 | 0.00 | 0.00 | 0.25 | 1.15 | 0.02 | 0.00 | 1.17 | 0.31 | 2.32 | 3.79 | 1.10 | 0.02 | 0.00 | 1.12 | 0.08 | 0.81 | 2.01 | 0.19 | 0.00 | 0.00 | 0.19 | 3.15 | 0.02 | 0.00 | 3.17 | 1798.81 |
| 0.90 | 9.88 | 2374.01 | 0.00 | 269.93 | 2643.94 | 2.67 | 0.00 | 1.05 | 3.72 | 0.03 | 0.00 | 0.02 | 0.05 | 0.05 | 0.15 | 0.24 | 0.02 | 0.00 | 0.02 | 0.04 | 0.01 | 0.05 | 0.11 | 0.02 | 0.00 | 0.00 | 0.03 | 0.57 | 0.00 | 0.05 | 0.62 | 279.07 |
| 44.96 | 142.24 | 186714.22 | 0.00 | 7040.82 | 193755.04 | 3.72 | 0.00 | 9.69 | 13.41 | 0.73 | 0.00 | 0.19 | 0.91 | 3.18 | 3.81 | 7.91 | 0.67 | 0.00 | 0.17 | 0.84 | 0.80 | 1.33 | 2.97 | 1.85 | 0.00 | 0.07 | 1.92 | 5.85 | 0.00 | 3.22 | 9.07 | 20451.05 |
| 0.00 | 1.09 | 4519.81 | 0.00 | 0.00 | 4519.81 | 0.01 | 0.00 | 0.00 | 0.01 | 0.09 | 0.00 | 0.00 | 0.09 | 0.08 | 0.09 | 0.27 | 0.09 | 0.00 | 0.00 | 0.09 | 0.02 | 0.03 | 0.14 | 0.04 | 0.00 | 0.00 | 0.04 | 0.71 | 0.00 | 0.00 | 0.71 | 403.39 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.01 | 0.02 | 211.47 | 0.00 | 11.60 | 223.06 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 23.54 |
| 0.01 | 2.59 | 5571.07 | 0.00 | 1.32 | 5572.39 | 0.11 | 0.00 | 0.00 | 0.11 | 0.01 | 0.00 | 0.00 | 0.01 | 0.04 | 0.13 | 0.18 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.05 | 0.06 | 0.06 | 0.00 | 0.00 | 0.06 | 0.13 | 0.00 | 0.00 | 0.13 | 588.17 |
| 0.00 | 6.93 | 1292.88 | 0.00 | 0.00 | 1292.88 | 0.01 | 0.00 | 0.00 | 0.01 | 0.17 | 0.00 | 0.00 | 0.17 | 0.02 | 0.05 | 0.25 | 0.17 | 0.00 | 0.00 | 0.17 | 0.00 | 0.02 | 0.19 | 0.01 | 0.00 | 0.00 | 0.01 | 0.20 | 0.00 | 0.00 | 0.20 | 115.39 |
| 1.20 | 7.47 | 8427.33 | 67.01 | 145.28 | 8639.62 | 0.27 | 0.03 | 0.19 | 0.49 | 0.01 | 0.00 | 0.01 | 0.02 | 0.06 | 0.21 | 0.28 | 0.01 | 0.00 | 0.01 | 0.02 | 0.01 | 0.07 | 0.10 | 0.08 | 0.00 | 0.00 | 0.09 | 0.26 | 0.00 | 0.07 | 0.33 | 911.92 |
| 4.80 | 158.03 | 29441.69 | 1538.96 | 0.00 | 30980.65 | 0.36 | 0.03 | 0.00 | 0.39 | 4.11 | 0.19 | 0.00 | 4.30 | 0.30 | 1.12 | 5.72 | 3.94 | 0.18 | 0.00 | 4.11 | 0.07 | 0.39 | 4.58 | 0.28 | 0.01 | 0.00 | 0.29 | 4.63 | 0.24 | 0.00 | 4.88 | 2765.00 |
| 0.41 | 2.73 | 3790.40 | 17.89 | 31.83 | 3840.12 | 0.06 | 0.01 | 0.04 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.09 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.10 | 0.00 | 0.03 | 0.12 | 405.33 |
| 0.15 | 8.60 | 1666.79 | 39.29 | 0.00 | 1706.08 | 0.04 | 0.00 | 0.00 | 0.04 | 0.36 | 0.00 | 0.00 | 0.37 | 0.01 | 0.07 | 0.45 | 0.35 | 0.00 | 0.00 | 0.35 | 0.00 | 0.02 | 0.38 | 0.02 | 0.00 | 0.00 | 0.02 | 0.26 | 0.01 | 0.00 | 0.27 | 152.27 |
| 0.04 | 1.87 | 636.90 | 39.93 | 4.50 | 681.33 | 0.10 | 0.03 | 0.01 | 0.14 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.03 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.07 | 0.00 | 0.00 | 0.08 | 71.91 |
| 0.20 | 13.54 | 1554.59 | 139.29 | 0.00 | 1693.87 | 0.01 | 0.00 | 0.00 | 0.01 | 0.07 | 0.00 | 0.00 | 0.07 | 0.02 | 0.06 | 0.15 | 0.07 | 0.00 | 0.00 | 0.07 | 0.00 | 0.02 | 0.09 | 0.01 | 0.00 | 0.00 | 0.02 | 0.24 | 0.02 | 0.00 | 0.27 | 151.18 |
| 0.04 | 0.18 | 976.34 | 0.00 | 4.67 | 981.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 | 103.55 |
| 0.00 | 0.39 | 1496.01 | 0.00 | 0.00 | 1496.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.03 | 0.13 | 0.17 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.05 | 0.06 | 0.01 | 0.00 | 0.00 | 0.01 | 0.24 | 0.00 | 0.00 | 0.24 | 133.52 |
| 0.00 | 0.09 | 270.48 | 0.00 | 0.00 | 270.48 | 0.22 | 0.00 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.06 | 31.26 |
| 0.00 | 0.08 | 24.39 | 0.00 | 0.19 | 24.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.59 |
| 40.47 | 339.67 | 204343.90 | 13906.14 | 0.00 | 218250.03 | 0.09 | 0.28 | 0.00 | 0.38 | 3.84 | 0.03 | 0.00 | 3.87 | 4.68 | 10.10 | 18.65 | 3.67 | 0.03 | 0.00 | 3.71 | 1.17 | 3.53 | 8.41 | 1.94 | 0.13 | 0.00 | 2.07 | 32.19 | 2.19 | 0.00 | 34.39 | 19496.19 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.67 | 1105.61 | 92.24 | 0.00 | 1197.85 | 1.57 | 0.18 | 0.00 | 1.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.14 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.05 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 | 0.02 | 0.00 | 0.24 | 138.45 |
| 30.94 | 73.61 | 265051.21 | 0.00 | 8335.66 | 273386.87 | 2.38 | 0.00 | 8.49 | 10.87 | 1.20 | 0.00 | 0.24 | 1.44 | 7.52 | 7.40 | 16.37 | 1.10 | 0.00 | 0.22 | 1.32 | 1.88 | 2.59 | 5.80 | 2.62 | 0.00 | 0.08 | 2.70 | 4.58 | 0.00 | 3.90 | 8.48 | 28828.30 |
| 0.00 | 1.03 | 950.82 | 0.00 | 0.00 | 950.82 | 0.01 | 0.00 | 0.00 | 0.01 | 0.07 | 0.00 | 0.00 | 0.07 | 0.03 | 0.03 | 0.14 | 0.07 | 0.00 | 0.00 | 0.07 | 0.01 | 0.01 | 0.09 | 0.01 | 0.00 | 0.00 | 0.01 | 0.15 | 0.00 | 0.00 | 0.15 | 84.94 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.29 | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.10 | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.35 | 0.45 | 4487.03 | 0.00 | 197.89 | 4684.92 | 0.01 | 0.00 | 0.13 | 0.14 | 0.02 | 0.00 | 0.01 | 0.03 | 0.26 | 0.13 | 0.42 | 0.02 | 0.00 | 0.01 | 0.02 | 0.07 | 0.05 | 0.13 | 0.04 | 0.00 | 0.00 | 0.05 | 0.02 | 0.00 | 0.06 | 0.08 | 494.02 |
| 7.91 | 30.63 | 36120.24 | 0.00 | 1414.91 | 37535.15 | 1.08 | 0.00 | 2.16 | 3.24 | 0.26 | 0.00 | 0.06 | 0.32 | 0.84 | 1.02 | 2.17 | 0.24 | 0.00 | 0.05 | 0.29 | 0.21 | 0.36 | 0.86 | 0.36 | 0.00 | 0.01 | 0.37 | 1.48 | 0.00 | 0.67 | 2.16 | 3958.03 |
