

**Delivered via Electronic Mail**

703 Third Street Associates, LLC  
Wick Polite & Dennis Fisco  
980 Fifth Avenue  
San Rafael, CA 94901

**AIR QUALITY ANALYSES FOR THE PROPOSED 703 THIRD STREET IN SAN RAFAEL, CALIFORNIA**

Dear Wick Polite and Dennis Fisco:

Ramboll conducted a California Environmental Quality Act (CEQA) analysis of air quality impacts for the proposed project to be located at 703 Third Street in San Rafael, California (the "Project"). This memorandum provides a general overview of the Project and summarizes the methodology and results of the analysis.

**SUMMARY OF RESULTS**

This analysis found no significant air quality impacts from construction and operational emissions from the Project. Based on the size of the Project and Bay Area Air Quality Management District (BAAQMD) screening methods, both construction and operational mass emissions are estimated to be below BAAQMD CEQA thresholds. Also, health risk impacts from both construction and operation are expected to be less than BAAQMD CEQA thresholds based on a conservative screening assessment for operations and dispersion modeling and refined risk analysis for construction.

This analysis also shows that all areas of the Project site will not experience excess lifetime cancer risks, chronic hazard indices, and PM<sub>2.5</sub> (particulate matter of aerodynamic diameter of 2.5 microns or less) concentrations above cumulative thresholds of significance.

**PROJECT UNDERSTANDING AND BACKGROUND**

The Project consists of the construction of one building with 120 residential units (studios, one-bedroom, and two-bedroom apartments) and 970 square feet of retail space, located at 703 Third Street in San Rafael, California in the downtown area at the intersection of Third Street and Tamalpais Avenue. The Project will include demolition of existing site buildings, as well as new building construction.

The City of San Rafael is the lead agency responsible for Project approval. For air quality, Ramboll understands that the City of San Rafael requires Project evaluation under the current BAAQMD CEQA guidelines (published in May 2011 and updated in May 2017) and consistency with the 2020 General Plan (adopted in 2004 and

January 14, 2019

Ramboll  
201 California Street  
Suite 1200  
San Francisco, CA 94608  
USA

T +1 415 796 1950  
F +1 415 198 5812  
[www.ramboll.com](http://www.ramboll.com)

updated in 2016).<sup>1</sup> We understand the City of San Rafael has requested an analysis of air quality impacts due to the construction and operation of the Project as well as an analysis of cumulative air quality impacts to new sensitive receptors at the Project as required by the City Planner and the General Plan 2020.<sup>2</sup> Results of the analysis are compared to BAAQMD CEQA screening levels and significance thresholds for cancer risk, chronic health index, and PM<sub>2.5</sub> concentration to put the results in perspective.

## METHODOLOGY

### Construction- and Operational-Related Criteria Air Pollutant (CAP) Mass Emissions

The BAAQMD CEQA Guidelines have conservative screening sizes for land development projects, below which construction- and operational-related CAP emissions would be below BAAQMD CEQA thresholds. For a mid-rise apartment building, the screening size is 494 dwelling units for operational-related emissions and 240 dwelling units for construction-related emissions. The Project will consist of 120 dwelling units; this would be 24% of the screening size for operational-related emissions and 50% of the screening size for construction-related emissions. In addition, the Project will have 970 square feet of retail space. The BAAQMD CEQA guidelines have screening sizes for various retail land uses. While the exact use of the retail space has not yet been defined, the most conservative type of retail land use (i.e., generating the greatest number of operational vehicle trips and have the lowest screening size) would be for a 24-hour convenience market, which has screening sizes of 5,000 square feet (operational) and 277,000 square feet (construction). 970 square feet of proposed retail would only be 19% of the operational screening size and 0.4% of the construction screening size. Thus, in combination with the residential portion of the project, the combined percentages of the screening sizes would be 43% (operational) and 50% (construction), both still less than the screening thresholds. Therefore construction- and operational-related CAP emissions will be less than BAAQMD screening thresholds and no further analysis of emissions are required.

### Health Risk Impacts to Nearby Sensitive Receptors

The BAAQMD CEQA thresholds for health risk from **individual** project sources of toxic air contaminants (TACs) are:

- 10.0 in a million excess lifetime cancer risk;
- a chronic hazard index of 1.0;
- an acute hazard index of 1.0; and
- a PM<sub>2.5</sub> concentration of 0.3 µg/m<sup>3</sup>.

The BAAQMD CEQA thresholds for health risk from **cumulative** sources of TACs are:

- 100 in a million excess lifetime cancer risk (from all local sources);
- a chronic hazard index of 10 (from all local sources); and
- a PM<sub>2.5</sub> concentration of 0.8 µg/m<sup>3</sup>.

Individual project and cumulative impacts are evaluated against these thresholds as discussed in the next sections.

<sup>1</sup> City of San Rafael. 2004. General Plan – 2020. Available online at: <https://www.cityofsanrafael.org/documents/general-plan-2020/>.

<sup>2</sup> City of San Rafael. 2018. Letter to Rick Williams of Van Meter Williams Pollack LLP. April 20. Re: [ED18-018, IP18-018, LLA 18-001] Completeness Review – (N) 120-Unit, Multifamily Residential Apartment Bldg, 703-723 Third St./898 Lincoln Ave.; APNS:011-278-01 &-02

### **Project Construction Risks**

Ramboll analyzed Project construction-related risks by estimating ambient air concentrations of diesel particulate matter (DPM) and PM<sub>2.5</sub>. For sources of diesel exhaust, such as construction equipment and haul trucks, the primary health impact is cancer risk. The DPM concentration at which the cancer risk significance threshold is exceeded is lower than the concentration for exceeding the chronic HI. Thus, non-cancer hazard indices (i.e., chronic and acute hazard indices) from diesel exhaust are not explicitly estimated for this analysis.

To estimate air concentrations of DPM and PM<sub>2.5</sub>, Ramboll used AERMOD, USEPA's recommended Gaussian air dispersion model.<sup>3</sup> AERMOD incorporates emission factors, source parameters and full years of meteorological data to estimate air concentrations of inert pollutants. A 10-meter-by-10-meter array of volume sources was used to represent construction activity.<sup>4</sup> The model was run with – 2009 - 2013 surface meteorological data from the Sonoma Baylands Meteorological Station (OSID 9903 WBAN #12120) provided by BAAQMD with a wind correction factor of 20° to the north. These stations provide meteorological data that are representative for the vicinity of the Project.

The urban setting of the Project was reflected in AERMOD through the use of the population of the City of San Rafael.<sup>5</sup> An array of receptors with 20-meter spacing extending out to 1,000 feet from the Project boundary was used. All modeled receptors were conservatively evaluated as residential locations. The Project boundary, source configuration, and receptor locations are presented in **Figure 1.**

In this analysis, residential receptors were conservatively treated as a resident child of age 0-2 years old who is assumed to be exposed to emissions 24 hours a day and 7 days a week for one entire year using default exposure assumptions recommended by OEHHA and BAAQMD.<sup>6,7</sup> The 0-2 years old resident child scenario assumes a much higher daily breathing rate and age-sensitivity factor (ASF) than other residential receptor populations and therefore is the most conservative residential scenario to evaluate residential exposures for this analysis.

The estimated excess lifetime cancer risks for a resident child were adjusted using an ASF that accounts for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (TSD) and OEHHA 2015 Hot Spots guidance.<sup>8,9</sup> Cancer risk estimates were weighted by a factor of 10 for exposures that occur from the third trimester of

<sup>3</sup> Ramboll used the most recent version of AERMOD available, version 18081. Available online: <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod>

<sup>4</sup> There is no BAAQMD guidance on source selection for construction modeling. This source configuration is consistent with methodology used to develop SCAQMD LST thresholds.

<sup>5</sup> The most recent census for San Rafael provides a population of 58,954 in 2016. United States Census Bureau. 2010 Census Data. Available at: <https://www.census.gov/quickfacts/fact/table/sanrafaelcitycalifornia/>.

<sup>6</sup> Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available at: <http://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

<sup>7</sup> Bay Area Air Quality Management District (BAAQMD). 2016. BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines. January.

