

VINEYARD CROSSINGS RESIDENTIAL PROJECT

AIR QUALITY AND GREENHOUSE GAS ASSESSMENT

Mendocino County, California

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Project: 17-042

Introduction

The purpose of this report is to evaluate the air quality and greenhouse gas impacts associated with the proposed residential development at 156 Lovers Lane in Ukiah. The project proposes to subdivide an approximately 23.6 acre vacant site into 123 residential lots with an estimated 20 accessory dwelling units. The site plan evaluated proposes 91 single-family residences and 32 “Flex Residential Lots.” The project site would also include a neighborhood park, a linear park and some small undeveloped areas.

Air Quality Setting

Air Quality Regulatory Framework

Air quality and air pollution sources are regulated by Federal, State, regional, and local regulatory agencies. Air quality regulations provide the standards by which air quality is determined and institute controls on air pollution sources to improve air quality. The Federal Clean Air Act established the national ambient air quality standards and delegated the enforcement of air pollution control regulations to the states. In California, the California Air Resources Board (CARB) develops and enforces air regulations, but delegates the responsibility of stationary emission source regulation to local air pollution control agencies. In the project area, the MCAQMD is responsible for air pollution source regulation. Mobile sources of air pollutant emissions are regulated on a state-wide basis by the CARB. The air pollutants of concern and the roles of the agencies primarily responsible for managing the air quality within the project area and relevant air quality regulations are further discussed below.

Federal Air Quality Regulations

The Federal Clean Air Act (Federal Act) was established in an effort to assure that acceptable levels of air quality are maintained in all areas of the United States. Air quality is characterized by the presence of pollutants that fall into two basic categories; criteria air pollutants and toxic or hazardous air contaminants. Criteria air pollutants refer to a group of pollutants that the regulatory agencies have adopted ambient air quality standards and pollution management and control strategies. Toxic or hazardous air contaminants refer to a category of air pollutants that have potential adverse health effects but do not have an associated ambient air quality standard. These pollutants are called hazardous air pollutants (HAPs) in Federal law and toxic air pollutants (TACs) in California law.

Each state is divided into air basins based on topographic, geographic, and meteorological conditions. Each air basin is then assessed to determine if the area meets the National Ambient Air Quality Standards (NAAQS). Air basins or portions thereof have been classified as either “attainment” or “nonattainment” for each criteria air pollutant based on whether or not compliance with the standards has been achieved.

If an area does not meet the NAAQS over a set period of time, the USEPA designates the area as a “nonattainment” area for that particular pollutant and sets deadlines for bringing the area into compliance with the standards. These deadlines vary by pollutant, the current level of air pollution in the air basin, and the ability of each region to meet the deadline. The USEPA requires states that have areas that are not in compliance with the national standards to prepare and submit air quality plans showing how and when the standards will be met. These plans are referred to as State Implementation Plans (SIPs). If the states cannot show how the standards will be met, then they must show progress toward meeting the standards. Under severe cases, the USEPA may impose a Federal plan to show progress in meeting the Federal standards. Since, as discussed below, the area meets all NAAQS, there is no SIP imposed on the North Coast Air Basin.

State Air Quality Regulations

Air pollution in California is regulated under the provisions of the California Clean Air Act (State Act). These statutes provide the basis for implementing the Federal Act. The CARB is responsible for establishing and reviewing the State standards, compiling the California SIP, securing approval of that plan from the USEPA, and identifying toxic air contaminants. CARB also regulates mobile emission sources in California, such as construction equipment, trucks, and automobiles. The State Act divides implementation responsibility between the CARB and local or regional agencies called air quality management districts or air pollution control districts. The MCAQMD is the local air quality district for the project. The MCAQMD is responsible for bringing and/or maintaining air quality within Federal and State air quality standards. This includes the responsibility to monitor ambient air pollutant levels and to develop and implement attainment strategies to ensure that future emissions will be within standards.

The air districts are primarily responsible for implementing and enforcing Federal and State regulations for stationary sources at industrial and commercial facilities within their jurisdictions and for preparing the regional air quality plans that are required under the Federal Clean Air Act and California Clean Air Act. These regional air quality plans prepared by districts throughout the State are compiled by the CARB to form the California SIP. The local air districts also have the responsibility and authority to adopt transportation control measures and emission reduction programs for indirect and area-wide emission sources.

The CARB oversees air district regulation of stationary sources and is the agency primarily responsible for controlling air pollution from mobile sources in California. Regulations have been adopted at both USEPA and CARB levels that set specific emission standards for vehicles. As older vehicles are retired and replaced with newer, cleaner vehicles (called “fleet turnover”), it is expected that the air quality will improve. Consistent with this notion, most air quality planning documents project reduced vehicle emissions in the future.

Criteria Air Pollutants

The California Clean Air Act outlines a program for areas in the State to attain the California Air Quality Standards (CAAQS) by the earliest practical date. The California Clean Air Act set more stringent air quality standards, as shown in Table 1, for most of the pollutants covered

under the Federal standards. Additionally, California has adopted ambient air quality standards for vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates.

In a manner similar to the Federal requirements, the California Clean Air Act requires designation of attainment and nonattainment areas with respect to CAAQS. The California Clean Air Act also requires that local and regional air districts prepare a Clean Air Plan (CAP) if the State air quality standards for CO, SO₂, NO₂, or ozone are violated in their district. These CAPs include information on existing air quality in the region, an inventory of current and forecasted future emissions, emission reductions required to meet the standards, and the control measures required to achieve the emission reduction. The CAP must show satisfactory progress in attaining the State air quality standards. The California Clean Air Act requires that the State air quality standards be met as expeditiously as practicable but unlike the Federal Clean Air Act, does not set precise attainment date deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

Unlike for other pollutants an attainment plan is not required for areas that violate the State PM₁₀ standards. As discussed below, the State PM₁₀ standards are exceeded in Mendocino County. While the MCAQMD is not required to prepare a PM₁₀ attainment plan, the District is required to prevent significant deterioration of local air quality and make reasonable efforts toward achieving attainment status for all pollutants. However, the MCAQMD has prepared a Particulate Matter Attainment Plan, which lists PM₁₀ control measures it considers cost-effective and developed a schedule for implementation of the plan.

Toxic Air Contaminants

Toxic Air Contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer or serious illness) and include, but are not limited to, the criteria air pollutants listed in Section 2.3.2.2. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established ambient air quality standards. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an ambient air quality standard or emission-based threshold.

Diesel exhaust is the predominant cancer causing TAC in California. CARB estimates that about 70% of total known cancer risk related to air toxics in California is attributable to DPM¹. According to CARB, diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

¹ CAEB. *Summary: Diesel Particulate Matter Health Impacts*. https://www.arb.ca.gov/research/diesel/diesel-health_summ.htm

To address the issue of diesel emissions in the state, CARB developed the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles². In addition to requiring more stringent emission standards for new on-road and off-road mobile sources and stationary diesel-fueled engines to reduce particulate matter emissions by 90 percent, a significant component of the plan involves application of emission control strategies to existing diesel vehicles and equipment. Many of the measures of the Diesel Risk Reduction Plan have been approved and adopted, including the Federal on-road and non-road diesel engine emission standards for new engines, as well as adoption of regulations for low sulfur fuel in California.

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

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

Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) was identified as a TAC in 1986 by CARB. NOA is located in many parts of California and is commonly associated with ultramafic rocks. Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Ultramafic rocks form in high-temperature environments well below the surface of the earth. When exposed at the surface by geologic uplift and erosion, ultramafic rocks may be partially to completely altered into a type of rock called serpentinite. Sometimes the metamorphic conditions are right for the formation of chrysotile asbestos or tremolite-actinolite asbestos in the bodies of these rocks, along their boundaries, or in the soil. For individuals living in areas of NOA, there are many potential pathways for airborne exposure.

² California Air Resources Board. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October 2000.