| 0.00 | 0.06 | 16.27 | 0.00 | 0.00 | 16.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.45 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 24.61 | 0.00 | 1.18 | 25.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.72 |
| 24.74 | 69.30 | 182513.39 | 0.00 | 5848.92 | 188362.31 | 1.79 | 0.00 | 5.83 | 7.62 | 0.72 | 0.00 | 0.14 | 0.86 | 4.15 | 4.77 | 9.78 | 0.66 | 0.00 | 0.13 | 0.79 | 1.04 | 1.67 | 3.50 | 1.80 | 0.00 | 0.06 | 1.86 | 3.55 | 0.00 | 2.55 | 6.10 | 19862.57 |
| 0.00 | 0.15 | 539.66 | 0.00 | 0.00 | 539.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.04 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.09 | 0.00 | 0.00 | 0.09 | 48.21 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.05 | 0.07 | 676.63 | 0.00 | 35.49 | 712.13 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.02 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 75.09 |
| 14.17 | 28.24 | 42763.85 | 170.11 | 532.14 | 43466.11 | 0.65 | 0.16 | 0.78 | 1.59 | 0.10 | 0.00 | 0.01 | 0.11 | 0.38 | 3.67 | 4.16 | 0.09 | 0.00 | 0.01 | 0.10 | 0.09 | 1.28 | 1.48 | 0.42 | 0.00 | 0.01 | 0.43 | 0.74 | 0.00 | 1.05 | 1.80 | 4583.45 |
| 0.00 | 189.50 | 44362.32 | 289.59 | 0.00 | 44651.91 | 0.78 | 0.01 | 0.00 | 0.79 | 3.82 | 0.06 | 0.00 | 3.88 | 0.84 | 5.43 | 10.15 | 3.65 | 0.06 | 0.00 | 3.71 | 0.21 | 1.90 | 5.82 | 0.42 | 0.00 | 0.00 | 0.42 | 6.99 | 0.05 | 0.00 | 7.03 | 3988.74 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.44 | 2.48 | 5299.98 | 20.91 | 57.70 | 5378.59 | 0.04 | 0.02 | 0.07 | 0.13 | 0.01 | 0.00 | 0.00 | 0.01 | 0.04 | 0.49 | 0.54 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.17 | 0.19 | 0.05 | 0.00 | 0.00 | 0.05 | 0.06 | 0.00 | 0.11 | 0.17 | 567.17 |
| 0.00 | 36.60 | 16455.62 | 128.65 | 0.00 | 16584.27 | 0.19 | 0.00 | 0.00 | 0.19 | 0.93 | 0.02 | 0.00 | 0.95 | 0.26 | 1.94 | 3.14 | 0.89 | 0.02 | 0.00 | 0.90 | 0.06 | 0.68 | 1.65 | 0.16 | 0.00 | 0.00 | 0.16 | 2.59 | 0.02 | 0.00 | 2.61 | 1481.47 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.72 | 7.97 | 2060.50 | 0.00 | 233.55 | 2294.04 | 2.12 | 0.00 | 0.89 | 3.01 | 0.02 | 0.00 | 0.02 | 0.04 | 0.04 | 0.13 | 0.21 | 0.02 | 0.00 | 0.01 | 0.03 | 0.01 | 0.04 | 0.09 | 0.02 | 0.00 | 0.00 | 0.02 | 0.47 | 0.00 | 0.04 | 0.51 | 241.90 |
| 25.72 | 70.50 | 159178.92 | 0.00 | 5538.16 | 164717.09 | 1.74 | 0.00 | 5.90 | 7.65 | 0.53 | 0.00 | 0.12 | 0.66 | 2.97 | 3.51 | 7.14 | 0.49 | 0.00 | 0.11 | 0.60 | 0.74 | 1.23 | 2.57 | 1.57 | 0.00 | 0.05 | 1.63 | 3.20 | 0.00 | 2.21 | 5.41 | 17369.21 |
| 0.00 | 0.66 | 3633.80 | 0.00 | 0.00 | 3633.80 | 0.01 | 0.00 | 0.00 | 0.01 | 0.07 | 0.00 | 0.00 | 0.07 | 0.07 | 0.08 | 0.22 | 0.07 | 0.00 | 0.00 | 0.07 | 0.02 | 0.03 | 0.11 | 0.03 | 0.00 | 0.00 | 0.03 | 0.57 | 0.00 | 0.00 | 0.57 | 324.61 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.02 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.05 | 481.52 | 0.00 | 29.72 | 511.24 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 53.91 |
| 0.01 | 1.08 | 3587.49 | 0.00 | 0.76 | 3588.25 | 0.03 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.09 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.04 | 0.04 | 0.00 | 0.00 | 0.04 | 0.06 | 0.00 | 0.00 | 0.06 | 378.38 |
| 0.00 | 5.40 | 1091.65 | 0.00 | 0.00 | 1091.65 | 0.01 | 0.00 | 0.00 | 0.01 | 0.13 | 0.00 | 0.00 | 0.13 | 0.02 | 0.05 | 0.19 | 0.13 | 0.00 | 0.00 | 0.13 | 0.00 | 0.02 | 0.15 | 0.01 | 0.00 | 0.00 | 0.01 | 0.17 | 0.00 | 0.00 | 0.17 | 97.52 |
| 0.71 | 2.76 | 6891.03 | 43.32 | 76.12 | 7010.47 | 0.06 | 0.02 | 0.08 | 0.16 | 0.01 | 0.00 | 0.00 | 0.01 | 0.05 | 0.18 | 0.24 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.06 | 0.08 | 0.07 | 0.00 | 0.00 | 0.07 | 0.10 | 0.00 | 0.05 | 0.15 | 739.25 |
| 11.86 | 54.89 | 30824.06 | 1423.83 | 0.00 | 32247.89 | 0.04 | 0.01 | 0.00 | 0.05 | 0.43 | 0.02 | 0.00 | 0.46 | 0.33 | 1.23 | 2.02 | 0.41 | 0.02 | 0.00 | 0.44 | 0.08 | 0.43 | 0.95 | 0.29 | 0.01 | 0.00 | 0.31 | 4.86 | 0.22 | 0.00 | 5.08 | 2880.69 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.31 | 1.47 | 2337.01 | 13.09 | 23.04 | 2373.14 | 0.03 | 0.01 | 0.03 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.06 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.02 | 0.00 | 0.00 | 0.02 | 0.05 | 0.00 | 0.02 | 0.07 | 250.24 |
| 0.33 | 3.04 | 1666.39 | 37.33 | 0.00 | 1703.72 | 0.01 | 0.00 | 0.00 | 0.01 | 0.06 | 0.00 | 0.00 | 0.06 | 0.02 | 0.07 | 0.14 | 0.05 | 0.00 | 0.00 | 0.05 | 0.00 | 0.02 | 0.08 | 0.02 | 0.00 | 0.00 | 0.02 | 0.26 | 0.01 | 0.00 | 0.27 | 152.19 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.03 | 0.68 | 414.50 | 25.03 | 2.55 | 442.08 | 0.02 | 0.02 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.03 | 46.62 |
| 0.36 | 9.01 | 1475.62 | 132.23 | 0.00 | 1607.84 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.00 | 0.00 | 0.04 | 0.02 | 0.06 | 0.11 | 0.03 | 0.00 | 0.00 | 0.04 | 0.00 | 0.02 | 0.06 | 0.01 | 0.00 | 0.00 | 0.02 | 0.23 | 0.02 | 0.00 | 0.25 | 143.63 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.04 | 0.13 | 993.47 | 0.00 | 4.74 | 998.21 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 105.26 |
| 0.00 | 0.42 | 1575.04 | 0.00 | 0.00 | 1575.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.04 | 0.14 | 0.18 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.05 | 0.06 | 0.01 | 0.00 | 0.00 | 0.01 | 0.25 | 0.00 | 0.00 | 0.25 | 140.70 |
| 0.00 | 0.01 | 175.09 | 0.00 | 0.00 | 175.09 | 0.58 | 0.00 | 0.00 | 0.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.04 | 20.24 |