<sup>8</sup> California Environmental Protection Agency (Cal/EPA). 2009. Technical Support Document for Cancer Potency Factors: Methodologies for Derivation, Listing of Available Values, and Adjustment to Allow for Early Life Stage Exposures. Available at: <http://oehha.ca.gov/air/crnr/technical-support-document-cancer-potency-factors-2009>

<sup>9</sup> Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available at: <http://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

pregnancy to two years of age. This approach was also adopted by BAAQMD in its most recent Air Toxics NSR Program HRA Guideline.<sup>10</sup>

DPM emissions from construction activities were estimated using CalEEMod® using standard model defaults for the intended Project land use. CalEEMod® is a statewide program designed to calculate both criteria air pollutant and greenhouse gas emissions from development projects in California. CalEEMod output files are included in **Appendix A**.

Construction emissions only impact receptors in the vicinity of the project during the 9 hours when construction equipment operates; however, the emissions modeled during the 9 hours each day were annualized assuming 24 hours per day in the air modeling outputs. These concentrations represent the theoretical maximum average concentrations over the construction period to which these receptors might be exposed. The supporting files for the air modeling analysis are included in **Appendix B**.

Excess lifetime cancer risk and PM<sub>2.5</sub> concentrations were calculated following methodologies that are consistent with BAAQMD and OEHHHA guidance. The estimated excess lifetime cancer risk, chronic HI, acute HI, and annual PM<sub>2.5</sub> concentration are below the BAAQMD significance thresholds.

#### Cumulative Risk

Ramboll used guidance from BAAQMD for CEQA analyses to conduct the analysis of cumulative risk at the construction MEISR. According to BAAQMD, the sources of TACs to be included in the analysis are roadways with over 10,000 vehicles per day, any BAAQMD permitted stationary source, and any other major source of emissions within the zone of influence. As shown in **Figure 2**, Ramboll identified the sources within the 1,000-foot zone of influence of the Project to be:

- Roadways:<sup>11</sup>
  - Fourth Street between Lincoln Avenue and Tamalpais Avenue
  - Hetherton Street North of Second Street
  - Lincoln Avenue south of Third Street
  - Second Street east of Lincoln Avenue
  - Third Street between Tamalpais Avenue and Lincoln Avenue
  - U.S. Route 101
- Railways:
  - Sonoma-Marin Area Rail Transit (SMART) Train<sup>12</sup>

<sup>10</sup> Bay Area Air Quality Management District (BAAQMD). 2016. BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines. January.

<sup>11</sup> Average daily traffic data provided by Willie Lagleva of the City of San Rafael, Public Works Department in an e-mail to David Kim of Ramboll on June 4, 2018. ("ADT Surrounding SMART Train area.pdf")

<sup>12</sup> The nearest SMART train station (San Rafael Station) is located directly across the intersection of Third Street and Tamalpais Avenue. In addition, the planned extension to Larkspur is expected to be complete by the time residents would move into the Project. After the completion of this extension, the SMART rail line will be 100 feet from the Project. The health impact data provided by BAAQMD includes cancer risk and PM<sub>2.5</sub> impacts from all major rail lines (including the SMART rail and the extension to Larkspur) and includes impacts at the Project site. Thus, impacts from the SMART train are included in the cumulative analysis.

- Permitted Stationary Sources:<sup>13</sup>
  - Western Dealer Holding Co, LLC (Gas Station)
  - 76 Gas Station (Gas Station)<sup>14</sup>
  - Irwin Shell (Gas Station)
  - San Rafael Sanitation District (Diesel Generator)

The health impacts of all sources were evaluated using methods consistent with BAAQMD CEQA guidance<sup>15</sup> and general guidance provided by BAAQMD. BAAQMD screening tools use residential exposure assumptions to estimate health impacts, which conservatively assume outdoor exposure to TACs all day, 350 days per year for 30 years for cancer risk, and all day every day for one year for PM<sub>2.5</sub>. The analysis is based on the maximum impact from each source within proximity to the Project.

The health impacts of major surface streets, railways, and highways were evaluated using BAAQMD's screening tools provided by BAAQMD as raster files in GIS.<sup>16</sup> The raster files consist of 20-by-20-meter grid cells with cancer risk and PM<sub>2.5</sub> concentration associated with roads, railways, and nearby major streets. Cancer risk and PM<sub>2.5</sub> concentration values for the construction MEISR were determined based on the maximum impact of a raster cell located closest to the construction MEISR.

The major street raster file accounts for streets with greater than 30,000 annual average daily traffic (AADT). For roadways with AADT greater than 10,000 but less than 30,000 AADT, BAAQMD's Roadway Screening Analysis Calculator was used to estimate cancer and PM<sub>2.5</sub> concentration values.<sup>17</sup> The roadways analyzed in this manner were the following five segments:

- Fourth Street between Lincoln Avenue and Tamalpais Avenue
- Hetherton Street North of Second Street
- Lincoln Avenue south of Third Street
- Second Street east of Lincoln Avenue
- Third Street between Tamalpais Avenue and Lincoln Avenue

While the BAAQMD raster files take into account the most recent (2015) risk assessment guidelines from the Office of Environmental Health Hazard Assessment (OEHHA),<sup>18</sup> the Roadway Screening Analysis Calculator does not. Thus, cancer risk from the Roadway Screening Analysis Calculator was

<sup>13</sup> Impacts from these sources were scaled based on their distance from the Project boundary using the Internal Combustion Diesel Multiplier Tool and Gasoline Dispensing Facility Multiplier Tool and conservatively included in the cumulative analysis.

<sup>14</sup> Identified as "Sa Ngasilpa" in the BAAQMD Stationary Source Inquiry Form.

<sup>15</sup> BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available at: <http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en>

<sup>16</sup> Received by Varsha Gopalakrishnan at Ramboll through Personal Communication with Areana Flores from BAAQMD on April 20, 2018.

<sup>17</sup> BAAQMD. 2011. Roadway Screening Analysis Calculator. Available at: <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools>. Accessed April 2018.

<sup>18</sup> OEHHA. 2015. Guidance Manual for Preparation of Health Risk Assessments. February. Available at: <https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf>. Accessed June 2018.

scaled to take into account the 2015 OEHHA guidelines using a factor of 1.377, consistent with guidance from BAAQMD.<sup>19</sup>

PM<sub>2.5</sub> concentrations from the BAAQMD raster files and the Roadway Screening Analysis Calculator were adjusted to account for lower expected PM<sub>2.5</sub> emissions by the time the Project would be under construction (2021 at the earliest). PM<sub>2.5</sub> concentrations from the BAAQMD raster files and the Roadway Screening Analysis Calculator were estimated using 2014 emission rates from the California Air Resources Board's (ARB) mobile source emissions estimation tool EMFAC.<sup>20</sup> Fleetwide PM<sub>2.5</sub> emissions are expected to be lower in 2021 due to California regulations for cleaner emissions from vehicles. To estimate PM<sub>2.5</sub> concentration in 2021, the PM<sub>2.5</sub> concentrations obtained from the BAAQMD raster files and the Roadway Screening Analysis Calculator were multiplied by the ratio of the fleetwide emission factor for PM<sub>2.5</sub> in 2021 to the emission factor for PM<sub>2.5</sub> in 2014, obtained from EMFAC. The calculated ratio is 0.78.<sup>21</sup> A similar downward adjustment could also be made for cancer risk, but has conservatively not been applied to this analysis.

Impacts from the stationary sources were estimated using BAAQMD's Stationary Source Screening Analysis Tool for Marin and Sonoma Counties and through communication with the BAAQMD.<sup>22 23</sup> **Appendix C** shows the health impacts provided by BAAQMD for the sources in the area. These impacts take into account the most recent OEHHA guidance, so additional scaling was not necessary. The health impacts for gas stations and diesel generators reported in the tools were scaled by distance from the sources throughout the site using BAAQMD's Diesel Internal Combustion (IC) Engine Distance Multiplier Tool<sup>24</sup> and the Gasoline Dispensing Facility (GDF) Distance Multiplier Tool,<sup>25</sup> as appropriate. One of the stationary sources found within 1,000 feet of the Project, Heritage Cleaners, was a dry cleaner. BAAQMD indicated that there are new requirements for dry cleaners to phase out perchloroethylene by 2023 and therefore impacts from Heritage Cleaners do not need to be considered in this analysis.

<sup>19</sup> Personal communication between Shari Beth Libicki (Ramboll) and Virginia Lau (Bay Area Air Quality Management District), February 3<sup>rd</sup>, 2016.

<sup>20</sup> BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. Available at: <http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en>. Accessed January 2018.