Exposures to soil dust containing asbestos can occur under a variety of scenarios, including children playing in the dirt; dust raised from unpaved roads and driveways covered with crushed serpentine; grading and earth disturbance associated with construction activity; quarrying; gardening; and other human activities. For homes built on asbestos outcroppings, asbestos can be tracked into the home and can also enter as fibers suspended in the air. People exposed to low levels of asbestos may be at elevated risk (e.g., above background rates) of lung cancer and mesothelioma. The risk is proportional to the cumulative inhaled quantity of fibers, and also increases with the time since first exposure. Although there are a number of factors that influence the disease-causing potency of any given asbestos (such as fiber length and width, fiber type, and fiber chemistry), all forms are carcinogens.

Local Air Quality Policies and Regulations

Mendocino County General Plan Goals and Policies

The Mendocino County General Plan contains goals, policies, standards, and implementation programs pertinent to air quality. The following general plan policies regarding air quality are considered relevant to the proposed project:

- Policy RM-37: Public and private development shall not exceed Mendocino County Air Quality Management District emissions standards.
- Policy RM-38: The County shall work to reduce or mitigate particulate matter emissions resulting from development, including emissions from wood-burning devices.
- Policy RM-43: Reduce the effects of earth-moving, grading, clearing and construction activities on air quality.
- Policy RM-44: New development should be focused within and around community areas to reduce vehicle travel.
- Policy RM-45: Encourage the use of alternative fuels, energy sources and advanced technologies that result in fewer airborne pollutants.
- Policy RM-46: Reduce or eliminate exposure of persons, especially sensitive populations, to air toxics.
- Policy RM-47: Minimize the exposure of sensitive uses, such as residences, schools, day care, group homes or medical facilities to industrial uses, transportation facilities, or other sources of air toxics.

Mendocino County Air Quality Management District (MCAQMD) Regulations

The MCAQMD is responsible for permitting and inspection of stationary sources; enforcement of regulations, including setting fees, levying fines, and enforcement actions; and ensuring that public nuisances are minimized.

Regulation 4 *Particulate Matter Reduction Measures* would apply to construction of the project. This Regulation contains general limitations associated with air emission source operations including those relating to public nuisance, visible emissions, particulate matter emissions, and fugitive dust.

Rule 1-400(a) Public Nuisance – This is a general requirement that is applicable to odors, as well as other air contaminants. Specifically, the rule states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or that cause or have a natural tendency to cause injury or damage to business or property.

Rule 1-410 Visible Emissions – This applies to any source at the facility and limits visible emissions to no more than 20 percent opacity for more than a 3-minute period in any one hour.

Rule 1-420 Particulate Matter – This rule imposes particulate matter emission rate limitations and is applicable to combustion and non-combustion sources. Combustion sources do not include mobile sources. The proposed project will have both combustion and non-combustion sources that would be subject to these requirements.

Rule 1-430 Fugitive Dust Emissions – This rule requires that (a) all reasonable precautions be taken to prevent particulate matter from becoming airborne and (b) specifies airborne dust control measures that would be required. The project would be subject to these requirements.

In addition, there are other MCAQMD rules and regulations, not detailed here, which may apply to the proposed project but are administrative or descriptive in nature. These include rules associated with fees, enforcement and penalty actions, and variance procedures.

Existing Ambient Air Quality

Table 1 summarizes air quality data for monitoring stations in Ukiah. Data from 2016 are the most recent available. The data reported in Table 1 show that the ambient air quality standards for PM10 and PM2.5 were exceeded in 2015. These high levels were recorded in August and likely were the result of nearby wild fires³. All 3 days exceeding the standard occurred in August (the 15th to 17th). Ozone concentrations measured in Ukiah were below the ambient air quality standards. Carbon monoxide, nitrogen dioxide, sulphur dioxide, and lead are not measured in the county due to the lack of emission sources. These pollutants have been measured at very low levels in the past.

Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are

³ Note the Press Democrat article on August 15, 2015 at <http://www.pressdemocrat.com/news/4346832-181/northern-california-wildfires-blamed-for?artslide=0>

judged for each air pollutant, using the most recent three years of monitoring data. The Mendocino County as a whole does not meet State standards for PM₁₀, as designated by CARB⁴. The air basin and County is considered attainment or unclassified for all other air pollutants. Unclassified typically means the region does not have concentrations of that pollutant that exceed ambient air quality standards.

Sensitive Receptors

Sensitive receptors are people who are particularly susceptible to the adverse effects of air pollution. The CARB has identified the following people who are most likely to be affected by air pollution: children, the elderly, the acutely ill and the chronically ill, especially those with cardio-respiratory diseases. Residential areas are also considered sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. The closest sensitive receptors to the project site are residences to the south across Lovers Lane.

Table 1 Maximum Measured Air Pollutant Concentrations Closest to the Project Site

Table 1 Maximum Measured Air Pollutant Concentrations Closest to the Project Site							
Pollutant & Location		Averaging Period	Air Quality Standard		2014	2015	2016
			National	State			
Fine Particulate Matter (PM2.5)							
	24-Hour (µg/m³)	35	-	24	65	18	
	Annual (µg/m³)	15	12	6	6	7	
Ozone (O3)							
	1-Hour (ppm)	-	0.09	0.07	0.08	0.07	
	8-Hour (ppm)	0.075	0.070	0.057	0.061	0.051	

Notes: ppm = parts per million

µg/m³ = micrograms per cubic meter

Values reported in bold exceed ambient air quality standard

There are no stations measuring other pollutants (i.e., NO₂, CO, SO₂, or Lead).

Greenhouse Gas Emissions and Global Climate Change

Climate change is caused by greenhouse gases (GHGs) emitted into the atmosphere around the world from a variety of sources, including the combustion of fuel for energy and transportation, cement manufacturing, and refrigerant emissions. GHGs are those gases that have the ability to trap heat in the atmosphere, a process that is analogous to the way a greenhouse traps heat. GHGs may be emitted as a result of human activities, as well as through natural processes. GHGs have been accumulating in the earth's atmosphere at a faster rate than has occurred historically. Increasing GHG concentrations in the atmosphere are leading to global climate change.

Carbon dioxide (CO₂) is the most important anthropogenic GHG because it comprises the majority of total GHG emissions emitted per year and it is very long-lived in the atmosphere. Common

⁴ CARB. See <http://www.arb.ca.gov/desig/adm/adm.htm>, accessed August 24, 2016.

GHGs include carbon dioxide, methane, nitrous oxides, and halocarbons (a group of gases containing fluorine, chlorine, or bromine). Typically, when evaluating GHG emissions they are expressed as carbon dioxide equivalents, or CO₂e, which is a means of weighting the global warming potential (GWP) of the different gases relative to the global warming effect of CO₂, which has a GWP value of one. Other GHGs, such as methane and nitrous oxide which are commonly found in the atmosphere, but at much lower concentrations, have a GWP of 21 and 310, respectively. In the United States, CO₂ emissions account for about 85 percent of the CO₂e emissions, followed by methane at about eight percent and nitrous oxide at about five percent.

Federal Regulations

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC). In 2007, the USEPA identified CO₂ as an air pollutant as defined under the Clean Air Act, and that the USEPA has the authority to regulate emissions of GHGs. The USEPA has promulgated several GHG regulations, which for the most part, apply to larger facilities that emit large amounts of CO₂ or its equivalent in other regulated GHGs. These regulations include the Federal Mandatory Reporting of Greenhouse Gases (Mandatory Reporting Rule) and the Tailoring Rule. The Mandatory Reporting Rule, which requires reporting of CO₂ and other GHG emissions, applies to particular facility types. Land use projects are not identified as facilities that are subject to this rule.

State Regulations

In response to the increasing body of evidence that GHGs will continue to affect the global climate, the State has enacted key legislation and implemented regulations in an effort to reduce the State's contribution to climate change.

California Assembly Bill 1493 (Pavley), enacted on July 22, 2002, required the CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by the CARB will apply to 2009 and later model year vehicles. The CARB estimates that the regulation will reduce GHG emissions from light duty passenger vehicles in California by an estimated 18 percent in 2020 and by 27 percent in 2030.