## Road Dust Emission Factors

**Daily Paved Road Dust EF[1]**

$$E_{ext} = [\, k\, (sL)^{0.91} \times (W)^{1.02} \,]\, (1 - P/4N)$$

| Parameter | Description | Source: |
|---|---|---|
| $E_{ext}$ | Annual or other long-term average emission factor in the same units as k | USEPA AP-42, Paved Roads Methodology |
| k | Particle size multiplier for particle size range and units of interest | USEPA AP-42, Table 13.2.1-1 |
| sL | road surface silt loading (g/m$^2$) | CARB_2021 (local road) |
| W | average weight (tons) of all the vehicles raveling the road (2.4 tons) | CARB_2021, page 14 |
| P | Number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period | Folsom Data from WRCC |
| N | Number of days in the averaging period (e.g. 365 for annual, 91 for seasonal, 30 for monthly) | |

| Parameters | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|
| k (lb/VMT) | 0.0022 | 0.00054 |
| k (g/VMT) | 0.998 | 0.245 |
| sL (g/m$^2$) | 0.32 | 0.32 |
| W (tons) | 2.4 | 2.4 |
| P | 63 | 63 |
| N | 365 | 365 |
| EF without natural dust control (g/mi) | 8.64E-01 | 2.12E-01 |
| EF with natural dust control (g/mi) | 0.83 | 0.20 |

Table 13.2.1-1. PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

| Size range[a] | Particle Size Multiplier k[b] | | |
|---|---|---|---|
| | g/VKT | g/VMT | lb/VMT |
| PM-2.5[c] | 0.15 | 0.25 | 0.00054 |
| PM-10 | 0.62 | 1.00 | 0.0022 |
| PM-15 | 0.77 | 1.23 | 0.0027 |
| PM-30[d] | 3.23 | 5.24 | 0.011 |

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers

[b] Units shown are grams per vehicle kilometer traveled (g/VKT), grams per vehicle mile traveled (g/VMT), and pounds per vehicle mile traveled (lb/VMT). The multiplier k includes unit conversions to produce emission factors in the units shown for the indicated size range from the mixed units required in Equation 1.

[c] The k-factors for $PM_{2.5}$ were based on the average $PM_{2.5}$:$PM_{10}$ ratio of test runs in Reference 30.

[d] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

Appendix A: Calculation Details for CalEEMod

Where:

- $Emissions_{pollutant}$ = emissions for each pollutant
- Trip = vehicle trips (per day, per season, or per year)
- $EF_{pollutant}$ = CalEEMod emission factor for each pollutant

### 5.3 Road Dust

Vehicles that drive on both paved and unpaved roads generate fugitive dust by dispersing the silt from the roads. The following equation is used to calculate the fugitive dust emissions associated with paved roads:

$$E_{ext} = [\, k\, (sL)^{0.91} \times (W)^{1.02} \,]\, (1 - P/4N)$$

Where:

$E_{ext}$ = annual or other long-term average emission factor in the same units as k

*k* = particle size multiplier for particle size range and units of interest (see below)

*sL* = road surface silt loading (grams per square meter) (g/m$^2$)

*W* = average weight (tons) of *all the vehicles* traveling the road (2.4 tons)

*P* = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period

*N* = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly).

### Vehicle Weight Estimates

The estimated statewide average vehicle weight is based on an informal traffic count conducted by MRI while performing California silt loading measurements.[2,5] The statewide default fleet vehicle weight is 2.4 tons; Table 4 contains fleet vehicle weights.

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: Butte
Calendar Year: 2019, 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumptio

| Region | Calendar Y | Vehicle Cat | Model Yea | Speed | Fuel | Population | Total VMT | CVMT | EVMT | Trips | Energy Cor | NOx_RUNE | NOx_IDLE | NOx_STRE | NOx_TOTE | PM2.5_RU | PM2.5_IDL | PM2.5_STF | PM2.5_TO | PM2.5_PM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Butte | 2019 | HHDT | Aggregate | Aggregate | Gasoline | 5.283971 | 43595.48 | 43595.48 | 0 | 34571 | 0 | 0.891419 | 0 | 0.061564 | 0.952982 | 0.000408 | 0 | 0.000203 | 0.000611 | 0.00024 |
| Butte | 2019 | HHDT | Aggregate | Aggregate | Diesel | 2105.946 | 1.03E+08 | 1.03E+08 | 0 | 10904015 | 0 | 494.6239 | 66.29982 | 21.52354 | 582.4472 | 9.844801 | 0.181917 | 0 | 10.02672 | 1.007048 |
| Butte | 2019 | HHDT | Aggregate | Aggregate | Natural Ga | 21.40905 | 450380.7 | 450380.7 | 0 | 38338.01 | 0 | 0.581088 | 0.054988 | 0 | 0.636076 | 0.00041 | 4.2E-05 | 0 | 0.000452 | 0.004468 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Gasoline | 66328.97 | 7.54E+08 | 7.54E+08 | 0 | 1.05E+08 | 0 | 89.4004 | 0 | 45.30054 | 134.7009 | 1.23208 | 0 | 0.28143 | 1.51351 | 1.661673 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Diesel | 517.9523 | 5393945 | 5393945 | 0 | 790049.7 | 0 | 2.737571 | 0 | 0 | 2.737571 | 0.162719 | 0 | 0 | 0.162719 | 0.011892 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Electricity | 472.6056 | 5456372 | 0 | 5456372 | 829567.6 | 2106610 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.012029 |
| Butte | 2019 | LDA | Aggregate | Aggregate | Plug-in Hyb | 705.926 | 10494499 | 5666562 | 4827937 | 1012894 | 1458181 | 0.04156 | 0 | 0.127563 | 0.169122 | 0.009827 | 0 | 0.002775 | 0.012602 | 0.023136 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Gasoline | 12883.51 | 1.23E+08 | 1.23E+08 | 0 | 19011299 | 0 | 49.08299 | 0 | 14.46256 | 63.54555 | 0.44815 | 0 | 0.103168 | 0.551317 | 0.270991 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Diesel | 16.68627 | 74953.53 | 74953.53 | 0 | 17909.59 | 0 | 0.138288 | 0 | 0 | 0.138288 | 0.020519 | 0 | 0 | 0.020519 | 0.000165 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Electricity | 12.10708 | 81895.05 | 0 | 81895.05 | 17954.06 | 31618.25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000181 |
| Butte | 2019 | LDT1 | Aggregate | Aggregate | Plug-in Hyb | 0.080831 | 1242.223 | 673.1253 | 569.0975 | 115.9803 | 171.8844 | 4.94E-06 | 0 | 1.46E-05 | 1.95E-05 | 1.38E-06 | 0 | 3.87E-07 | 1.77E-06 | 2.74E-06 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Gasoline | 35566.06 | 4.14E+08 | 4.14E+08 | 0 | 56833493 | 0 | 83.66 | 0 | 37.71199 | 121.372 | 0.716756 | 0 | 0.152217 | 0.868973 | 0.913365 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Diesel | 90.66753 | 1156470 | 1156470 | 0 | 148302.2 | 0 | 0.243695 | 0 | 0 | 0.243695 | 0.019693 | 0 | 0 | 0.019693 | 0.00255 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Electricity | 0.397702 | 4533.36 | 0 | 4533.36 | 694.8146 | 1750.251 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.99E-06 |
| Butte | 2019 | LDT2 | Aggregate | Aggregate | Plug-in Hyb | 34.27006 | 555671.9 | 295334.8 | 260337.2 | 49172.23 | 78629.58 | 0.002166 | 0 | 0.006193 | 0.008359 | 0.000599 | 0 | 0.000163 | 0.000762 | 0.001225 |
| Butte | 2019 | LHDT1 | Aggregate | Aggregate | Gasoline | 5069.736 | 52517111 | 52517111 | 0 | 24698804 | 0 | 26.25626 | 0.075162 | 19.39923 | 45.73065 | 0.150943 | 0 | 0.017495 | 0.168438 | 0.11578 |
| Butte | 2019 | LHDT1 | Aggregate | Aggregate | Diesel | 7512.049 | 86612687 | 86612687 | 0 | 30898925 | 0 | 312.36 | 6.646388 | 0 | 319.0064 | 5.323573 | 0.075247 | 0 | 5.39882 | 0.286422 |
| Butte | 2019 | LHDT2 | Aggregate | Aggregate | Gasoline | 488.6089 | 5554158 | 5554158 | 0 | 2380411 | 0 | 2.044756 | 0.007215 | 1.801659 | 3.85363 | 0.011815 | 0 | 0.001083 | 0.012897 | 0.012245 |
| Butte | 2019 | LHDT2 | Aggregate | Aggregate | Diesel | 1814.033 | 23090774 | 23090774 | 0 | 7461568 | 0 | 52.9069 | 1.560545 | 0 | 54.46745 | 1.104494 | 0.017311 | 0 | 1.121805 | 0.07636 |
| Butte | 2019 | MCY | Aggregate | Aggregate | Gasoline | 5849.956 | 11073185 | 11073185 | 0 | 4059869 | 0 | 8.977344 | 0 | 0.898699 | 9.876044 | 0.024308 | 0 | 0.020503 | 0.044811 | 0.012206 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Gasoline | 32807.24 | 3.61E+08 | 3.61E+08 | 0 | 51495889 | 0 | 97.28399 | 0 | 44.95903 | 142.243 | 0.670519 | 0 | 0.170868 | 0.841387 | 0.796108 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Diesel | 668.6408 | 9549174 | 9549174 | 0 | 1116065 | 0 | 1.085324 | 0 | 0 | 1.085324 | 0.089893 | 0 | 0 | 0.089893 | 0.021052 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Electricity | 9.133734 | 77705.72 | 0 | 77705.72 | 14627.2 | 30000.82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000171 |
| Butte | 2019 | MDV | Aggregate | Aggregate | Plug-in Hyb | 71.30874 | 1239001 | 669318.8 | 569681.8 | 102317 | 172060.9 | 0.004909 | 0 | 0.012886 | 0.017795 | 0.00138 | 0 | 0.000343 | 0.001723 | 0.002732 |
| Butte | 2019 | MH | Aggregate | Aggregate | Gasoline | 1065.895 | 2664375 | 2664375 | 0 | 34868.71 | 0 | 2.570265 | 0 | 0.014739 | 2.585004 | 0.00764 | 0 | 2.77E-05 | 0.007668 | 0.008811 |
| Butte | 2019 | MH | Aggregate | Aggregate | Diesel | 366.9825 | 1076114 | 1076114 | 0 | 12000.33 | 0 | 6.929387 | 0 | 0 | 6.929387 | 0.167074 | 0 | 0 | 0.167074 | 0.004745 |
| Butte | 2019 | MHDT | Aggregate | Aggregate | Gasoline | 335.1491 | 4165562 | 4165562 | 0 | 2192752 | 0 | 6.26234 | 0.010336 | 1.201752 | 7.474428 | 0.012333 | 0 | 0.005317 | 0.01765 | 0.013775 |
| Butte | 2019 | MHDT | Aggregate | Aggregate | Diesel | 1808.185 | 22516797 | 22516797 | 0 | 6393822 | 0 | 134.3254 | 18.90979 | 4.799169 | 158.0343 | 3.93504 | 0.179693 | 0 | 4.114733 | 0.074462 |
| Butte | 2019 | OBUS | Aggregate | Aggregate | Gasoline | 127.2866 | 1844422 | 1844422 | 0 | 832787.3 | 0 | 2.320529 | 0.002951 | 0.408531 | 2.73201 | 0.002218 | 0 | 0.00031 | 0.002528 | 0.006099 |
| Butte | 2019 | OBUS | Aggregate | Aggregate | Diesel | 62.88714 | 1100936 | 1100936 | 0 | 194646.1 | 0 | 8.069929 | 0.386074 | 0.145547 | 8.60155 | 0.346779 | 0.003572 | 0 | 0.350351 | 0.003641 |
| Butte | 2019 | SBUS | Aggregate | Aggregate | Gasoline | 41.1252 | 653660.3 | 653660.3 | 0 | 53791.76 | 0 | 1.81713 | 0.012878 | 0.038076 | 1.868084 | 0.004561 | 0 | 0.000187 | 0.004748 | 0.001441 |
| Butte | 2019 | SBUS | Aggregate | Aggregate | Diesel | 170.7654 | 1191091 | 1191091 | 0 | 808567.4 | 0 | 11.48811 | 1.854752 | 0.195581 | 13.53845 | 0.065408 | 0.003588 | 0 | 0.068996 | 0.003939 |
| Butte | 2019 | UBUS | Aggregate | Aggregate | Gasoline | 26.24314 | 485893.7 | 485893.7 | 0 | 34326.02 | 0 | 0.139865 | 0 | 0.039453 | 0.179318 | 0.000276 | 0 | 1.86E-05 | 0.000294 | 0.001607 |
| Butte | 2019 | UBUS | Aggregate | Aggregate | Diesel | 25.23378 | 1067935 | 1067935 | 0 | 33005.79 | 0 | 0.391825 | 0 | 0 | 0.391825 | 0.007118 | 0 | 0 | 0.007118 | 0.008576 |
| Butte | 2019 | UBUS | Aggregate | Aggregate | Natural Ga | 7.06546 | 155821.6 | 155821.6 | 0 | 9241.621 | 0 | 0.089599 | 0 | 0 | 0.089599 | 2.74E-05 | 0 | 0 | 2.74E-05 | 0.001546 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Gasoline | 0.501725 | 10478.3 | 10478.3 | 0 | 3282.591 | 0 | 0.079803 | 0 | 0.000302 | 0.080105 | 1.61E-05 | 0 | 2.64E-06 | 1.87E-05 | 5.78E-05 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Diesel | 2541.615 | 1.19E+08 | 1.19E+08 | 0 | 13326974 | 0 | 225.1055 | 74.09857 | 40.46865 | 339.6727 | 3.672753 | 0.032285 | 0 | 3.705037 | 1.169704 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Electricity | 16.82968 | 657503.2 | 0 | 657503.2 | 81091.91 | 1208231 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.006367 |