<sup>21</sup> Total PM<sub>2.5</sub> emissions estimated by EMFAC2014 in Marin County for 2014 and 2021 are 0.261 tons per year and 0.2038 tons per year, respectively.

<sup>22</sup> BAAQMD. 2012. Santa Clara County Stationary Source Screening Analysis Tool. Available at: <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools>

<sup>23</sup> Completed Stationary Source Inquiry Form received by Jill Leva at Ramboll through Personal Communication with Areana Flores from BAAQMD on June 7, 2018.

<sup>24</sup> BAAQMD. 2012. Diesel Internal Combustion (IC) Engine Distance Multiplier Tool. Available at: <http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Multiplier%20Tools%20May%202012/Diesel%20IC%20Engine%20Multiplier%20Tool.ashx?la=en>

<sup>25</sup> BAAQMD. 2012. Gasoline Dispensing Fuel (GDF) Distance Multiplier Tool. Available at: <http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/multiplier-tools-may-2012/gdf-distance-multiplier-tool.xlsx?la=en>

### **Project Operation Risks**

The only sources of operational TAC emissions resulting from the Project are from vehicles going to and from the development. The Project developer has confirmed that there will not be an emergency generator installed for the development. The BAAQMD recommends evaluating health risk impacts from traffic where there will be more than 10,000 vehicle trips per day. Ramboll used the Institute of Transportation Engineers (ITE) Trip Generation Manual (10<sup>th</sup> Edition) to estimate the number of daily vehicle trips associated with the Project.<sup>26</sup> Based on 120 dwelling units in a mid-rise residential building and 970 square feet of a convenience market, the estimated number of daily vehicle trips would be 2,821 trips, well below the 10,000-vehicle trip threshold.<sup>27</sup> Thus, health risk from project operations is not assessed and assumed to be less than significant.

### **Health Risk Impacts to Sensitive Receptors at the Project**

Policy AW-2a of the Air and Water Quality Element of the General Plan 2020, requires:

**AW-2a. Sensitive Receptors.** Through development review, ensure that siting of any new sensitive receptors provides for adequate buffers from existing sources of toxic air contaminants or odors. If development of a sensitive receptor (a facility or land use that includes members of the population sensitive to the effects of air pollutants, such as children, the elderly and people with illnesses) is proposed within 500 feet of Highway 101 or I-580, an analysis of mobile source toxic air contaminant health risks should be performed. Development review should include an evaluation of the adequacy of the setback from the highway and, if necessary, identify design mitigation measures to reduce health risks to acceptable levels.

In accordance with Policy AW-2a, Ramboll completed a site-specific health risk assessment of nearby sources of TACs and PM<sub>2.5</sub> emissions on Project residents to determine BAAQMD CEQA threshold exceedances, if any. To assess cumulative health risk impacts for new residents at the Project, Ramboll used the same health risk tools and methodologies used to analyze the cumulative health risk impacts for construction emissions, described above. The same roadways, railway, and permitted stationary sources were evaluated for their impacts to future Project residents.

2019 Title 24 standards require all buildings constructed after 2019 to implement MERV 13 filters to minimize impacts from particulate emissions.<sup>28</sup> MERV 13 filters have an efficiency of 80-90% for PM<sub>2.5</sub>.

<sup>26</sup> ITE, 2017. Trip Generation Manual. Volume 1: Desk Reference. September.

<sup>27</sup> Assumptions used for estimating trip generation:

Residential

- 120 dwelling units
- Mid-rise multifamily housing
- General urban/suburban setting
- Weekday (generally higher than weekends)
- Result: 653 daily vehicle trips

Retail

- 2,000 square feet of retail (this was the lowest value possible)
- General urban/suburban setting
- Weekend (generally higher than weekday)
- Result: 2,168 daily vehicle trips

<sup>28</sup> California Energy Commission (CEC). 2018. 2019 Standards Part 6 Chapter 3 (Section 120) Revised Express Terms. Available at: [http://www.energy.ca.gov/title24/2019standards/rulemaking/documents/2018-05-09\\_hearing/2019\\_Revised\\_EnergyCode.php](http://www.energy.ca.gov/title24/2019standards/rulemaking/documents/2018-05-09_hearing/2019_Revised_EnergyCode.php) (Accessed 6/22/2018)

when operated with windows continuously closed. However, the behavior of occupants (i.e., whether or not they open or close windows and the duration) cannot be predicted. Studies have found that indoor air concentration is at least 30% lower than outdoor concentration when filtration is turned off. Thus, a filtration efficiency of 30% was conservatively assumed for MERV 13 filters for PM<sub>2.5</sub>.<sup>29</sup> Based on the same study, a 30% reduction in indoor PM<sub>2.5</sub> concentrations can also be conservatively assumed for a situation where a building does not have MERV 13 filters and also does not have operable windows. A 30% reduction of diesel particulate matter (DPM) concentrations (and therefore a 30% reduction in cancer risk) could also be assumed, but is conservatively not taken into account in this analysis.

## RESULTS AND CONCLUSIONS

### Construction- and Operational-Related Criteria Air Pollutant (CAP) Mass Emissions

The Project falls below BAAQMD screening sizes for mid-rise apartment and retail land use. Therefore, construction- and operational-related CAP emissions associated with the Project are less than significant.

### Health Risk Impacts to Nearby Sensitive Receptors

#### *Project Construction*

Health risk impacts resulting from Project construction are shown in **Table 1a**. As shown, cancer risk and PM<sub>2.5</sub> concentrations resulting from Project construction are below BAAQMD CEQA thresholds of significance and therefore impacts from are less than significant. Additionally, as shown in **Table 1b**, cumulative cancer risk and PM<sub>2.5</sub> concentrations accounting for nearby sources of TACs and PM<sub>2.5</sub> are also below BAAQMD CEQA thresholds of significance and therefore cumulative impacts are less than significant.

#### *Project Operation*

As described above, the only source of operational TACs and PM<sub>2.5</sub> emissions are vehicles. The screening analysis indicated that due to the size of the retail area and the number of dwelling units, the number of vehicle trips is below the threshold above which the BAAQMD would quantify health risk. Therefore, health risk impacts associated with Project operations are less than significant.

### Health Risk Impacts to Sensitive Receptors at the Project

**Table 2** shows the cancer risk, chronic hazard index, and PM<sub>2.5</sub> concentration from the surrounding sources for a resident at the Project site.<sup>30</sup> The table shows that all the areas within the Project boundary are below the threshold of significance of 100 in a million for excess lifetime cancer risk, 10 for chronic hazard index, and 0.8 µg/m<sup>3</sup> for PM<sub>2.5</sub> concentration. Thus, health risk impacts to sensitive receptors at the Project are less than significant.

As stated previously, cumulative health impacts presented in Table 2 are for a residential exposure, which assumes all day exposure for 350 days per year for 30 years. This is applicable to the residents expected due to the Project. The exposure duration of customers visiting the retail space is expected to be much shorter indicating that the actual exposure to health impacts will be much lower.

<sup>29</sup> BAAQMD 2018. Measurement study to evaluate controls for reducing in-home pollutant exposures at homes near high trafficked roadways. Available online at: [http://www.baaqmd.gov/~/media/files/planning-and-research/care-program/documents/2018/sfdph\\_indoorair7\\_interactive-pdf.pdf?la=en](http://www.baaqmd.gov/~/media/files/planning-and-research/care-program/documents/2018/sfdph_indoorair7_interactive-pdf.pdf?la=en)

<sup>30</sup> There are no chronic hazard values associated with highways, railways and major streets because the BAAQMD's screening tools do not estimate chronic hazards since the screening levels were found to be extremely low.

If you have any questions about these analyses, please feel free to contact me at 415.796.1934 or [mkeinath@ramboll.com](mailto:mkeinath@ramboll.com). Thank you for the opportunity to assist you with this matter.