In 2006, AB 32, the *California Global Warming Solutions Act of 2006* was adopted. AB 32 focuses on reducing GHG emissions in California. GHGs as defined under AB 32 include: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires the CARB to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020. CARB approved the Climate Change Scoping Plan (Scoping Plan) in December 2008. The Scoping Plan outlines actions to obtain the goal set out in AB 32 of reducing emissions to 1990 levels by 2020. The Scoping Plan “proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health”. Most of the measures in the Scoping Plan were in place by 2012. The Scoping Plan's recommendations for reducing greenhouse gas emissions to 1990 levels by 2020 provide for emission reduction measures, including a cap-and-trade program linked to Western Climate Initiative partner jurisdictions, green building strategies, recycling and waste-related measures, and Voluntary Early Actions and Reductions. CARB has also developed and

approved a 1990 State GHG emissions inventory of 427 million metric tons of carbon dioxide equivalent (MMTCO₂e) in December 2007. In 2020, GHG emissions in California are required to be at or below 427 MMTCO₂e.

In 2014, CARB approved the first update to the AB 32 Scoping Plan that was adopted in late 2008. The Update describes California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the initial Scoping Plan and identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. Furthermore, this update defines CARB's climate change priorities for the next five years, and also sets the groundwork to reach the long-term GHG reduction goals.

Executive Order S-01-07, enacted in 2007, mandated a Low Carbon Fuel Standard for transportation fuels sold in California.

California Senate Bill 375, adopted in 2008, requires: (1) metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Executive Order B-30-15, which was signed by the Governor in 2015, established a California GHG reduction target of 40 percent below 1990 levels by 2030. On September 8, 2016, the California legislature passed SB 32 which requires CARB to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by 2030. The bill noted that it would become operative only if AB 197 is enacted and becomes effective on or before January 1, 2017. AB 197 was enacted the same day.

Mendocino County General Plan Goals and Policies

Policy RM-50: Mendocino County acknowledges the real challenge of climate change and will implement existing strategies to reduce greenhouse gas emissions and incorporate future measures that the State adopts in the coming years.

Impact Assessment

Evaluation Criteria and Significance Thresholds

The project would cause a significant impact related to odor and air quality, as defined by the CEQA Guidelines (Appendix G), if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors);
4. Expose sensitive receptors to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

For GHG emissions, the project would have a significant effect if it would:

6. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment ; or
7. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Criteria Pollutant and GHG Significance Thresholds

The MCAQMD has identified significance thresholds for use in evaluating project impacts under CEQA⁵. The approach to MCAQMD thresholds for projects in Mendocino County is based on the Bay Area Air Quality Management District's (BAAQMD) Air Quality CEQA Guideline thresholds adopted in 2010. Significance thresholds used to evaluate air quality and GHG impacts from this project are described in Table 2. The District was contacted to confirm and clarify the thresholds and their application to this project, noting that the project includes both indirect sources and stationary sources. For criteria pollutants and GHGs, on-site emissions (direct emissions) are compared to the *Project/Stationary Source* emission thresholds, while emissions from off-site truck and other vehicle travel are compared against the *Indirect Source* thresholds. The thresholds identified for this project were confirmed with MCAQMD⁶.

⁵ MCAQMD. 2013. Advisory – District Interim CEQA Criteria and GHG Pollutant Thresholds. See http://www.co.mendocino.ca.us/aqmd/pdf_files/ceqa-criteria-and-ghg.pdf and http://www.co.mendocino.ca.us/aqmd/pdf_files/MCAQMDCEQARecomendations.pdf, accessed on August 24, 2016.

⁶ Barbara Moed, MCAQMD Air Pollution Control Officer. August 4, 2017 – telephone conversation with James Reyff, Illingworth & Rodkin, Inc.

Table 2 MCAQMD Significant Impact Thresholds

Criteria Pollutant and Precursors	Indirect Source	Project/Stationary Source
	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tons/year)
ROG	180	40
NO _x	42	40
PM ₁₀	82	15
PM _{2.5}	54	10
Fugitive Dust (PM ₁₀ /PM _{2.5})	same as above	
Local CO ^a	125 tons/year	
Greenhouse Gas Emissions	Projects Other than Stationary Sources	Stationary Sources
GHGs	1,100 MT of CO ₂ e/year OR 4.6 MT of CO ₂ e/Service Population/year ^b	10,000 MT of CO ₂ e/year

Notes: MT = metric tons, CO₂e = CO₂ equivalents

^a MCAQMD's indirect permitting rules allow 125 ton/year of CO.

^b Service population = number of new residents + workers.

Toxic Air Contaminant Significance Thresholds

The operation of any project with the potential to expose sensitive receptors to substantial levels of TACs would have a potentially significant impact. MCAQMD recommends that health effects be evaluated for proposed projects that emit TACs where sensitive receptors are within a 1,000-foot radius from the project boundary (Zone of Influence). The following MCAQMD-recommended CEQA thresholds should be considered to have a significant impact⁷.

- An increase in cancer risk of greater than 10.0 cases in a million people
- An increase in the exposure to non-carcinogenic TACs that would result in a Hazard Index (Chronic or Acute) of greater than 1.0

Non-cancer health risk is usually determined by comparing the predicted level of exposure to a chemical to the level of exposure that is not expected to cause any adverse effects (reference exposure level), even to the most susceptible people. This ratio of predicted exposure level to the reference exposure level is called the Hazard Index. This value represents the maximum concentration at which no adverse health effects to the respiratory system are anticipated to occur.

Impact: 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

⁷ MCAQMD. 2010. *Adopted Air Quality CEQA Thresholds of Significance – June 2, 2010*. See http://www.co.mendocino.ca.us/aqmd/pdf_files/MCAQMDCEQARecomendations.pdf, accessed on August 24, 2016.

ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

MBAQMD has established thresholds of significance for air pollutants. These thresholds are for ozone precursor pollutants (ROG and NO_x), PM₁₀ and PM_{2.5} and were applied to both construction period and operational period emissions.

Both construction and operational emissions were computed using the California Emissions Estimator Model, Version 2016.3.1 (CalEEMod). The land uses input were 91 “Single Family Housing” dwelling units, 20 “Condo/Townhouse” dwelling units and 32 “Apartments Low Rise” dwelling units on a 23.6-acre site.

Construction Period Emissions

Under a worst-case condition where construction is assumed to occur all at once, construction would begin in mid-2018 and be completed in early 2020, a total of 20 months or 550 workdays. This schedule assumed that the entire project was constructed all at once in 5 phases: Demolition, Site Preparation, Grading, Exterior Building Construction, Paving, and Interior Building Construction. The CalEEMod default construction schedule of 455 days was assumed. Equipment type, quantity, number of days in use, average hours of use per day (of use) were based on CalEEMod default assumptions.

Construction worker and vendor travel is based on the CalEEMod default values, which assign a daily rate for each phase. CalEEMod also computes the number of haul trips that are based on the amount of soil material to be imported or exported from the site. Since this is anticipated to be a balanced or nearly balanced site, no soil haul truck trips were included in the modeling. Note that since this is residential development in a built out area, there would be very little unpaved roadway travel for workers and vendors. The inputs to CalEEMod were adjusted to represent 100 percent travel on paved roadways.

CalEEMod provided construction emissions in tons per year. Average daily emissions were based on a construction start date of January 2018 and an anticipated construction completion date in 2019, or 455 days. Total construction emissions from full build out of the project are shown in *Table 2*.

Table 2. Vineyard Crossing Construction Period Emissions

Description	ROG Emissions	NO_x Emissions	PM10 Emissions	PM2.5 Exhaust Emissions
Project Construction	4.11 tons	6.00 tons	0.69 tons	0.45 tons
Daily Project Emissions -	18 lbs/day	26 lbs/day	3 lbs/day	2 lbs/day
<i>BAAQMD Thresholds</i>	<i>180 lbs/day</i>	<i>42lbs/day</i>	<i>82lbs/day</i>	<i>54lbs/day</i>
<i>Significant?</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>

Note: Average daily emissions were computed by dividing total construction emissions by the number of workdays. Based on the CalEEMod construction schedule, this would be 455 construction days.