| Butte | 2025 | HHDT | Aggregate | Aggregate | Natural Ga | 35.12571 | 689965.5 | 689965.5 | 0 | 63191.14 | 0 | 0.600235 | 0.06885 | 0 | 0.669084 | 0.000725 | 8.60E-05 | 0 | 0.000812 | 0.006845 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Gasoline | 67669.42 | 8.53E+08 | 8.53E+08 | 0 | 1.08E+08 | 0 | 42.67164 | 0 | 30.93595 | 73.60759 | 1.100125 | 0 | 0.224253 | 1.324378 | 1.881177 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Diesel | 367.195 | 3624704 | 3624704 | 0 | 537933.3 | 0 | 1.033067 | 0 | 0 | 1.033067 | 0.071093 | 0 | 0 | 0.071093 | 0.007991 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Electricity | 3443.665 | 59599344 | 0 | 59599344 | 5983815 | 23010266 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.131394 |
| Butte | 2025 | LDA | Aggregate | Aggregate | Plug-in Hyb | 1935.904 | 29598483 | 14231464 | 15367020 | 2777722 | 4641298 | 0.103934 | 0 | 0.349823 | 0.453757 | 0.018017 | 0 | 0.005704 | 0.023721 | 0.065253 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Gasoline | 9413.214 | 94939915 | 94939915 | 0 | 13684622 | 0 | 22.72209 | 0 | 7.910581 | 30.63267 | 0.238881 | 0 | 0.053191 | 0.292072 | 0.209307 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Diesel | 8.73823 | 34795.16 | 34795.16 | 0 | 8342.781 | 0 | 0.064103 | 0 | 0 | 0.064103 | 0.009492 | 0 | 0 | 0.009492 | 7.67E-05 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Electricity | 16.83198 | 240478.7 | 0 | 240478.7 | 27133.93 | 92844.63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00053 |
| Butte | 2025 | LDT1 | Aggregate | Aggregate | Plug-in Hyb | 10.59367 | 179340 | 78045.52 | 101294.5 | 15200.28 | 30593.94 | 0.00057 | 0 | 0.001914 | 0.002484 | 7.22E-05 | 0 | 2.29E-05 | 9.51E-05 | 0.000395 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Gasoline | 37288.3 | 4.71E+08 | 4.71E+08 | 0 | 59470237 | 0 | 44.55829 | 0 | 24.74399 | 69.30228 | 0.66032 | 0 | 0.131659 | 0.79198 | 1.037927 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Diesel | 117.6432 | 1561322 | 1561322 | 0 | 190881.9 | 0 | 0.145748 | 0 | 0 | 0.145748 | 0.013248 | 0 | 0 | 0.013248 | 0.003442 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Electricity | 229.9527 | 2892295 | 0 | 2892295 | 406111.2 | 1116665 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.006376 |
| Butte | 2025 | LDT2 | Aggregate | Aggregate | Plug-in Hyb | 290.3825 | 4679098 | 2146072 | 2533026 | 416653.8 | 765049.3 | 0.015673 | 0 | 0.052473 | 0.068146 | 0.002366 | 0 | 0.000748 | 0.003114 | 0.010316 |
| Butte | 2025 | LHDT1 | Aggregate | Aggregate | Gasoline | 3898.47 | 42693887 | 42693887 | 0 | 18992616 | 0 | 14.01519 | 0.053485 | 14.17392 | 28.2426 | 0.093083 | 0 | 0.008994 | 0.102077 | 0.094124 |
| Butte | 2025 | LHDT1 | Aggregate | Aggregate | Diesel | 5873.098 | 63194585 | 63194585 | 0 | 24157511 | 0 | 184.6303 | 4.867283 | 0 | 189.4976 | 3.654593 | 0.056565 | 0 | 3.711157 | 0.20898 |
| Butte | 2025 | LHDT1 | Aggregate | Aggregate | Electricity | 19.75425 | 454659.1 | 0 | 454659.1 | 90353.35 | 295939.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.001002 |
| Butte | 2025 | LHDT2 | Aggregate | Aggregate | Gasoline | 417.8453 | 4845378 | 4845378 | 0 | 2035664 | 0 | 1.041269 | 0.005583 | 1.435144 | 2.481995 | 0.00773 | 0 | 0.00058 | 0.00831 | 0.010682 |
| Butte | 2025 | LHDT2 | Aggregate | Aggregate | Diesel | 1653.05 | 19307127 | 19307127 | 0 | 6799407 | 0 | 35.30781 | 1.290264 | 0 | 36.59807 | 0.888934 | 0.015799 | 0 | 0.904733 | 0.063847 |
| Butte | 2025 | LHDT2 | Aggregate | Aggregate | Electricity | 5.060847 | 110710 | 0 | 110710 | 21945.51 | 70895.66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000244 |
| Butte | 2025 | MCY | Aggregate | Aggregate | Gasoline | 5474.751 | 9681026 | 9681026 | 0 | 3799477 | 0 | 7.244459 | 0 | 0.72411 | 7.968569 | 0.01973 | 0 | 0.014471 | 0.034201 | 0.010672 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Gasoline | 29096.82 | 3.37E+08 | 3.37E+08 | 0 | 45150171 | 0 | 44.78407 | 0 | 25.71596 | 70.50003 | 0.490898 | 0 | 0.111997 | 0.602895 | 0.742288 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Diesel | 645.2601 | 7890006 | 7890006 | 0 | 1021049 | 0 | 0.656451 | 0 | 0 | 0.656451 | 0.067732 | 0 | 0 | 0.067732 | 0.017394 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Electricity | 256.0711 | 3181713 | 0 | 3181713 | 450229 | 1228404 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.007014 |
| Butte | 2025 | MDV | Aggregate | Aggregate | Plug-in Hyb | 195.4689 | 3249762 | 1527224 | 1722538 | 280467.6 | 520257.8 | 0.011154 | 0 | 0.035322 | 0.046475 | 0.00203 | 0 | 0.000615 | 0.002645 | 0.007164 |
| Butte | 2025 | MH | Aggregate | Aggregate | Gasoline | 656.1121 | 1718835 | 1718835 | 0 | 21463.45 | 0 | 1.071649 | 0 | 0.00997 | 1.081619 | 0.003348 | 0 | 9.95E-06 | 0.003358 | 0.005684 |
| Butte | 2025 | MH | Aggregate | Aggregate | Diesel | 328.1077 | 908912.7 | 908912.7 | 0 | 10729.12 | 0 | 5.400425 | 0 | 0 | 5.400425 | 0.126191 | 0 | 0 | 0.126191 | 0.004008 |
| Butte | 2025 | MHDT | Aggregate | Aggregate | Gasoline | 225.0797 | 3625587 | 3625587 | 0 | 1472610 | 0 | 2.045427 | 0.007019 | 0.711771 | 2.764216 | 0.005587 | 0 | 0.000984 | 0.006571 | 0.01199 |
| Butte | 2025 | MHDT | Aggregate | Aggregate | Diesel | 1826.636 | 24763659 | 24763659 | 0 | 6517462 | 0 | 34.49262 | 8.543369 | 11.85584 | 54.89183 | 0.414169 | 0.023552 | 0 | 0.437721 | 0.081892 |
| Butte | 2025 | MHDT | Aggregate | Aggregate | Electricity | 15.38202 | 261788.8 | 0 | 261788.8 | 58285.76 | 284110.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000866 |
| Butte | 2025 | OBUS | Aggregate | Aggregate | Gasoline | 94.44951 | 1174824 | 1174824 | 0 | 617946.9 | 0 | 1.16404 | 0.002174 | 0.307882 | 1.474097 | 0.001438 | 0 | 0.000233 | 0.001671 | 0.003885 |
| Butte | 2025 | OBUS | Aggregate | Aggregate | Diesel | 64.50083 | 1156692 | 1156692 | 0 | 199878.1 | 0 | 2.529748 | 0.185757 | 0.325309 | 3.040814 | 0.052814 | 0.000296 | 0 | 0.05311 | 0.003825 |
| Butte | 2025 | OBUS | Aggregate | Aggregate | Electricity | 0.267976 | 7693.959 | 0 | 7693.959 | 1753.266 | 8492.304 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.54E-05 |
| Butte | 2025 | SBUS | Aggregate | Aggregate | Gasoline | 26.40326 | 453280.4 | 453280.4 | 0 | 34535.47 | 0 | 0.650487 | 0.008506 | 0.02512 | 0.684113 | 0.000822 | 0 | 2.69E-05 | 0.000849 | 0.000999 |
| Butte | 2025 | SBUS | Aggregate | Aggregate | Diesel | 166.3028 | 1180589 | 1180589 | 0 | 787436.9 | 0 | 7.157961 | 1.491938 | 0.363931 | 9.01383 | 0.034296 | 0.001759 | 0 | 0.036054 | 0.003904 |
| Butte | 2025 | SBUS | Aggregate | Aggregate | Electricity | 1.374368 | 12733.8 | 0 | 12733.8 | 6060.248 | 13414.49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.96E-05 |
| Butte | 2025 | UBUS | Aggregate | Aggregate | Gasoline | 26.67922 | 493967.9 | 493967.9 | 0 | 34896.42 | 0 | 0.095308 | 0 | 0.035351 | 0.130659 | 0.000681 | 0 | 4.03E-05 | 0.000721 | 0.001634 |
| Butte | 2025 | UBUS | Aggregate | Aggregate | Diesel | 27.76785 | 1126654 | 1126654 | 0 | 36320.34 | 0 | 0.418623 | 0 | 0 | 0.418623 | 0.007605 | 0 | 0 | 0.007605 | 0.009148 |
| Butte | 2025 | UBUS | Aggregate | Aggregate | Natural Ga | 5.068122 | 117438 | 117438 | 0 | 6629.104 | 0 | 0.008245 | 0 | 0 | 0.008245 | 3.84E-05 | 0 | 0 | 3.84E-05 | 0.001143 |