Yours sincerely,

**Michael Keinath**

Principal

D +1 415 796 1933

[mkeinath@ramboll.com](mailto:mkeinath@ramboll.com)**David Kim, PhD**

Senior Managing Consultant

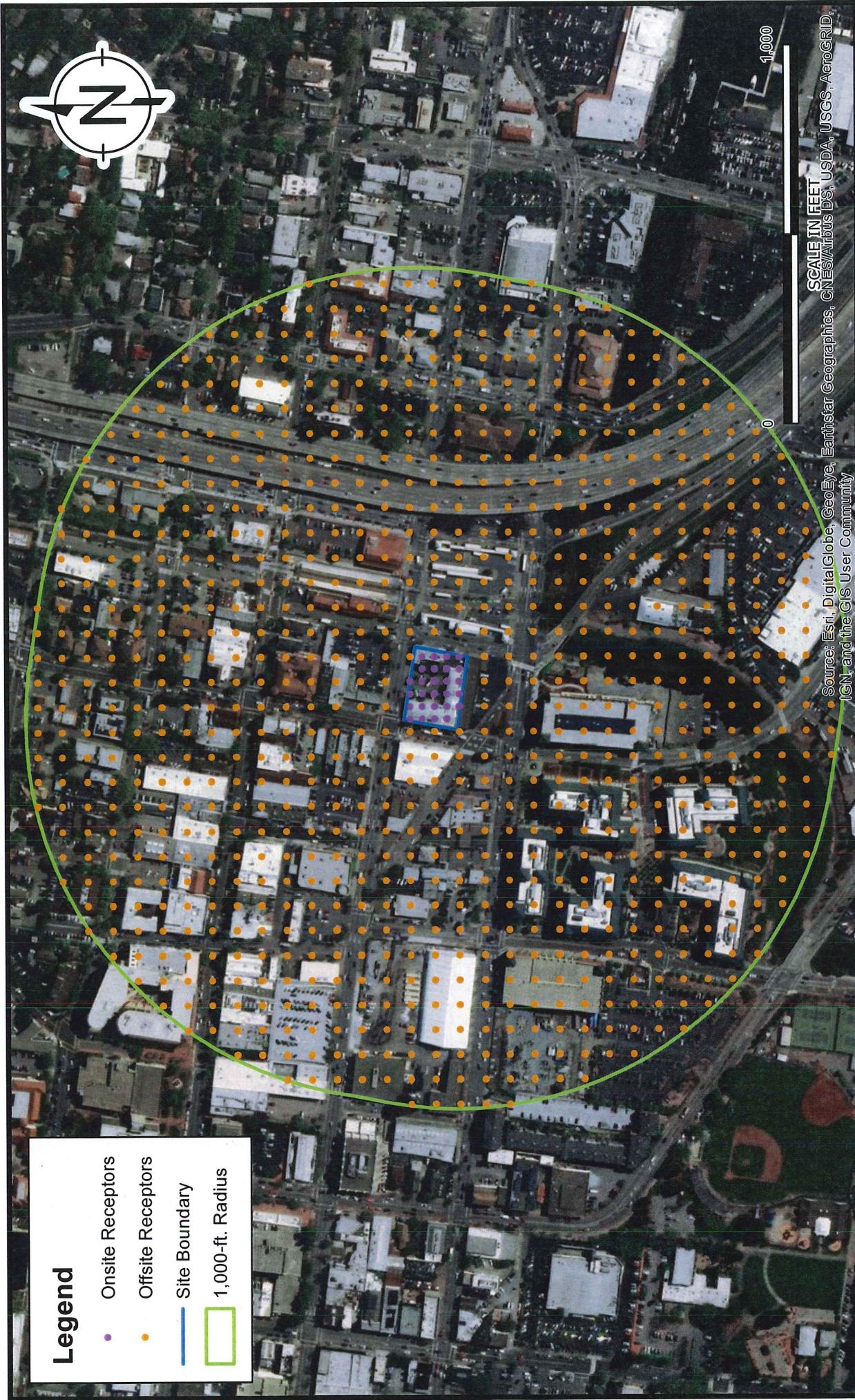
D +1 415 796 1940

[dkim@ramboll.com](mailto:dkim@ramboll.com)**Attachments:**

- |             |   |
|-------------|---|
| Figure 1:   | Project Site and Modeled Receptors                      |
| Figure 2:   | Cumulative Sources of Toxic Air Contaminants            |
| Table 1a:   | Health Risk Impacts Resulting from Project Construction |
| Table 1b:   | Cumulative Health Risk Impacts at the Offsite MEISR     |
| Table 2:    | Health Risk Impacts to Sensitive Receptors at Project   |
| Appendix A: | CalEEMod Output   |
| Appendix B: | AERMOD Model Files                                      |
| Appendix C: | Stationary Source Inquiry Form Response                 |

**D R A F T**

**FIGURES**

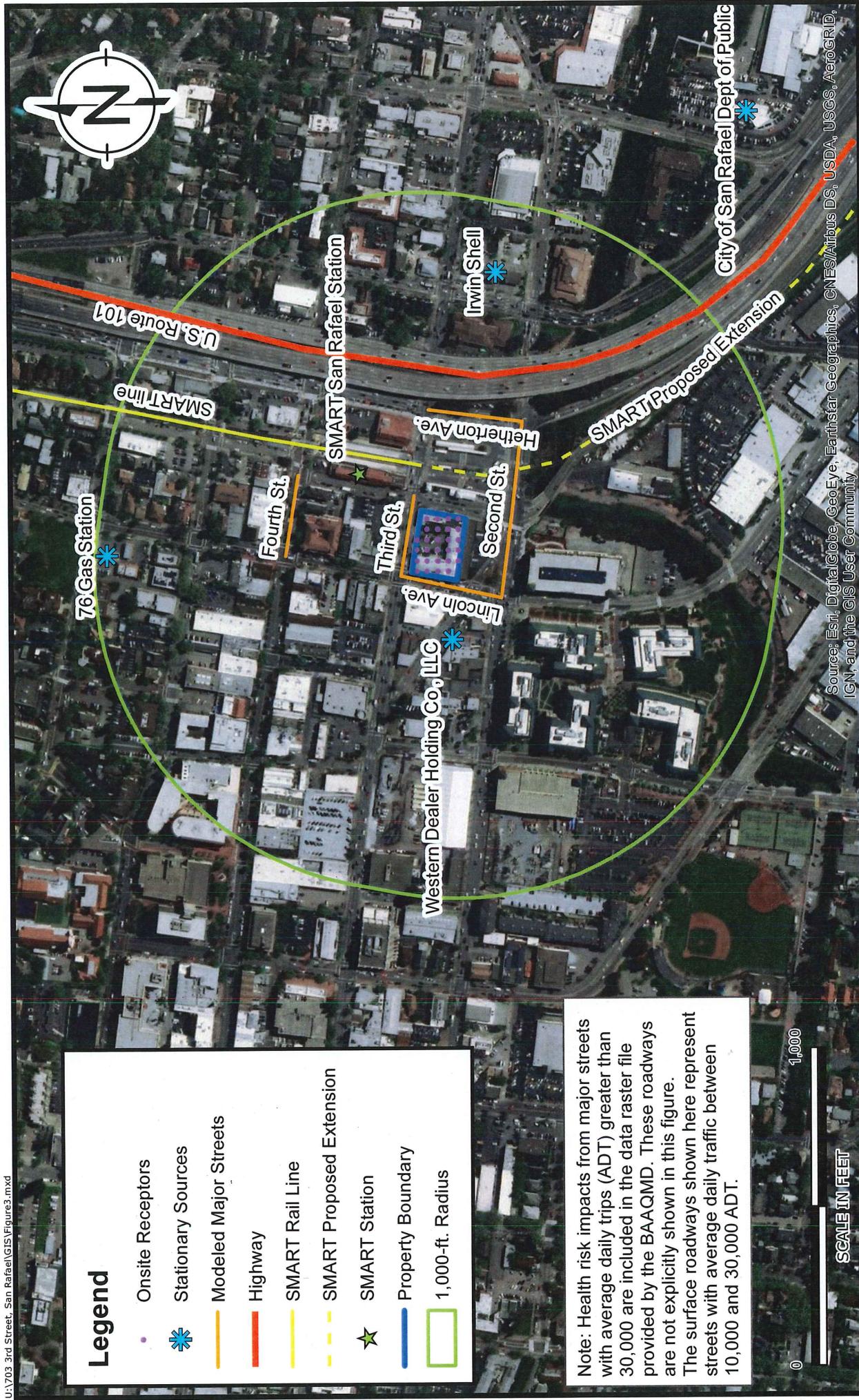


**Project Site and Modeled Receptors**

703 3rd Street  
San Rafael, California

**FIGURE**  
**1**



FIGURE  
2**Cumulative Sources of Toxic Air Contaminants**

703 3rd Street  
San Rafael, California

PROJECT:  
U:\703 3rd Street, San Rafael\GIS\Figure3.mxd

DRAFT DATE: 6/25/2018

**RAMBOLL**

DRAFTED BY:



**Table 1a**  
**Health Risk Impacts Resulting from Project Construction**  
**703 3rd Street**  
**San Rafael, California**

	Cancer Risk Impact (in one million)	Annual PM <sub>2.5</sub> Concentration ( $\mu\text{g}/\text{m}^3$ )
Project Construction Impact	6.6	0.14
BAAQMD Significance Threshold	10	0.3
Above Threshold?	No	No

**Notes:**

1. The cancer risk MEISR for offsite receptors is located at UTM coordinates: UTMx = 541800, UTMy = 4202800

**Abbreviations:**

BAAQMD: Bay Area Air Quality Management District  
MEISR: maximally exposed individual sensitive receptor  
PM<sub>2.5</sub>: fine particulate matter  
UTM: Universal Transverse Mercator coordinate system  
 $\mu\text{g}/\text{m}^3$ : micrograms per cubic meter

**Table 1b**  
**Cumulative Health Risk Impacts at the Offsite MEISR<sup>1</sup>**  
**703 3rd Street**  
**San Rafael, California**

Emission Source	Cancer Risk Impact (in one million)	Annual PM <sub>2.5</sub> Concentration ( $\mu\text{g}/\text{m}^3$ )
Project Construction	6.6	0.14
<b>Subtotal, Project Impacts</b>	<b>6.6</b>	<b>0.14</b>
<b>Existing Stationary Sources<sup>2</sup></b>		
Western Dealer Holding Co, LLC (gas station) <sup>3</sup>	13	--
76 Gas Station (#257384) <sup>3</sup>	0.60	--
Irwin Shell (gas station) <sup>3</sup>	0.82	--
San Rafael Sanitation District (diesel generator) <sup>3</sup>	2.2	0.0028
<b>Roadways</b>		
Major Streets <sup>4,5,6</sup>	36	0.41
Highway <sup>4,6</sup>	6.6	0.11
<b>Railway</b>		
SMART Train <sup>4</sup>	0.79	0.0010
<b>Subtotal, Background Sources</b>	<b>61</b>	<b>0.52</b>
<b>Total Cumulative Impact (Project + Background)</b>	<b>67</b>	<b>0.66</b>
BAAQMD Significance Threshold	100	0.8
Above Threshold?	No	No

**Notes:**

1. Health impacts from surrounding sources are estimated using BAAQMD Screening Tools. Impacts presented here are the maximum impacts at offsite sensitive receptor.
2. Consistent with BAAQMD guidance, Ramboll included all facilities within 1,000 feet of the proposed Project as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Marin and Sonoma County Stationary Source Screening tool with additional details provided by BAAQMD. Values have been adjusted using BAAQMD's Diesel Internal Combustion (IC) Engine Distance Multiplier Tool and BAAQMD's Gasoline Dispensing Facility (GDF) Distance Multiplier.
3. Western Dealer Holding Co., 76 Gas Station (identified as "Sa Ngasilpa" in the Stationary Source Tool), Irwin Shell, and San Rafael Sanitation District are 367, 855, 985, and 1,800 feet away from the offsite MEISR, respectively.
4. Cancer risk and PM<sub>2.5</sub> concentration values were determined based on the maximum impact of a raster cell located within the Project boundary. Raster data for cancer risk and PM<sub>2.5</sub> concentrations were provided by BAAQMD.
5. The raster file data for roadways with Average Daily Traffic (ADT) greater than 30,000 was summed with data from roadways with ADT between 10,000 and 30,000. Cancer risk and PM<sub>2.5</sub> concentration data for roadways with ADT between 10,000 and 30,000 was obtained through BAAQMD's Roadway Screening Analysis Tool, and then cancer risk was multiplied by a factor of 1.337 in accordance with OEHHA guidance to account for updated exposure parameters.
6. The BAAQMD Roadway and Highway tools incorporate 2014 emission factors and vehicle fleet mix for PM<sub>2.5</sub>. PM<sub>2.5</sub> emissions for 2021 were calculated using EMFAC2014 and impacts were scaled for the year 2021, the full buildout year for the project. Ratio of PM<sub>2.5</sub> emissions in 2021 to 2014 is 0.78.

**Abbreviations:**

- BAAQMD: Bay Area Air Quality Management District
- MEISR: Maximally Exposed Individual Sensitive Receptor
- PM<sub>2.5</sub>: fine particulate matter
- $\mu\text{g}/\text{m}^3$ : micrograms per cubic meter
- UTM: Universal Transverse Mercator coordinate system

**Table 2**  
**Health Risk Impacts to Sensitive Receptors at Project<sup>1</sup>**  
**703 3rd Street**  
**San Rafael, California**

Emission Source	Cancer Risk Impact (in one million)	Annual PM <sub>2.5</sub> Concentration <sup>7</sup> (ug/m <sup>3</sup> )
<b>Existing Stationary Sources<sup>2</sup></b>		
Western Dealer Holding Co, LLC (gas station) <sup>3</sup>	13	--
76 Gas station (#257384) <sup>3</sup>	0.48	--
Irwin Shell (gas station) <sup>3</sup>	1.3	--
San Rafael Sanitation District (diesel generator) <sup>3</sup>	2.2	0.0020
<b>Roadways</b>		
Major Streets <sup>4,5,6</sup>	63	0.46
Highway <sup>4,6</sup>	9.6	0.11
<b>Railway</b>		
SMART Train <sup>4</sup>	1.3	0.0011
<b>Subtotal, Background Sources</b>	<b>91</b>	<b>0.58</b>
<b>Total Cumulative Impact</b>	<b>91</b>	<b>0.58</b>
BAAQMD Significance Threshold	100	0.8
Above Threshold?	No	No

**Notes:**

1. Health impacts from surrounding sources are estimated using BAAQMD Screening Tools. Impacts presented here are the maximum impacts at offsite sensitive receptor.
2. Consistent with BAAQMD guidance, Ramboll included all facilities within 1,000 feet of the proposed Project as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Marin and Sonoma County Stationary Source Screening tool with additional details provided by BAAQMD. Values have been adjusted using BAAQMD's Diesel Internal Combustion (IC) Engine Distance Multiplier Tool and BAAQMD's Gasoline Dispensing Facility (GDF) Distance Multiplier.
3. Western Dealer Holding Co., 76 Gas Station (identified as "Sa Ngasilpa" in the Stationary Source Tool), Irwin Shell, and San Rafael Sanitation District are 367, 855, 985, and 1,800 feet away from the offsite MEISR, respectively.
4. Cancer risk and PM<sub>2.5</sub> concentration values were determined based on the maximum impact of a raster cell located within the Project boundary. Raster data for cancer risk and PM<sub>2.5</sub> concentrations were provided by BAAQMD.
5. The raster file data for roadways with Average Daily Traffic (ADT) greater than 30,000 was summed with data from roadways with ADT between 10,000 and 30,000. Cancer risk and PM<sub>2.5</sub> concentration data for roadways with ADT between 10,000 and 30,000 was obtained through BAAQMD's Roadway Screening Analysis Tool, and then cancer risk was multiplied by a factor of 1.337 in accordance with OEHHA guidance to account for updated exposure parameters.
6. The BAAQMD Roadway and Highway tools incorporate 2014 emission factors and vehicle fleet mix for PM<sub>2.5</sub>. PM<sub>2.5</sub> emissions for 2021 were calculated using EMFAC2014 and impacts were scaled for the year 2021, the full buildout year for the project. Ratio of PM<sub>2.5</sub> emissions in 2021 to 2014 is 0.78.

**Table 2**  
**Health Risk Impacts to Sensitive Receptors at Project<sup>1</sup>**  
**703 3rd Street**  
**San Rafael, California**

7. 2019 Title 24 standards (CEC 2018) require all buildings constructed after 2019 to implement MERV 13 filters to minimize impacts from particulate emissions. MERV 13 filters have an efficiency of 80-90% for PM2.5 when operated with windows continuously closed. However, the behavior of occupants (i.e., whether or not they open or close windows and the duration) cannot be predicted. Studies have found that indoor air concentration is at least 30% lower than outdoor concentration when filtration is turned off. Thus, a filtration efficiency of 30% was conservatively assumed for MERV 13 filters for PM2.5 (BAAQMD 2018). Based on the same study, a 30% reduction in indoor PM2.5 concentrations can also be conservatively assumed for a situation where a building does not have MERV 13 filters and also does not have operable windows. A 30% reduction of diesel particulate matter (DPM) concentrations (and therefore a 30% reduction in cancer risk) could also be assumed, but is conservatively not taken into account in this analysis.