Construction Fugitive Dust

During grading and construction activities, dust would be generated. Most of the dust would result during grading activities. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed at any given time, amount of activity, soil conditions and meteorological conditions. Nearby areas could be adversely affected by dust generated during construction activities. According to maps provided by MCAQMD, the project site is not in an area identified as possibly containing naturally occurring asbestos; therefore, no additional dust control measures or special permits would be required during project grading activities⁸. The Project would be subject to requirements of MCAQMD Regulation 1, Rule 1-430. Projects requiring grading of more than 1 acre, such as this project, will require an application for a Large Grading Operation Permit from the District in accordance with District Regulation 1, Rule 1-200. This impact is considered less-than-significant with implementation with activities carried out in conformance with MCAQMD rules and regulations and implementation of *Mitigation Measures AQ-1* to ensure dust emissions are properly controlled.

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

During any construction period ground disturbance, the applicant shall ensure that the project contractor implement measures to control dust and exhaust. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

⁸ MCAQMD. 2013. Maps – Areas that may contain Naturally Occurring Asbestos in the Ukiah Valley. Accessed August 4, 2017. See <http://www.co.mendocino.ca.us/aqmd/natural-occurring-asbestos.html>

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Effectiveness of Mitigation Measure AQ-1: Implementation of the measures listed above combined with district required measures would reduce emissions by about 80 percent.

Operational Emissions

CalEEMod provided emissions for operation that primarily includes traffic and energy usage (i.e., natural gas usage). Some adjustments to the model were made to represent this particular project:

1. Trip generation rates used in the traffic analysis were used for each different type of residential land use. Trip lengths for non-commute trips were adjusted to 2 miles per trip based on the Statewide model for northern Ukiah that uses a vehicle miles travelled estimate of 9.79 miles per household. This trip distance reflects the relatively short distances residents would travel for goods and services in Ukiah. CalEEMod model default trip types were used.
2. Vehicle Fleet Mix assumed by CalEEMod was modified to be more representative of residential land uses. The default trip generation assigned by CalEEMod is reflective of all travel in Mendocino County and includes a relatively high percentage of truck traffic (i.e., 13.7 percent heavy-duty trucks). The fleet mix was adjusted to reflect that of a more urban fleet mix. The default vehicle mix for the Bay Area air basin was used to be reflective of a residential development. This fleet mix is comprised of 6.5% heavy-duty trucks. The adjustment of the vehicle mix was discussed with MCAQMD⁹.
3. The CalEEMod default assumptions for wood burning was adjusted to reflect that there would be no woodstoves and all fireplaces would be natural gas-fired (i.e., the number of new wood fireplaces was set to 0 and the number of natural gas fireplaces was adjusted upwards based on the model default for wood fireplaces).

Table 3 provides a summary of the operational emissions. Since the site is undeveloped, there are no existing emissions from the project site. Therefore, the modeled emissions shown in *Table 3* represent net-new emissions caused by the project. Total daily and annual emissions from operation of the project would not exceed any of the significance thresholds. The impact is considered a *less than significant*.

⁹ Barbara Moed, MCAQMD Air Pollution Control Officer. August 4, 2017 – email to James Reyff, Illingworth & Rodkin, Inc.

Table 3. Vineyard Crossing Operation Period Emissions

Description	ROG Emissions	NOx Emissions	PM10 Exhaust Emissions	PM2.5 Exhaust Emissions
Project Build Out	1.80 tons/yr.	2.15 tons/yr.	0.84 tons/yr.	0.25 tons/yr.
Average Daily Emissions	10 lbs/day	12 lbs/day	5 lbs/day	1 lbs/day
<i>MCQMD Thresholds</i>	<i>180lbs/day</i>	<i>42lbs/day</i>	<i>82lbs/day</i>	<i>54lbs/day</i>
<i>Significant?</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>

Note: Average daily emissions assume 365 days operation per year.

Impact: Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

As described above, emissions of air pollutants or their precursors associated with the project were computed and compared to relevant significance thresholds. These include precursors to ozone, carbon monoxide (or CO) and particulate matter in the form of PM10 and PM2.5. Emissions of these pollutants or precursors that would exceed the thresholds are considered to contribute substantially to an existing or projected air quality violation.

As described above, emissions of ozone precursors, CO and particulate matter would not exceed the significance thresholds. Increased intersection congestion can lead to increased localized CO concentrations (hot spots) in the vicinity of the intersection. Typically there needs to be a substantial increase in the number of vehicles accessing an intersection and a decrease in the intersection level of service (LOS) in order for there to be elevated CO concentrations of concern. The project would not cause or contribute to CO exceedances since the traffic at affected intersections would be well below the BAAQMD screening criteria. Note that the North Coast Air Basin, as a whole, is considered attainment for CO and has not recorded an exceedance of a standard.

Since the project would have emissions that do not exceed the significance thresholds and traffic would not cause or contribute to exceedances of the CO ambient air quality standards, this impact is considered *less than significant*.

Impact: Expose sensitive receptors to substantial pollutant concentrations from construction activities?

The proposed project would be a temporary source of air pollutant and TAC emissions during construction. The project would be subject to MCAQMD rules and regulations pertaining to construction and construction contractors would be subject to CARB requirements regarding emissions from construction fleets. All off-road vehicles used for the construction, regardless of time spent on site, must be registered with CARB and portable diesel powered equipment that is 50 horsepower or greater used during the construction must be either registered with the CARB Portable Equipment Registration Program (PERP). These measures are meant to reduce PM2.5 (and TAC) emissions associated with diesel exhaust. Based on discussions with MCAQMD staff,

application of CARB-regulated construction fleets, application of MCAQMD requirements for grading would be sufficient to avoid significant temporary exposures to TACs and particulate matter. The District does not require health risk assessments of construction activity for land use projects¹⁰. Compliance with District and CARB requirements, along with implementation of Mitigation Measure AQ-1 is expected to result in less than significant emissions.

GHG EMISSIONS

GHG emissions associated with the project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust and worker and vendor trips. There would also be long-term operational emissions associated with vehicular traffic within the project vicinity, energy and water usage, and solid waste disposal. Emissions for the proposed project were predicted using the methodology recommended in the BAAQMD CEQA Air Quality Guidelines that MCAQMD recommends.¹¹

CalEEMod Modeling

The CalEEMod model (version 2016.3.1) was used to predict air pollutant emissions associated with the project, as described under *Air Quality Impact 1*. The CalEEMod modeling is described in the discussion associated with *Impact 1*.

Indirect Emissions from Electricity

For GHG emissions, CalEEMod predicts emissions associated with electricity usage that are based on the expected electricity consumption of the new residences combined with the anticipated emissions rate reported for the utility company providing the electricity.

CalEEMod predicts electricity consumption, which are assumed to include 2013 Title 24 Building Standards. The model mitigation scenario adjusts the rate downward to account for new 2016 Title 24 Building Standards that are not incorporated into the model. These are assumed to reduce Title 24 energy demand by 28 percent. In addition, the project would include high efficiency lighting and energy efficient appliances.

Pacific Gas and Electric (PG&E) is the utility provider for electricity and natural gas. The CalEEMod model has a default rate of 641.3 pounds of CO₂ per megawatt of electricity produced, which is based on PG&E's 2008 emissions rate. The latest certified PG&E rate is 435 pounds of CO₂ per megawatt of electricity produced for the year 2014. The PG&E rate was updated to be the 2020 rate predicted PG&E, which is 290 pounds of CO₂ per megawatt of electricity produced.¹²

¹⁰ Barbara Moed, MCAQMD Air Pollution Control Officer. August 4, 2017 – email to James Reyff, Illingworth & Rodkin, Inc.

¹¹ BAAQMD, 2011. *Op cit*. BAAQMD updated these guidelines in May 2017 and these can be found at this website: http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, Accessed on August 11, 2017.

¹² See PG&E emissions factors

https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf. Accessed: May 17, 2016.

Water and Wastewater

The CalEEMod default rates were used for water consumption. The project is anticipated to provide low-flow water fixtures, drought-tolerant landscape and drip irrigation systems. Water consumption is anticipated to be 20-percent below the State default rate assumed by CalEEMod.