**Notre Dame Bridge Project Critiera Pollutant Emissions**

| Condition | Daily Emissions (lb/day) | | |
|---|---|---|---|
| | ROG | NOx | PM10 |
| Existing (2019) - no project | 0.20 | 1.89 | 0.12 |
| Existing (2019) - proposed project | 0.30 | 2.80 | 0.18 |
| Notre Dame Blvd Bridge (2025) - no project | 0.11 | 1.05 | 0.12 |
| Notre Dame Blvd Bridge (2025) - proposed project | 0.17 | 1.56 | 0.18 |
| **Comparsions** | | | |
| Existing (2019) - proposed project to Existing (2019) - no project | 0.10 | 0.91 | 0.06 |
| Notre Dame Blvd Bridge (2025) - proposed project to to Existing (2019) - no project | -0.04 | -0.34 | 0.05 |
| Notre Dame Blvd Bridge (2025) - proposed project to Notre Dame Blvd Bridge (2025) - no project | 0.05 | 0.50 | 0.06 |
| BCAQMD Threshold | 25 | 25 | 80 |

**Notre Dame Bridge Project GHG Emissions**

| Source | Annual Emissions (mty) | | | |
|---|---|---|---|---|
| | CO2 | CH4 | N2O | CO2e |
| Existing (2019) - no project | 229 | 0 | 0 | 234 |
| Existing (2019) - proposed project | 339 | 0 | 0 | 346 |
| Notre Dame Blvd Bridge (2025) - no project | 248 | 0 | 0 | 253 |
| Notre Dame Blvd Bridge (2025) - proposed project | 368 | 0 | 0 | 375 |
| **Comparsions** | | | | |
| Existing (2019) - proposed project to Existing (2020) - no project | 110 | 0.00 | 0.01 | 112 |
| Notre Dame Blvd Bridge (2025) - proposed project to to Existing (2019) - no project | 139 | 0.00 | 0.01 | 141 |
| Notre Dame Blvd Bridge (2025) - proposed project to Notre Dame Blvd Bridge (2025) - no project | 119 | 0.00 | 0.01 | 122 |

## Mobile

**EMFAC2021 Emission Factors**

| Year | Running (RUNEX, PMTW, PMBW, RD) grams per mile | | | | | | | | | | | | Fuel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROG | TOG | CO | NOx | CO2 | CH4 | PM10 Ex | PM10 D | PM2.5 Ex | PM2.5 D | SOX | N2O | gal/mi |
| Butte, 2019 | 0.07 | 0.09 | 1.77 | 0.63 | 486 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.03 | 0.06 |
| Butte, 2025 | 0.03 | 0.04 | 0.98 | 0.28 | 427 | 0.01 | 0.01 | 0.03 | 0.00 | 0.01 | 0.00 | 0.03 | 0.05 |

*Source: See EMFAC for VMT spreadsheet*

**Traffic Data**

| Condition | Daily VMT | Daily Trips | Annual VMT |
|---|---|---|---|
| Existing (2019) - no project | 1,357 | 3,310 | 470,879 |
| Existing (2019) - proposed project | 2,009 | 4,018 | 697,123 |
| Notre Dame Blvd Bridge (2025) - no project | 1,677 | 4,090 | 581,919 |
| Notre Dame Blvd Bridge (2025) - proposed project | 2,483 | 4,965 | 861,601 |