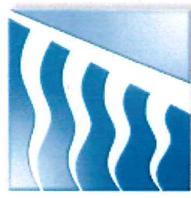
**Abbreviations:**

- BAAQMD: Bay Area Air Quality Management District
- MEISR: Maximally Exposed Individual Sensitive Receptor
- PM<sub>2.5</sub>: fine particulate matter
- ug/m<sup>3</sup>: micrograms per cubic meter
- UTM: Universal Transverse Mercator coordinate system

**References:**

BAAQMD 2018. Measurement study to evaluate controls for reducing in-home pollutant exposures at homes near high trafficked roadways. Available online at: [http://www.baaqmd.gov/~/media/files/planning-and-research/care-program/documents/2018/sfdph\\_indoorair7\\_interactive-pdf.pdf?la=en](http://www.baaqmd.gov/~/media/files/planning-and-research/care-program/documents/2018/sfdph_indoorair7_interactive-pdf.pdf?la=en)

California Energy Commission (CEC). 2018. 2019 Standards Part 6 Chapter 3 (Section 120) Revised Express Terms. Available at:  
[http://www.energy.ca.gov/title24/2019standards/rulemaking/documents/2018-05-09\\_hearing/2019\\_Revised\\_EnergyCode.php](http://www.energy.ca.gov/title24/2019standards/rulemaking/documents/2018-05-09_hearing/2019_Revised_EnergyCode.php) (Accessed 6/22/2018)



# BAY AREA AIR QUALITY MANAGEMENT DISTRICT

## Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD

This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

[Click here for guidance on conducting risk & hazard screening, including roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.](#)

[Click here for District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.](#)

**Table A: Requester Contact Information**

Date of Request	6/5/2018
Contact Name	Jill Leva
Affiliation	Ramboll
Phone	213-943-6347
Email	<a href="mailto:jleva@ramboll.com">jleva@ramboll.com</a>
Project Name	703 3rd Street
Address	703 3rd Street
City	San Rafael
County	Marin
Type (residential, commercial, mixed use, industrial, etc.)	Mixed Use - Residential and Retail
Project Size (# of units or building square feet)	120 Residential Units, 970 square feet of retail space
Comments:	

For Air District assistance, the following steps must be completed:

1. Complete all the contact and project information requested in [Table A](#). Incomplete forms will not be processed. Please include a project site map.
2. Download and install the free program Google Earth, <http://www.google.com/earth/download/ge/>, and then download the county specific Google Earth stationary source application files from the District's website, <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx>. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.
3. Find the project site in Google Earth by inputting the site's address in the Google Earth search box.
4. Identify stationary sources within at least a 1000ft radius of project site. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm the source's address location. Please report any mapping errors to the District.
5. List the stationary source information in [Table B](#) blue section only.
6. Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.



7. Email this completed form to District staff. District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Areana Flores at 415-749-4616, or [aiores@baaqmd.gov](mailto:aiores@baaqmd.gov)



**Table B: Google Earth data**

Distance from Receptor (feet) or MEI <sup>1</sup>	Facility Name	Address	Plant No.	Cancer Risk <sup>2</sup>	Hazard Risk <sup>2</sup>	PM <sub>2.5</sub> <sup>2</sup>	Source No. <sup>3</sup>	Type of Source <sup>4</sup>	Fuel Code <sup>5</sup>	Status/Comments
										Updated to include OEHHA factor. Use GDF Distance Multiplier for 98 more accurate screening
355 Western Dealer Holding Co, LLC	34 Ritter Street	112350	175.582	0.867	0		1	Gas Station		Updated to include OEHHA factor. Use GDF Distance Multiplier for 98 more accurate screening
972 Sa Ngasipa #257384	1125 Lincoln Avenue	109767	31.783	0.157	0		1	Gas Station		Updated to include OEHHA factor. Use GDF Distance Multiplier for 98 more accurate screening
805 Irwin Shell	834 Irwin Street	112309	54.541	0.269	0		1	Gas Station		Facility not present on Stationary Source Screening Analysis Tool, but shows up on Facility Data Map. Plant No. and risks not shown on that map.
733 Heritage Cleaners	915 Irwin Street		11737 N/A	N/A	N/A		1	Dry Cleaner	N/A	Updated to include OEHHA factor. Use Diesel Multiplier for more 98 accurate screening
931 San Rafael Sanitation District	201 N Francisco Blvd	21247	55.301	0.0616	0.071		1	Generator		

Footnotes:

1. Maximally exposed individual
2. These Cancer Risk, Hazard Index, and PM<sub>2.5</sub> columns represent the values in the Google Earth Plant Information Table.
3. Each plant may have multiple permits and sources.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. Fuel codes: 98 = diesel, 189 = Natural Gas.
6. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
7. The date that the HRSA was completed.
8. Engineer who completed the HRSA. For District purposes only.
9. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
10. The HRSA "Chronic Health" number represents the Hazard Index.
11. Further information about common sources:
  - a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
  - b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard



- c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
- d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but
- e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Multiplier worksheet.
- f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
- g. This spray booth is considered to be insignificant.

Date last updated:  
03/13/2018



## 703 3rd Street San Rafael - Marin County, Annual

### 703 3rd Street San Rafael Marin County, Annual

## 1.0 Project Characteristics

### 1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Supermarket	0.97	1000sqft	0.00	969.00	0
Apartments Mid Rise	120.00	Dwelling Unit	0.47	111,157.00	343
Health Club	0.28	1000sqft	0.00	279.00	0
Enclosed Parking with Elevator	109.00	Space	0.14	21,427.96	0
Enclosed Parking Structure	12.00	Space	0.02	2,359.04	0

### 1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	69
Climate Zone	5			Operational Year	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MMWhr)	641.35	CH4 Intensity (lb/MMWhr)	0.029	N2O Intensity (lb/MMWhr)	0.006

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Assuming PG&E is the utility provider in San Rafael.

Land Use - Land uses for Project provided by client. The total lot acreage is 0.63 and the default acreages were scaled based on this total.

Construction Phase - Default CalEEMod construction schedule

Off-road Equipment - Default CalEEMod construction equipment for Phases

Demolition - Assuming amount of demolition is twice the lot area.



Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	120,000.00	111,157.00
tblLandUse	LandUseSquareFeet	43,600.00	21,427.96
tblLandUse	LandUseSquareFeet	4,800.00	2,359.04
tblLandUse	LotAcreage	0.02	3.0000e-003
tblLandUse	LotAcreage	3.16	0.47
tblLandUse	LotAcreage	0.01	1.0000e-003
tblLandUse	LotAcreage	0.98	0.14
tblLandUse	LotAcreage	0.11	0.02

2.0 Emissions Summary

## 2.1 Overall Construction Unmitigated Construction

Year	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	
											tons/yr	Mt/yr					
2019	"	0.8754	0.7272	0.6311	1.4100e-003	0.0750	0.0363	0.1113	0.0172	0.0336	0.0508	0.0000	128.77868	128.77868	0.0209	0.0000	129.3104
Maximum		0.8754	0.7272	0.6311	1.4100e-003	0.0750	0.0363	0.1113	0.0172	0.0336	0.0508	0.0000	128.77868	128.77868	0.0209	0.0000	129.3104

## Mitigated Construction



Year	tons/yr			MT/yr		
2019	0.8754	0.7272	0.6311	1.4100e-003	0.0750	0.0363
Maximum	0.8754	0.7272	0.6311	1.4100e-003	0.0750	0.0363

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2019	3-31-2019	0.4544	0.4544
2	4-1-2019	6-30-2019	1.1447	1.1447