Solid Waste

The CalEEMod default rates were used for residential solid waste production. The project is anticipated to be subject to local recycling programs that would reduce waste. Solid waste generation is anticipated to be 20-percent below the State default rate assumed by CalEEMod.

Service Population

This study evaluates the GHG emissions based on annual operational emissions per service population. For this project, the service population is the number of new residents. The proposed project would construct a total of 143 new residences. According to the latest U.S. Census data, Ukiah has an average of 2.53 persons per household¹³. This equates to a population of 362 new residents, which was used as the Service Population.

Construction Emissions

GHG emissions associated with construction of the maximum land uses under rezoning were computed to range from about 300 to 400 metric tons of CO₂e per year under the modeled construction scenario. The total construction period emissions were computed as 756 metric tons. These are the emissions from on-site operation of construction equipment, vendor and hauling truck trips, and worker trips. Neither the City nor MCAQMD have an adopted threshold of significance for construction-related GHG. Best management practices assumed to be incorporated into construction of the proposed rezoning project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Emissions

Following construction, emissions would occur on a nearly continuous basis as the project operates through traffic generation, energy usage, water usage and waste generation. The CalEEMod model was used to predict annual emissions associated with operation of the fully-developed project. The operational emissions were assumed to be at the highest levels in 2020 with the full build-out and occupancy of the project¹⁴. *Table 4* reports the annual emissions resulting from operation of the project.

¹³ US Census data for Ukiah, CA Persons per household, 2011-2015

<https://www.census.gov/quickfacts/fact/table/ukiahcitycalifornia/PST045216>, accessed July 20, 2017.

¹⁴ Note that the provided construction schedule indicates that the project would not be completed until mid-2021.

Table 4 Annual Project GHG Emissions (CO₂e) in Metric Tons

Source Category	2020 Emissions
Area	75
Energy Consumption	217
Mobile	949
Solid Waste Generation	63
Water Usage	18
Total Emissions	1,322
Per Capita Emissions*	3.65 MT CO ₂ e/year/capita
<i>MCAQMD Threshold</i>	<i>1,100 MT of CO₂e/year OR 4.6 MT of CO₂e per year per capita</i>
<i>Significant?</i>	<i>No</i>
* Based on 362 new residents.	

Attachment: CalEEMod Output

Vineyard Crossing, Criteria and Operational emissions - Mendocino-Inland County, Annual

Vineyard Crossing, Criteria and Operational emissions Mendocino-Inland County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	32.00	Dwelling Unit	0.00	32,000.00	81
Condo/Townhouse	20.00	Dwelling Unit	0.00	20,000.00	51
Single Family Housing	91.00	Dwelling Unit	23.50	163,800.00	230

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	86
Climate Zone	1	Operational Year	2020		
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - PG&E rate for 2020

Land Use - Acreage from the project description traffic from 6/21/2017 email

Construction Phase - Default Construction Schedule (added trenching) with no demolition

Off-road Equipment -

Off-road Equipment - Architectural coating might use aerial lifts

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Default vendor and worker trips

On-road Fugitive Dust - all off-site travel on paved roads

Demolition -

Grading -

Vehicle Trips - Default trip generation rates. Adjusted trip length for VMT per household of 9.79 miles but adjusted upward to 2 miles/trip for all non work

Road Dust - all on-road travel (100% Paved)

Woodstoves - No woodstoves or wood fireplaces per Regulation 4

Energy Use - default

Construction Off-road Equipment Mitigation -

Energy Mitigation - Energy efficient homes per 2016 Title 24

Water Mitigation - water efficiency

Waste Mitigation - Waste diversion

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblFireplaces	FireplaceWoodMass	4,992.00	0.00
tblFireplaces	FireplaceWoodMass	4,992.00	0.00
tblFireplaces	FireplaceWoodMass	4,992.00	0.00
tblFireplaces	NumberGas	1.60	3.00
tblFireplaces	NumberGas	1.00	2.00
tblFireplaces	NumberGas	27.30	60.00

tblFireplaces	NumberWood	1.60	0.00
tblFireplaces	NumberWood	1.00	0.00
tblFireplaces	NumberWood	31.85	0.00
tblFleetMix	HHD	0.07	0.02
tblFleetMix	HHD	0.07	0.02
tblFleetMix	HHD	0.07	0.02
tblFleetMix	LDA	0.47	0.57
tblFleetMix	LDA	0.47	0.57
tblFleetMix	LDA	0.47	0.57
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT2	0.19	0.19
tblFleetMix	LDT2	0.19	0.19
tblFleetMix	LDT2	0.19	0.19
tblFleetMix	LHD1	0.04	0.02
tblFleetMix	LHD1	0.04	0.02
tblFleetMix	LHD1	0.04	0.02
tblFleetMix	LHD2	7.0690e-003	5.3710e-003
tblFleetMix	LHD2	7.0690e-003	5.3710e-003
tblFleetMix	LHD2	7.0690e-003	5.3710e-003
tblFleetMix	MCY	5.6160e-003	5.9420e-003
tblFleetMix	MCY	5.6160e-003	5.9420e-003
tblFleetMix	MCY	5.6160e-003	5.9420e-003
tblFleetMix	MDV	0.14	0.11
tblFleetMix	MDV	0.14	0.11
tblFleetMix	MDV	0.14	0.11
tblFleetMix	MH	1.2270e-003	8.1200e-004
tblFleetMix	MH	1.2270e-003	8.1200e-004
tblFleetMix	MH	1.2270e-003	8.1200e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	1.5310e-003	2.5450e-003
tblFleetMix	OBUS	1.5310e-003	2.5450e-003
tblFleetMix	OBUS	1.5310e-003	2.5450e-003
tblFleetMix	SBUS	1.1240e-003	8.7700e-004
tblFleetMix	SBUS	1.1240e-003	8.7700e-004
tblFleetMix	SBUS	1.1240e-003	8.7700e-004
tblFleetMix	UBUS	1.4440e-003	2.4420e-003
tblFleetMix	UBUS	1.4440e-003	2.4420e-003
tblFleetMix	UBUS	1.4440e-003	2.4420e-003
tblLandUse	LotAcreage	2.00	0.00
tblLandUse	LotAcreage	1.25	0.00
tblLandUse	LotAcreage	29.55	23.50
tblLandUse	Population	92.00	81.00
tblLandUse	Population	57.00	51.00
tblLandUse	Population	260.00	230.00
tblOnRoadDust	HaulingPercentPave	80.00	100.00
tblOnRoadDust	HaulingPercentPave	80.00	100.00
tblOnRoadDust	HaulingPercentPave	80.00	100.00

tblOnRoadDust	HaulingPercentPave	80.00	100.00
tblOnRoadDust	HaulingPercentPave	80.00	100.00
tblOnRoadDust	VendorPercentPave	80.00	100.00
tblOnRoadDust	VendorPercentPave	80.00	100.00
tblOnRoadDust	VendorPercentPave	80.00	100.00
tblOnRoadDust	VendorPercentPave	80.00	100.00
tblOnRoadDust	VendorPercentPave	80.00	100.00
tblOnRoadDust	WorkerPercentPave	80.00	100.00
tblOnRoadDust	WorkerPercentPave	80.00	100.00
tblOnRoadDust	WorkerPercentPave	80.00	100.00
tblOnRoadDust	WorkerPercentPave	80.00	100.00
tblOnRoadDust	WorkerPercentPave	80.00	100.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblProjectCharacteristics	OperationalYear	2018	2020
tblRoadDust	RoadPercentPave	80	100
tblVehicleTrips	HO_TL	7.50	2.00
tblVehicleTrips	HO_TL	7.50	2.00
tblVehicleTrips	HO_TL	7.50	2.00
tblVehicleTrips	HS_TL	7.30	2.00
tblVehicleTrips	HS_TL	7.30	2.00
tblVehicleTrips	HS_TL	7.30	2.00
tblWoodstoves	WoodstoveWoodMass	4,896.00	0.00
tblWoodstoves	WoodstoveWoodMass	4,896.00	0.00
tblWoodstoves	WoodstoveWoodMass	4,896.00	0.00