*Source: Headway Traffic Memo; Daily to annual conversion from CARB 2008.*

**Daily Criteria Pollutant Emissions (pounds)**

| Analysis | ROG | TOG | NOx | CO | PM10 | PM2.5 | SOx |
|---|---|---|---|---|---|---|---|
| Existing (2019) - no project | 0.20 | 0.26 | 1.89 | 5.29 | 0.12 | 0.06 | 0.01 |
| Existing (2019) - proposed project | 0.30 | 0.39 | 2.80 | 7.83 | 0.18 | 0.09 | 0.02 |
| Notre Dame Blvd Bridge (2025) - no project | 0.11 | 0.15 | 1.05 | 3.63 | 0.12 | 0.05 | 0.02 |
| Notre Dame Blvd Bridge (2025) - proposed project | 0.17 | 0.22 | 1.56 | 5.38 | 0.18 | 0.07 | 0.02 |

**Annual Greenhouse Gas Emissions (metric tons)**

| Analysis | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Existing (2019) - no project | 229 | 0 | 0 | 234 |
| Existing (2019) - proposed project | 339 | 0 | 0 | 346 |
| Notre Dame Blvd Bridge (2025) - no project | 248 | 0 | 0 | 253 |
| Notre Dame Blvd Bridge (2025) - proposed project | 368 | 0 | 0 | 375 |

**Annual Fuel (Gallons)**

| Analysis | Gallons |
|---|---|
| Existing (2019) - no project | 26,685 |
| Existing (2019) - proposed project | 39,507 |
| Notre Dame Blvd Bridge (2025) - no project | 28,571 |
| Notre Dame Blvd Bridge (2025) - proposed project | 42,302 |

| | |
|---|---|
| tons per pound | 0.0005 |
| ton per gram | 1.10231E-06 |
| mt per gram | 1.00E-06 |
| mt per kg | 1.00E-03 |
| mt per lb | 4.54E-04 |
| mt per ton | 9.07E-01 |
| lb per kg | 2.20 |
| lb per gram | 0.00220 |

**Global Warming Potentials**

| | | |
|---|---|---|
| $CO_2$ | 1 | https://ww2.arb.ca.gov/ghg-gwps |
| $CH_4$ | 25 | https://ww2.arb.ca.gov/ghg-gwps |
| $N_2O$ | 298 | https://ww2.arb.ca.gov/ghg-gwps |

**Attachment 3**

Source: EMFAC2021 (v1.0.1) Emission Rates
Region Type: County
Region: Butte
Calendar Year: 2025
Season: Winter
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for CVMT and EVMT, g/mile for RUNEX, PMBW and PMTW, mph for Speed, kWh/mile for Energy Consumption, gallon/mile for Fuel Consumption. PHEV calculated based on total VMT.