## **2.2 Overall Operational Unmitigated Operational**



## Mitigated Operational

Category	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
	tons/yr															MT/yr
Area	0.8240	0.0167	1.2753	8.1000e-004	0.0594	0.0594	0.0594	0.0594	0.0594	0.4708	3.7048	9.1755	0.0102	3.6000e-004	9.5376	
Energy	5.8800e-003	0.0504	0.0223	3.2000e-004	4.0600e-003	4.0600e-003	4.0600e-003	4.0600e-003	4.0600e-003	0.0000	257.1579	257.1579	0.0101	2.9500e-003	258.2833	
Mobile	0.2338	0.7576	2.5124	8.0100e-003	0.7223	8.4800e-003	0.7308	0.1938	7.3500e-003	0.2018	0.0000	731.6835	731.6835	0.0257	0.0000	732.3262
Waste											0.0000	12.6403	0.0000	0.7470	0.0000	31.3157
Water											0.0000	2.5236	17.5543	20.0780	0.2600	28.4506
<b>Total</b>	<b>1.0637</b>	<b>0.8247</b>	<b>3.8101</b>	<b>9.1400e-003</b>	<b>0.7223</b>	<b>0.0720</b>	<b>0.7942</b>	<b>0.1938</b>	<b>0.0714</b>	<b>0.2653</b>	<b>20.6346</b>	<b>1,010.100</b>	<b>1,030.7351</b>	<b>1.0530</b>	<b>9.5700e-003</b>	<b>1,059.913</b>
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

## 3.0 Construction Detail

### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days	Num Days Week	Phase Description
1	Demolition	Demolition	1/11/2019	1/14/2019	5	10	
2	Site Preparation	Site Preparation	1/15/2019	1/15/2019	5	1	
3	Grading	Grading	1/16/2019	1/17/2019	5	2	
4	Building Construction	Building Construction	1/18/2019	6/6/2019	5	100	
5	Paving	Paving	6/7/2019	6/13/2019	5	5	
6	Architectural Coating	Architectural Coating	6/14/2019	6/20/2019	5	5	



**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Paving: 0.16**

**Residential Indoor: 225,093; Residential Outdoor: 75,031; Non-Residential Indoor: 1,872; Non-Residential Outdoor: 624; Striped Parking**

#### OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

#### Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	249.00	10.80	7.30	20.00 LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00 LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00 LD_Mix	HDT_Mix	HHDT



Building Construction	5	97.00	17.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	19.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

### 3.1 Mitigation Measures Construction

#### 3.2 Demolition - 2019

##### Unmitigated Construction On-Site

Category	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
	tons/yr															MT/yr
Fugitive Dust					0.0269	0.0000	0.0269	4.0800e-003	0.0000	4.0800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	4.7700e-003	0.0430	0.0385	6.0000e-005		2.6900e-003	2.6900e-003		2.5600e-003	0.0000	5.2601	5.2601	1.0000e-003	0.0000	5.2682	
<b>Total</b>	<b>4.7700e-003</b>	<b>0.0430</b>	<b>0.0385</b>	<b>6.0000e-005</b>	<b>0.0269</b>	<b>2.6900e-003</b>	<b>0.0296</b>	<b>4.0800e-003</b>	<b>0.03</b>	<b>6.6400e-003</b>	<b>0.0000</b>	<b>5.2601</b>	<b>5.2601</b>	<b>1.0000e-003</b>	<b>0.0000</b>	<b>5.2682</b>

##### Unmitigated Construction Off-Site

Category	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
	tons/yr															MT/yr
Hauling	1.2100e-003	0.0390	0.0115	1.0000e-004	2.0800e-003	1.6000e-004	2.2500e-003	5.8000e-004	1.5000e-004	7.3000e-004	0.0000	9.6140	9.6140	5.6000e-004	0.0000	9.6281
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	
Worker	1.9000e-004	1.3100e-004	0.0000	3.9000e-004	0.0000	4.0000e-004	1.0000e-004	0.0000	1.1000e-004	0.0000	0.3626	0.3626	1.0000e-005	0.0000	0.3629	
<b>Total</b>	<b>1.4000e-003</b>	<b>0.0391</b>	<b>0.0129</b>	<b>1.0000e-004</b>	<b>2.4800e-003</b>	<b>1.6000e-004</b>	<b>6.3000e-003</b>	<b>1.5000e-004</b>	<b>8.4000e-004</b>	<b>0.0000</b>	<b>9.9766</b>	<b>9.9766</b>	<b>5.7000e-004</b>	<b>0.0000</b>	<b>9.9910</b>	



### Mitigated Construction On-Site

Category	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					0.0269	0.0000	0.0269	4.0800e-003	0.0000	4.0800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	4.7700e-003	0.0430	0.0385	6.0000e-005	2.6900e-003	0.003	2.6900e-003	2.5600e-003	0.003	2.5600e-003	5.2601	5.2601	1.0000e-003	0.0000	0.0000	5.2852	
<b>Total</b>	<b>4.7700e-003</b>	<b>0.0430</b>	<b>0.0385</b>	<b>6.0000e-005</b>	<b>0.0269</b>	<b>2.6900e-003</b>	<b>0.0296</b>	<b>4.0800e-003</b>	<b>0.003</b>	<b>4.0800e-003</b>	<b>6.6400e-003</b>	<b>0.0000</b>	<b>5.2601</b>	<b>5.2601</b>	<b>1.0000e-003</b>	<b>0.0000</b>	<b>5.2852</b>

### Mitigated Construction Off-Site

Category	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	1.2100e-003	0.0390	0.0115	1.0000e-004	2.0900e-003	1.6000e-004	2.2500e-003	5.8000e-004	1.5000e-004	7.3000e-004	0.0000	9.6140	9.6140	5.6000e-004	0.0000	9.6281
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	1.9000e-004	1.3000e-004	1.3100e-003	0.0000	3.9000e-004	0.0000	4.0000e-004	1.0000e-004	0.004	1.1000e-004	0.0000	0.3626	0.3626	1.0000e-005	0.0000	0.3629
<b>Total</b>	<b>1.4000e-003</b>	<b>0.0391</b>	<b>0.0129</b>	<b>1.0000e-004</b>	<b>2.4800e-003</b>	<b>1.6000e-004</b>	<b>0.003</b>	<b>6.8000e-004</b>	<b>0.004</b>	<b>8.4000e-004</b>	<b>0.0000</b>	<b>9.9766</b>	<b>9.9766</b>	<b>5.7000e-004</b>	<b>0.0000</b>	<b>9.9910</b>

### 3.3 Site Preparation - 2019

### Unmitigated Construction On-Site



Category	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	
	MT/yr																
	tons/yr																
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	3.6000e-004	4.4500e-003	2.0700e-003	0.0000	1.8000e-004	0.004	1.8000e-004	0.004	1.7000e-004	0.0000	0.4378	0.4378	1.4000e-004	0.0000	0.0000	0.4413	
<b>Total</b>	<b>3.6000e-004</b>	<b>4.4600e-003</b>	<b>2.0700e-003</b>	<b>0.0000</b>	<b>2.7000e-004</b>	<b>0.004</b>	<b>1.8000e-004</b>	<b>0.004</b>	<b>4.5000e-005</b>	<b>0.0000</b>	<b>2.0000e-004</b>	<b>0.004</b>	<b>0.4378</b>	<b>0.4378</b>	<b>1.4000e-004</b>	<b>0.0000</b>	<b>0.4413</b>

## Unmitigated Construction Off-Site

Category	Emissions by Pollutant										Emissions by Gas				CO2e Mt/yr
	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
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
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
Worker	1.0000e-005	7.0000e-005	0.0000	2.0000e-005	0.005	0.005	2.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0181	0.0181	0.0181
Total	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	2.0000e-005	0.005	0.0000	2.0000e-005	0.005	1.0000e-005	0.0000	0.0181	0.0181	0.0181	0.0181

## Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Mt/yr					
											Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Fugitive Dust											2.7000e-004	0.0000	2.7000e-004	0.0000	0.0000	0.0000



Off-Road	3.6000e-004	4.4600e-003	2.0700e-003	0.0000	1.8000e-004	1.7000e-004	1.7000e-004	1.7000e-004	0.0000	0.4378	0.4378	0.4413	
Off-Road	0.004	0.003	0.003	0.000	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	
Total	3.6000e-004	4.4600e-003	2.0700e-003	0.0000	2.7000e-004	1.8000e-004	4.5000e-004	3.0000e-005	1.7000e-004	2.0000e-004	0.4378	1.4000e-004	0.4413

#### Mitigated Construction Off-Site

Category	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	MT/yr
	tons/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	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	2.0000e-005	0.005	2.0000e-005	0.005	1.0000e-005	0.005	1.0000e-005	0.005	0.0000	0.0181	0.0181	0.0181	
Total	1.0000e-005	1.0000e-005	7.0000e-005	0.0000	2.0000e-005	0.005	2.0000e-005	0.005	1.0000e-005	0.005	1.0000e-005	0.005	0.0000	0.0181	0.0181	0.0181	