2.0 Emissions Summary

2.1 Overall Construction Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.3602	3.1384	2.4218	3.9200e-003	0.2909	0.1669	0.4578	0.1257	0.1557	0.2815	0.0000	353.0003	353.0003	0.0825	0.0000	355.0619
2019	2.3975	2.8876	2.7622	4.4900e-003	0.0754	0.1597	0.2352	0.0204	0.1501	0.1704	0.0000	397.7533	397.7533	0.0796	0.0000	399.7426
2020	1.3518	7.1400e-003	0.0108	2.0000e-005	4.4000e-004	4.5000e-004	8.8000e-004	1.2000e-004	4.5000e-004	5.6000e-004	0.0000	1.4180	1.4180	1.1000e-004	0.0000	1.4207
Maximum	2.3975	3.1384	2.7622	4.4900e-003	0.2909	0.1669	0.4578	0.1257	0.1557	0.2815	0.0000	397.7533	397.7533	0.0825	0.0000	399.7426

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.3602	3.1384	2.4218	3.9200e-003	0.2909	0.1669	0.4578	0.1257	0.1557	0.2815	0.0000	353.0000	353.0000	0.0825	0.0000	355.0616
2019	2.3975	2.8876	2.7622	4.4900e-003	0.0754	0.1597	0.2352	0.0204	0.1501	0.1704	0.0000	397.7529	397.7529	0.0796	0.0000	399.7422
2020	1.3518	7.1400e-003	0.0108	2.0000e-005	4.4000e-004	4.5000e-004	8.8000e-004	1.2000e-004	4.5000e-004	5.6000e-004	0.0000	1.4180	1.4180	1.1000e-004	0.0000	1.4207

Maximum	2.3975	3.1384	2.7622	4.4900e-003	0.2909	0.1669	0.4578	0.1257	0.1557	0.2815	0.0000	397.7529	397.7529	0.0825	0.0000	399.7422
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-14-2018	7-13-2018	1.6981	1.6981
2	7-14-2018	10-13-2018	0.9745	0.9745
3	10-14-2018	1-13-2019	0.9692	0.9692
4	1-14-2019	4-13-2019	0.8674	0.8674
5	4-14-2019	7-13-2019	0.8698	0.8698
6	7-14-2019	10-13-2019	0.8806	0.8806
7	10-14-2019	1-13-2020	3.8870	3.8870
		Highest	3.8870	3.8870

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.2202	0.0752	1.0921	4.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	74.5781	74.5781	3.0900e-003	1.3400e-003	75.0533
Energy	0.0106	0.0903	0.0384	5.8000e-004		7.3000e-003	7.3000e-003		7.3000e-003	7.3000e-003	0.0000	254.1080	254.1080	0.0170	5.0100e-003	256.0253
Mobile	0.5680	1.9801	5.9734	0.0104	0.8026	0.0147	0.8173	0.2154	0.0139	0.2293	0.0000	946.9714	946.9714	0.0604	0.0000	948.4806
Waste						0.0000	0.0000		0.0000	0.0000	25.3982	0.0000	25.3982	1.5010	0.0000	62.9230
Water						0.0000	0.0000		0.0000	0.0000	2.9559	9.3359	12.2917	0.3045	7.3600e-003	22.0987
Total	1.7988	2.1456	7.1039	0.0115	0.8026	0.0330	0.8356	0.2154	0.0321	0.2476	28.3541	1,284.9933	1,313.3474	1.8859	0.0137	1,364.5809

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.2202	0.0752	1.0921	4.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	74.5781	74.5781	3.0900e-003	1.3400e-003	75.0533
Energy	7.9500e-003	0.0679	0.0289	4.3000e-004		5.4900e-003	5.4900e-003		5.4900e-003	5.4900e-003	0.0000	215.8330	215.8330	0.0152	4.2800e-003	217.4891
Mobile	0.5680	1.9801	5.9734	0.0104	0.8026	0.0147	0.8173	0.2154	0.0139	0.2293	0.0000	946.9714	946.9714	0.0604	0.0000	948.4806
Waste						0.0000	0.0000		0.0000	0.0000	25.3982	0.0000	25.3982	1.5010	0.0000	62.9230
Water						0.0000	0.0000		0.0000	0.0000	2.3647	7.8446	10.2093	0.2437	5.9000e-003	18.0581
Total	1.7962	2.1233	7.0944	0.0113	0.8026	0.0312	0.8337	0.2154	0.0303	0.2458	27.7629	1,245.2271	1,272.9900	1.8233	0.0115	1,322.0041

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.15	1.04	0.13	1.31	0.00	5.49	0.22	0.00	5.64	0.73	2.08	3.09	3.07	3.32	15.97	3.12

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/14/2018	4/27/2018	5	10	
2	Grading	Grading	4/28/2018	6/15/2018	5	35	
3	Building Construction	Building Construction	6/16/2018	11/15/2019	5	370	
4	Paving	Paving	11/16/2019	12/13/2019	5	20	
5	Architectural Coating	Architectural Coating	12/14/2019	1/10/2020	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 436,995; Residential Outdoor: 145,665; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	70.00	15.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0228	0.2410	0.1124	1.9000e-004		0.0129	0.0129		0.0119	0.0119	0.0000	17.3800	17.3800	5.4100e-003	0.0000	17.5152
Total	0.0228	0.2410	0.1124	1.9000e-004	0.0903	0.0129	0.1032	0.0497	0.0119	0.0615	0.0000	17.3800	17.3800	5.4100e-003	0.0000	17.5152

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.4000e-004	7.9000e-004	6.6600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6706	0.6706	6.0000e-005	0.0000	0.6720
Total	8.4000e-004	7.9000e-004	6.6600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6706	0.6706	6.0000e-005	0.0000	0.6720

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0228	0.2410	0.1124	1.9000e-004		0.0129	0.0129		0.0119	0.0119	0.0000	17.3799	17.3799	5.4100e-003	0.0000	17.5152
Total	0.0228	0.2410	0.1124	1.9000e-004	0.0903	0.0129	0.1032	0.0497	0.0119	0.0615	0.0000	17.3799	17.3799	5.4100e-003	0.0000	17.5152

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.4000e-004	7.9000e-004	6.6600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6706	0.6706	6.0000e-005	0.0000	0.6720
Total	8.4000e-004	7.9000e-004	6.6600e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6706	0.6706	6.0000e-005	0.0000	0.6720

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Fugitive Dust					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0891	1.0416	0.6141	1.0900e-003		0.0461	0.0461		0.0424	0.0424	0.0000	99.1349	99.1349	0.0309	0.0000	99.9064
Total	0.0891	1.0416	0.6141	1.0900e-003	0.1518	0.0461	0.1979	0.0629	0.0424	0.1053	0.0000	99.1349	99.1349	0.0309	0.0000	99.9064

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2800e-003	3.0600e-003	0.0259	3.0000e-005	2.7300e-003	3.0000e-005	2.7600e-003	7.3000e-004	3.0000e-005	7.6000e-004	0.0000	2.6079	2.6079	2.2000e-004	0.0000	2.6134
Total	3.2800e-003	3.0600e-003	0.0259	3.0000e-005	2.7300e-003	3.0000e-005	2.7600e-003	7.3000e-004	3.0000e-005	7.6000e-004	0.0000	2.6079	2.6079	2.2000e-004	0.0000	2.6134

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0891	1.0416	0.6141	1.0900e-003		0.0461	0.0461		0.0424	0.0424	0.0000	99.1348	99.1348	0.0309	0.0000	99.9063
Total	0.0891	1.0416	0.6141	1.0900e-003	0.1518	0.0461	0.1979	0.0629	0.0424	0.1053	0.0000	99.1348	99.1348	0.0309	0.0000	99.9063

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2800e-003	3.0600e-003	0.0259	3.0000e-005	2.7300e-003	3.0000e-005	2.7600e-003	7.3000e-004	3.0000e-005	7.6000e-004	0.0000	2.6079	2.6079	2.2000e-004	0.0000	2.6134
Total	3.2800e-003	3.0600e-003	0.0259	3.0000e-005	2.7300e-003	3.0000e-005	2.7600e-003	7.3000e-004	3.0000e-005	7.6000e-004	0.0000	2.6079	2.6079	2.2000e-004	0.0000	2.6134