| Region | Calendar Y | Vehicle Ca | Model Yea | Speed | Fuel | Total VMT | CVMT | EVMT | NOx_RUNI | PM2.5_RU | PM10_RUI | CO2_RUNI | CH4_RUNI | N2O_RUN | ROG_RUN | TOG_RUNI | CO_RUNE) | SOx_RUNE | NH3_RUNI | PM10_PM | PM2.5_PN | Fuel Consu | Energy Consumption |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Butte | 2025 | All Other E | Aggregate | 5 | Diesel | 46.81078 | 46.81078 | 0 | 6.350507 | 0.106797 | 0.111626 | 2400.579 | 0.041541 | 0.378212 | 0.894365 | 1.018167 | 1.672131 | 0.022732 | 0.202442 | 0.061496 | 0.021524 | 0.236383 | 0 |
| Butte | 2025 | LDA | Aggregate | 5 | Gasoline | 2092.585 | 2092.585 | 0 | 0.096475 | 0.008179 | 0.008895 | 656.3578 | 0.01661 | 0.009913 | 0.065358 | 0.095371 | 1.401876 | 0.006489 | 0.035566 | 0.005961 | 0.002086 | 0.076293 | 0 |
| Butte | 2025 | LDA | Aggregate | 5 | Diesel | 8.889149 | 8.889149 | 0 | 0.300667 | 0.066763 | 0.069782 | 607.1501 | 0.013527 | 0.095657 | 0.291235 | 0.331552 | 4.64472 | 0.005753 | 0.0031 | 0.006116 | 0.00214 | 0.059785 | 0 |
| Butte | 2025 | LDT1 | Aggregate | 5 | Gasoline | 232.8287 | 232.8287 | 0 | 0.482636 | 0.014903 | 0.016208 | 806.5825 | 0.062348 | 0.029974 | 0.290314 | 0.423626 | 4.20131 | 0.007974 | 0.037773 | 0.008751 | 0.003063 | 0.093755 | 0 |
| Butte | 2025 | LDT1 | Aggregate | 5 | Diesel | 0.085331 | 0.085331 | 0 | 1.1709 | 1.025672 | 1.072048 | 1068.02 | 0.055019 | 0.168267 | 1.184536 | 1.348515 | 4.44777 | 0.01012 | 0.0031 | 0.009762 | 0.003417 | 0.105167 | 0 |
| Butte | 2025 | LDT2 | Aggregate | 5 | Gasoline | 1154.57 | 1154.57 | 0 | 0.185373 | 0.008857 | 0.009633 | 824.5804 | 0.022132 | 0.014062 | 0.090821 | 0.132526 | 1.74672 | 0.008152 | 0.036752 | 0.008285 | 0.0029 | 0.095847 | 0 |
| Butte | 2025 | LDT2 | Aggregate | 5 | Diesel | 3.828953 | 3.828953 | 0 | 0.191046 | 0.025038 | 0.02617 | 789.2485 | 0.012869 | 0.124346 | 0.277067 | 0.315422 | 2.700365 | 0.007479 | 0.0031 | 0.008176 | 0.002862 | 0.077717 | 0 |
| Butte | 2025 | LHD1 | Aggregate | 5 | Gasoline | 3705.263 | 3705.263 | 0 | 0.447402 | 0.005638 | 0.006132 | 1644.811 | 0.041059 | 0.023508 | 0.206387 | 0.30116 | 3.172513 | 0.016261 | 0.044899 | 0.078 | 0.0273 | 0.191188 | 0 |
| Butte | 2025 | LHD1 | Aggregate | 5 | Diesel | 3398.311 | 3398.311 | 0 | 3.199585 | 0.124141 | 0.129754 | 1217.604 | 0.026318 | 0.191834 | 0.566605 | 0.645042 | 1.867688 | 0.011537 | 0.13915 | 0.078 | 0.0273 | 0.119896 | 0 |
| Butte | 2025 | LHD2 | Aggregate | 5 | Gasoline | 420.5145 | 420.5145 | 0 | 0.301051 | 0.003765 | 0.004094 | 1776.752 | 0.023768 | 0.016821 | 0.113843 | 0.166119 | 2.099478 | 0.017565 | 0.044955 | 0.091 | 0.03185 | 0.206525 | 0 |
| Butte | 2025 | LHD2 | Aggregate | 5 | Diesel | 1038.248 | 1038.248 | 0 | 2.421056 | 0.093319 | 0.097538 | 1435.504 | 0.019143 | 0.226164 | 0.412143 | 0.469197 | 1.348817 | 0.013602 | 0.170356 | 0.091 | 0.03185 | 0.141353 | 0 |
| Butte | 2025 | MCY | Aggregate | 5 | Gasoline | 23.74155 | 23.74155 | 0 | 1.022162 | 0.011296 | 0.012067 | 485.5739 | 1.171495 | 0.068568 | 7.968833 | 9.495547 | 40.25717 | 0.0048 | 0.008538 | 0.012 | 0.0042 | 0.056442 | 0 |
| Butte | 2025 | MDV | Aggregate | 5 | Gasoline | 825.707 | 825.707 | 0 | 0.260466 | 0.009137 | 0.009938 | 1009.975 | 0.02982 | 0.017756 | 0.13161 | 0.192024 | 2.078005 | 0.009985 | 0.035809 | 0.008525 | 0.002984 | 0.117397 | 0 |
| Butte | 2025 | MDV | Aggregate | 5 | Diesel | 19.34929 | 19.34929 | 0 | 0.177612 | 0.025134 | 0.02627 | 992.4602 | 0.010983 | 0.156363 | 0.236465 | 0.2692 | 4.481467 | 0.009404 | 0.0031 | 0.008601 | 0.00301 | 0.097727 | 0 |
| Butte | 2025 | MH | Aggregate | 5 | Gasoline | 45.45536 | 45.45536 | 0 | 1.010826 | 0.009351 | 0.01017 | 4216.661 | 0.089099 | 0.057694 | 0.379582 | 0.553886 | 3.966363 | 0.041686 | 0.044862 | 0.061496 | 0.021524 | 0.490133 | 0 |
| Butte | 2025 | MH | Aggregate | 5 | Diesel | 22.35536 | 22.35536 | 0 | 15.81413 | 0.347904 | 0.363635 | 2151.455 | 0.05554 | 0.338963 | 1.195744 | 1.361275 | 2.660245 | 0.020386 | 0.122991 | 0.061496 | 0.021524 | 0.211852 | 0 |
| Butte | 2025 | OBUS | Aggregate | 5 | Gasoline | 28.89564 | 28.89564 | 0 | 1.650945 | 0.006106 | 0.00664 | 4027.684 | 0.122563 | 0.068501 | 0.613362 | 0.895016 | 4.676995 | 0.039818 | 0.044996 | 0.061496 | 0.021524 | 0.468167 | 0 |
| Butte | 2025 | SBUS | Aggregate | 5 | Gasoline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Butte | 2025 | T6 Public | Aggregate | 5 | Diesel | 274.5711 | 274.5711 | 0 | 8.834055 | 0.061679 | 0.064468 | 2348.425 | 0.014381 | 0.369995 | 0.30962 | 0.352479 | 0.515746 | 0.022238 | 0.159586 | 0.061496 | 0.021524 | 0.231247 | 0 |
| Butte | 2025 | T6 Utility | Aggregate | 5 | Diesel | 19.7999 | 19.7999 | 0 | 1.945641 | 0.003377 | 0.00353 | 2315.957 | 0.002517 | 0.36488 | 0.054188 | 0.061689 | 0.279558 | 0.021931 | 0.22 | 0.061496 | 0.021524 | 0.22805 | 0 |
| Butte | 2025 | T6TS | Aggregate | 5 | Gasoline | 95.88027 | 95.88027 | 0 | 0.947336 | 0.00753 | 0.00819 | 3839.408 | 0.080618 | 0.04426 | 0.405135 | 0.591171 | 3.423723 | 0.037956 | 0.044974 | 0.061496 | 0.021524 | 0.446283 | 0 |
| Butte | 2025 | T7 Public | Aggregate | 5 | Diesel | 287.8082 | 287.8082 | 0 | 20.37906 | 0.131761 | 0.137719 | 3436.345 | 0.027896 | 0.541397 | 0.600603 | 0.683741 | 1.366876 | 0.03254 | 0.145214 | 0.15523 | 0.054331 | 0.338373 | 0 |
| Butte | 2025 | T7 Utility | Aggregate | 5 | Diesel | 10.46554 | 10.46554 | 0 | 6.180481 | 0.005068 | 0.005297 | 3384.449 | 0.004046 | 0.533221 | 0.087104 | 0.099161 | 0.976456 | 0.032049 | 0.22 | 0.137116 | 0.04799 | 0.333263 | 0 |
| Butte | 2025 | T7IS | Aggregate | 5 | Gasoline | 0.116732 | 0.116732 | 0 | 13.64516 | 0.009101 | 0.009898 | 5051.317 | 1.728131 | 0.438002 | 9.739023 | 14.21116 | 65.28348 | 0.049937 | 0.044859 | 0.166349 | 0.058222 | 0.587152 | 0 |
| Butte | 2025 | UBUS | Aggregate | 5 | Gasoline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Butte | 2025 | UBUS | Aggregate | 5 | Diesel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Notre Dame Bridge - 20th and Notre Dame
RUN: CALINE4 RUN (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

## I. SITE VARIABLES

| | | | |
|---|---|---|---|
| U= | 0.5 M/S | Z0= | 100. CM |
| ALT= | 0. (M) | | |
| BRG= | WORST CASE | VD= | 0.0 CM/S |
| CLAS= | 7 (G) | VS= | 0.0 CM/S |
| MIXH= | 1000. M | AMB= | 0.0 PPM |
| SIGTH= | 5. DEGREES | TEMP= | 4.0 DEGREE (C) |

## II. LINK VARIABLES

| LINK DESCRIPTION | * | X1 | Y1 | X2 | Y2 | * | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | LINK COORDINATES (M) | | | | * | | | | | |
| A. EBA | * | -1000 | -5 | 0 | -5 | * | AG | 1102 | 2.2 | 2.0 | 17.0 |
| B. EBD | * | 0 | -4 | 1000 | -4 | * | AG | 1223 | 2.2 | 2.0 | 13.3 |
| C. WBA | * | 1000 | 5 | 0 | 5 | * | AG | 1202 | 2.2 | 2.0 | 17.0 |
| D. WBD | * | 0 | 2 | -1000 | 2 | * | AG | 1190 | 2.2 | 2.0 | 10.0 |
| E. SBA | * | -5 | 1000 | -5 | 0 | * | AG | 128 | 2.2 | 2.0 | 17.0 |
| F. SBD | * | -2 | 0 | -2 | -1000 | * | AG | 352 | 2.2 | 2.0 | 10.0 |
| G. NBA | * | 5 | -1000 | 5 | 0 | * | AG | 453 | 2.2 | 2.0 | 17.0 |
| H. NBD | * | 2 | 0 | 2 | 1000 | * | AG | 120 | 2.2 | 2.0 | 10.0 |

## III. RECEPTOR LOCATIONS

| RECEPTOR | COORDINATES (M) X | Y | Z |
|---|---|---|---|
| 1. R_001 | -7 | 7 | 1.8 |
| 2. R_002 | 7 | 10 | 1.8 |
| 3. R_003 | -7 | -14 | 1.8 |
| 4. R_004 | 10 | -7 | 1.8 |

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Notre Dame Bridge - 20th and Notre Dame
RUN: CALINE4 RUN (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. R_001 | 92. | 1.0 | 0.0 | 0.3 | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2. R_002 | 266. | 0.7 | 0.3 | 0.0 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3. R_003 | 86. | 0.7 | 0.0 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4. R_004 | 272. | 1.0 | 0.5 | 0.1 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |

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