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Off-Road	0.1889	1.6490	1.2394	1.9000e-003		0.1057	0.1057		0.0994	0.0994	0.0000	167.6259	167.6259	0.0411	0.0000	168.6526
Total	0.1889	1.6490	1.2394	1.9000e-003		0.1057	0.1057		0.0994	0.0994	0.0000	167.6259	167.6259	0.0411	0.0000	168.6526

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.1100e-003	0.1598	0.0584	3.0000e-004	6.8600e-003	1.7200e-003	8.5800e-003	1.9900e-003	1.6500e-003	3.6300e-003	0.0000	28.8102	28.8102	1.7100e-003	0.0000	28.8529
Worker	0.0462	0.0432	0.3650	4.1000e-004	0.0385	4.4000e-004	0.0389	0.0102	4.0000e-004	0.0107	0.0000	36.7709	36.7709	3.1400e-003	0.0000	36.8494
Total	0.0553	0.2029	0.4234	7.1000e-004	0.0453	2.1600e-003	0.0475	0.0122	2.0500e-003	0.0143	0.0000	65.5811	65.5811	4.8500e-003	0.0000	65.7022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1889	1.6490	1.2394	1.9000e-003		0.1057	0.1057		0.0994	0.0994	0.0000	167.6257	167.6257	0.0411	0.0000	168.6524
Total	0.1889	1.6490	1.2394	1.9000e-003		0.1057	0.1057		0.0994	0.0994	0.0000	167.6257	167.6257	0.0411	0.0000	168.6524

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.1100e-003	0.1598	0.0584	3.0000e-004	6.8600e-003	1.7200e-003	8.5800e-003	1.9900e-003	1.6500e-003	3.6300e-003	0.0000	28.8102	28.8102	1.7100e-003	0.0000	28.8529
Worker	0.0462	0.0432	0.3650	4.1000e-004	0.0385	4.4000e-004	0.0389	0.0102	4.0000e-004	0.0107	0.0000	36.7709	36.7709	3.1400e-003	0.0000	36.8494
Total	0.0553	0.2029	0.4234	7.1000e-004	0.0453	2.1600e-003	0.0475	0.0122	2.0500e-003	0.0143	0.0000	65.5811	65.5811	4.8500e-003	0.0000	65.7022

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Off-Road	0.2704	2.4135	1.9653	3.0800e-003		0.1477	0.1477		0.1389	0.1389	0.0000	269.1943	269.1943	0.0656	0.0000	270.8338
Total	0.2704	2.4135	1.9653	3.0800e-003		0.1477	0.1477		0.1389	0.1389	0.0000	269.1943	269.1943	0.0656	0.0000	270.8338

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0129	0.2451	0.0834	4.9000e-004	0.0111	2.3200e-003	0.0135	3.2300e-003	2.2200e-003	5.4500e-003	0.0000	46.5729	46.5729	2.6000e-003	0.0000	46.6378
Worker	0.0705	0.0637	0.5401	6.5000e-004	0.0625	6.7000e-004	0.0631	0.0166	6.2000e-004	0.0173	0.0000	58.2775	58.2775	4.6500e-003	0.0000	58.3938
Total	0.0834	0.3088	0.6235	1.1400e-003	0.0736	2.9900e-003	0.0766	0.0199	2.8400e-003	0.0227	0.0000	104.8504	104.8504	7.2500e-003	0.0000	105.0317

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2704	2.4135	1.9653	3.0800e-003		0.1477	0.1477		0.1389	0.1389	0.0000	269.1940	269.1940	0.0656	0.0000	270.8334
Total	0.2704	2.4135	1.9653	3.0800e-003		0.1477	0.1477		0.1389	0.1389	0.0000	269.1940	269.1940	0.0656	0.0000	270.8334

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0129	0.2451	0.0834	4.9000e-004	0.0111	2.3200e-003	0.0135	3.2300e-003	2.2200e-003	5.4500e-003	0.0000	46.5729	46.5729	2.6000e-003	0.0000	46.6378
Worker	0.0705	0.0637	0.5401	6.5000e-004	0.0625	6.7000e-004	0.0631	0.0166	6.2000e-004	0.0173	0.0000	58.2775	58.2775	4.6500e-003	0.0000	58.3938
Total	0.0834	0.3088	0.6235	1.1400e-003	0.0736	2.9900e-003	0.0766	0.0199	2.8400e-003	0.0227	0.0000	104.8504	104.8504	7.2500e-003	0.0000	105.0317

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Off-Road	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3200e-003	1.1900e-003	0.0101	1.0000e-005	1.1700e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0907	1.0907	9.0000e-005	0.0000	1.0928
Total	1.3200e-003	1.1900e-003	0.0101	1.0000e-005	1.1700e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0907	1.0907	9.0000e-005	0.0000	1.0928

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0145	0.1524	0.1467	2.3000e-004		8.2500e-003	8.2500e-003		7.5900e-003	7.5900e-003	0.0000	20.4752	20.4752	6.4800e-003	0.0000	20.6371

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3200e-003	1.1900e-003	0.0101	1.0000e-005	1.1700e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0907	1.0907	9.0000e-005	0.0000	1.0928
Total	1.3200e-003	1.1900e-003	0.0101	1.0000e-005	1.1700e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0907	1.0907	9.0000e-005	0.0000	1.0928

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Archit. Coating	2.0255					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6000e-003	0.0110	0.0111	2.0000e-005		7.7000e-004	7.7000e-004		7.7000e-004	7.7000e-004	0.0000	1.5320	1.5320	1.3000e-004	0.0000	1.5352
Total	2.0271	0.0110	0.0111	2.0000e-005		7.7000e-004	7.7000e-004		7.7000e-004	7.7000e-004	0.0000	1.5320	1.5320	1.3000e-004	0.0000	1.5352

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4000e-004	6.7000e-004	5.6600e-003	1.0000e-005	6.5000e-004	1.0000e-005	6.6000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.6108	0.6108	5.0000e-005	0.0000	0.6120
Total	7.4000e-004	6.7000e-004	5.6600e-003	1.0000e-005	6.5000e-004	1.0000e-005	6.6000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.6108	0.6108	5.0000e-005	0.0000	0.6120

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.0255					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6000e-003	0.0110	0.0111	2.0000e-005		7.7000e-004	7.7000e-004		7.7000e-004	7.7000e-004	0.0000	1.5320	1.5320	1.3000e-004	0.0000	1.5352
Total	2.0271	0.0110	0.0111	2.0000e-005		7.7000e-004	7.7000e-004		7.7000e-004	7.7000e-004	0.0000	1.5320	1.5320	1.3000e-004	0.0000	1.5352

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4000e-004	6.7000e-004	5.6600e-003	1.0000e-005	6.5000e-004	1.0000e-005	6.6000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.6108	0.6108	5.0000e-005	0.0000	0.6120
Total	7.4000e-004	6.7000e-004	5.6600e-003	1.0000e-005	6.5000e-004	1.0000e-005	6.6000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.6108	0.6108	5.0000e-005	0.0000	0.6120

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Archit. Coating	1.3503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7000e-004	6.7400e-003	7.3300e-003	1.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	1.0213	1.0213	8.0000e-005	0.0000	1.0233
Total	1.3513	6.7400e-003	7.3300e-003	1.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	1.0213	1.0213	8.0000e-005	0.0000	1.0233

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	4.1000e-004	3.4500e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3967	0.3967	3.0000e-005	0.0000	0.3974
Total	4.7000e-004	4.1000e-004	3.4500e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3967	0.3967	3.0000e-005	0.0000	0.3974

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.3503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7000e-004	6.7400e-003	7.3300e-003	1.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	1.0213	1.0213	8.0000e-005	0.0000	1.0233
Total	1.3513	6.7400e-003	7.3300e-003	1.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	1.0213	1.0213	8.0000e-005	0.0000	1.0233

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	4.1000e-004	3.4500e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3967	0.3967	3.0000e-005	0.0000	0.3974
Total	4.7000e-004	4.1000e-004	3.4500e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3967	0.3967	3.0000e-005	0.0000	0.3974

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5680	1.9801	5.9734	0.0104	0.8026	0.0147	0.8173	0.2154	0.0139	0.2293	0.0000	946.9714	946.9714	0.0604	0.0000	948.4806
Unmitigated	0.5680	1.9801	5.9734	0.0104	0.8026	0.0147	0.8173	0.2154	0.0139	0.2293	0.0000	946.9714	946.9714	0.0604	0.0000	948.4806

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	210.88	229.12	194.24	390,490	390,490
Condo/Townhouse	116.20	113.40	96.80	209,070	209,070
Single Family Housing	866.32	901.81	784.42	1,590,180	1,590,180
Total	1,193.40	1,244.33	1,075.46	2,189,741	2,189,741

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	2.00	2.00	42.30	19.60	38.10	86	11	3
Condo/Townhouse	10.80	2.00	2.00	42.30	19.60	38.10	86	11	3
Single Family Housing	10.80	2.00	2.00	42.30	19.60	38.10	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.573139	0.040894	0.193976	0.114604	0.017740	0.005371	0.017133	0.024527	0.002545	0.002442	0.005942	0.000877	0.000812
Condo/Townhouse	0.573139	0.040894	0.193976	0.114604	0.017740	0.005371	0.017133	0.024527	0.002545	0.002442	0.005942	0.000877	0.000812
Single Family Housing	0.573139	0.040894	0.193976	0.114604	0.017740	0.005371	0.017133	0.024527	0.002545	0.002442	0.005942	0.000877	0.000812

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	137.1611	137.1611	0.0137	2.8400e-003	138.3497
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	149.5866	149.5866	0.0150	3.0900e-003	150.8829
NaturalGas Mitigated	7.9500e-003	0.0679	0.0289	4.3000e-004		5.4900e-003	5.4900e-003		5.4900e-003	5.4900e-003	0.0000	78.6719	78.6719	1.5100e-003	1.4400e-003	79.1395
NaturalGas Unmitigated	0.0106	0.0903	0.0384	5.8000e-004		7.3000e-003	7.3000e-003		7.3000e-003	7.3000e-003	0.0000	104.5214	104.5214	2.0000e-003	1.9200e-003	105.1425

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	476015	2.5700e-003	0.0219	9.3300e-003	1.4000e-004		1.7700e-003	1.7700e-003		1.7700e-003	1.7700e-003	0.0000	25.4020	25.4020	4.9000e-004	4.7000e-004	25.5529
Condo/Townhouse	125622	6.8000e-004	5.7900e-003	2.4600e-003	4.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004	0.0000	6.7037	6.7037	1.3000e-004	1.2000e-004	6.7435
Single Family Housing	1.35702e+006	7.3200e-003	0.0625	0.0266	4.0000e-004		5.0600e-003	5.0600e-003		5.0600e-003	5.0600e-003	0.0000	72.4157	72.4157	1.3900e-003	1.3300e-003	72.8461
Total		0.0106	0.0903	0.0384	5.8000e-004		7.3000e-003	7.3000e-003		7.3000e-003	7.3000e-003	0.0000	104.5214	104.5214	2.0100e-003	1.9200e-003	105.1425

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	357058	1.9300e-003	0.0165	7.0000e-003	1.1000e-004		1.3300e-003	1.3300e-003		1.3300e-003	1.3300e-003	0.0000	19.0540	19.0540	3.7000e-004	3.5000e-004	19.1672
Condo/Townhouse	99402.4	5.4000e-004	4.5800e-003	1.9500e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3045	5.3045	1.0000e-004	1.0000e-004	5.3360
Single Family Housing	1.0178e+006	5.4900e-003	0.0469	0.0200	3.0000e-004		3.7900e-003	3.7900e-003		3.7900e-003	3.7900e-003	0.0000	54.3135	54.3135	1.0400e-003	1.0000e-003	54.6363
Total		7.9600e-003	0.0679	0.0289	4.4000e-004		5.4900e-003	5.4900e-003		5.4900e-003	5.4900e-003	0.0000	78.6719	78.6719	1.5100e-003	1.4500e-003	79.1394

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	164600	21.6517	2.1700e-003	4.5000e-004	21.8394
Condo/Townhouse	124228	16.3411	1.6300e-003	3.4000e-004	16.4827
Single Family Housing	848352	111.5937	0.0112	2.3100e-003	112.5608
Total		149.5866	0.0150	3.1000e-003	150.8828

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	151215	19.8911	1.9900e-003	4.1000e-004	20.0634
Condo/Townhouse	114059	15.0036	1.5000e-003	3.1000e-004	15.1336
Single Family Housing	777445	102.2665	0.0102	2.1200e-003	103.1526

Total		137.1611	0.0137	2.8400e-003	138.3497
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6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.2202	0.0752	1.0921	4.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	74.5781	74.5781	3.0900e-003	1.3400e-003	75.0533
Unmitigated	1.2202	0.0752	1.0921	4.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	74.5781	74.5781	3.0900e-003	1.3400e-003	75.0533

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3376					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.8428					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	7.3600e-003	0.0629	0.0268	4.0000e-004		5.0900e-003	5.0900e-003		5.0900e-003	5.0900e-003	0.0000	72.8437	72.8437	1.4000e-003	1.3400e-003	73.2766
Landscaping	0.0324	0.0123	1.0653	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7344	1.7344	1.6900e-003	0.0000	1.7767
Total	1.2202	0.0752	1.0921	4.6000e-004		0.0110	0.0110		0.0110	0.0110	0.0000	74.5781	74.5781	3.0900e-003	1.3400e-003	75.0533

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3376					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.8428					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	7.3600e-003	0.0629	0.0268	4.0000e-004		5.0900e-003	5.0900e-003		5.0900e-003	5.0900e-003	0.0000	72.8437	72.8437	1.4000e-003	1.3400e-003	73.2766
Landscaping	0.0324	0.0123	1.0653	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7344	1.7344	1.6900e-003	0.0000	1.7767
Total	1.2202	0.0752	1.0921	4.6000e-004		0.0110	0.0110		0.0110	0.0110	0.0000	74.5781	74.5781	3.0900e-003	1.3400e-003	75.0533

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

- Install Low Flow Toilet
- Install Low Flow Shower
- Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	10.2093	0.2437	5.9000e-003	18.0581
Unmitigated	12.2917	0.3045	7.3600e-003	22.0987

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	2.08493 / 1.31441	2.7506	0.0682	1.6500e-003	4.9452
Condo/Townhouse	1.30308 / 0.821507	1.7191	0.0426	1.0300e-003	3.0907
Single Family Housing	5.92902 / 3.73786	7.8220	0.1938	4.6800e-003	14.0628
Total		12.2917	0.3045	7.3600e-003	22.0987

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	1.66794 / 1.23423	2.2846	0.0545	1.3200e-003	4.0410
Condo/Townhouse	1.04246 / 0.771395	1.4279	0.0341	8.2000e-004	2.5256
Single Family Housing	4.74321 / 3.50985	6.4968	0.1551	3.7500e-003	11.4916
Total		10.2093	0.2437	5.8900e-003	18.0581

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			

Mitigated	25.3982	1.5010	0.0000	62.9230
Unmitigated	25.3982	1.5010	0.0000	62.9230

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	14.72	2.9880	0.1766	0.0000	7.4027
Condo/Townhouse	9.2	1.8675	0.1104	0.0000	4.6267
Single Family Housing	101.2	20.5427	1.2140	0.0000	50.8936
Total		25.3982	1.5010	0.0000	62.9230

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	14.72	2.9880	0.1766	0.0000	7.4027
Condo/Townhouse	9.2	1.8675	0.1104	0.0000	4.6267
Single Family Housing	101.2	20.5427	1.2140	0.0000	50.8936
Total		25.3982	1.5010	0.0000	62.9230

9.0 Operational Offroad

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

Fire Pumps and Emergency Generators

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

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

Equipment Type	Number
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11.0 Vegetation