#### 3.4 Grading - 2019

#### Unmitigated Construction On-Site

Category	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	MT/yr
	tons/yr																
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	9.5000e-004	8.6000e-003	7.6900e-003	0.003	1.0000e-005	0.005	5.4000e-004	0.004	5.1000e-004	5.1000e-004	1.0520	1.0520	2.0000e-004	0.004	1.0570		
Total	9.5000e-004	8.6000e-003	7.6900e-003	0.003	1.0000e-005	0.005	5.4000e-004	0.004	5.1000e-004	5.1000e-004	1.0520	1.0520	2.0000e-004	0.004	1.0570		

#### Unmitigated Construction Off-Site



Category	Emissions by Species										Emissions by Source				Emissions by Sector			
	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		
	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	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	0.0000	
Worker	4.0000e-005	3.0000e-005	2.6000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0725	0.0725	0.0725	0.0725	0.0726	0.0726	0.0726	
Total	4.0000e-005	3.0000e-005	2.6000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0725	0.0725	0.0725	0.0725	0.0726	0.0726	0.0726	

## Mitigated Construction On-Site

Category	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
	MT/yr															
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	9.5000e-004	8.6000e-003	7.6900e-003	1.0000e-005		5.4000e-004	5.4000e-004		5.1000e-004	0.0000	1.0520	1.0520	2.0000e-004	0.0000	1.0570	
Total	9.5000e-004	8.6000e-003	7.6900e-003	1.0000e-005	7.5000e-004	5.4000e-004	1.2900e-003	4.1000e-004	5.1000e-004	9.2000e-004	0.0000	1.0520	1.0520	2.0000e-004	0.0000	1.0570

## Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO <sub>2</sub>	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO <sub>2</sub>	NBio-CO <sub>2</sub>	Total CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
											tons/yr	Mt/yr	Mt/yr	Mt/yr	Mt/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
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
Worker	4.0000e-005	3.0000e-005	2.6000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0726
Total	4.0000e-005	3.0000e-005	2.6000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0726

### **3.5 Building Construction - 2019 Unmitigated Construction On-Site**

Category	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
	tons/yr															MT/yr
Off-Road	0.0479	0.4910	0.3772	5.7000e-004	0.04	0.0303	0.0303	0.0279	0.0279	0.0279	0.0000	51.1502	51.1502	0.0162	0.0000	51.5548
Total	0.0479	0.4910	0.3772	5.7000e-004	0.04	0.0303	0.0303	0.0279	0.0279	0.0279	0.0000	51.1502	51.1502	0.0162	0.0000	51.5548

### **Unmitigated Construction Off-Site**

Category	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	
	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	4.6200e-003	0.1034	0.0402	2.3000e-004	0.04	5.5600e-003	7.6000e-003	1.6100e-003	7.3000e-003	0.0000	21.9407	21.9407	1.1700e-003	0.0000	21.9699		
Worker	0.0183	0.0131	0.1275	3.9000e-004	0.04	0.0382	2.7000e-004	0.0355	0.0102	2.5000e-004	0.0104	0.0000	35.1763	35.1763	9.2000e-004	0.0000	35.1993
Total	0.0230	0.1165	0.1676	6.2000e-004	0.04	1.0300e-003	0.0448	0.0118	9.8000e-004	0.0127	0.0000	57.1170	57.1170	2.0900e-003	0.0000	57.1692	



### Mitigated Construction On-Site

Category	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
	tons/yr										MT/yr					
Off-Road	0.0479	0.4910	0.3772	5.7000e-004	0.0303	0.0303	0.0303	0.0279	0.0279	0.0000	51.1502	51.1502	0.0162	0.0000	51.5548	
Total	<b>0.0479</b>	<b>0.4910</b>	<b>0.3772</b>	<b>5.7000e-004</b>	<b>0.0303</b>	<b>0.0303</b>	<b>0.0303</b>	<b>0.0279</b>	<b>0.0279</b>	<b>0.0000</b>	<b>51.1502</b>	<b>51.1502</b>	<b>0.0162</b>	<b>0.0000</b>	<b>51.5548</b>	

### Mitigated Construction Off-Site

Category	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
	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	4.6200e-003	0.1034	0.0402	2.3000e-004	5.5600e-004	7.6000e-004	6.3200e-003	1.6100e-003	2.3300e-003	0.0000	21.9407	21.9407	1.1700e-003	0.0000	21.9699	
Worker	0.0183	0.0131	0.1275	3.9000e-004	0.0382	2.7000e-004	0.0385	0.0102	2.5000e-004	0.0104	0.0000	35.1763	35.1763	9.2000e-004	0.0000	35.1993
Total	<b>0.0230</b>	<b>0.1165</b>	<b>0.1676</b>	<b>6.2000e-004</b>	<b>0.0438</b>	<b>1.0300e-003</b>	<b>0.0448</b>	<b>0.0118</b>	<b>9.8000e-004</b>	<b>0.0127</b>	<b>0.0000</b>	<b>57.1170</b>	<b>57.1170</b>	<b>2.0900e-003</b>	<b>0.0000</b>	<b>57.1692</b>

### **3.6 Paving - 2019**

### Unmitigated Construction On-Site



Category	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
	tons/yr															MT/yr
Off-Road	2.0700e-003	0.0196	0.0179	3.0000e-005	1.1100e-003	0.003	1.1100e-003	0.003	1.0300e-003	0.003	0.0000	2.3931	2.3931	6.8000e-004	0.0000	2.4102
Paving	0.0000				0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
<b>Total</b>	<b>2.0700e-003</b>	<b>0.0196</b>	<b>0.0179</b>	<b>3.0000e-005</b>	<b>1.1100e-003</b>	<b>0.003</b>	<b>1.1100e-003</b>	<b>0.003</b>	<b>1.0300e-003</b>	<b>0.003</b>	<b>0.0000</b>	<b>2.3931</b>	<b>2.3931</b>	<b>6.8000e-004</b>	<b>0.0000</b>	<b>2.4102</b>

### Unmitigated Construction Off-Site

Category	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
	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	
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	
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.5000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3264	0.3264	1.0000e-005	0.0000	0.3266
<b>Total</b>	<b>1.7000e-004</b>	<b>1.2000e-004</b>	<b>1.1800e-003</b>	<b>0.0000</b>	<b>3.5000e-004</b>	<b>0.0000</b>	<b>3.6000e-004</b>	<b>9.0000e-005</b>	<b>0.0000</b>	<b>1.0000e-004</b>	<b>0.0000</b>	<b>0.3264</b>	<b>0.3264</b>	<b>1.0000e-005</b>	<b>0.0000</b>	<b>0.3266</b>

### Mitigated Construction On-Site

Category	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
	tons/yr															MT/yr
Off-Road	2.0700e-003	0.0196	0.0179	3.0000e-005	1.1100e-003	0.003	1.1100e-003	0.003	1.0300e-003	0.003	0.0000	2.3931	2.3931	6.8000e-004	0.0000	2.4102



Paving	0.0000				0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.0700e-003	0.0196	0.0179	3.0000e-005	1.1100e-003	1.1100e-003	1.0300e-003	1.0300e-003	0.0000	2.3931	2.3931	6.8000e-004	0.0000
													2.4102

### Mitigated Construction Off-Site

Category	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	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	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.5000e-004	0.004	0.0000	3.6000e-004	0.005	0.0000	1.0000e-004	0.004	0.3264	0.3264	1.0000e-005	0.3266	
Total	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.5000e-004	0.004	0.0000	3.6000e-004	0.005	0.0000	1.0000e-004	0.004	0.3264	0.3264	1.0000e-005	0.3266	

### 3.7 Architectural Coating - 2019 Unmitigated Construction On-Site

Category	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	MT/yr
Archit. Coating	0.7940				0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	6.7000e-004	4.5900e-003	4.6000e-003	1.0000e-005	3.2000e-004	0.004	3.2000e-004	3.2000e-004	0.004	3.2000e-004	0.004	0.6383	0.6383	5.0000e-005	0.0000	0.6397	
Total	0.7946	4.5900e-003	4.6000e-003	1.0000e-005	3.2000e-004	0.004	3.2000e-004	3.2000e-004	0.004	3.2000e-004	0.004	0.6383	0.6383	5.0000e-005	0.0000	0.6397	

### Unmitigated Construction Off-Site



Category	Emissions by Pollutant										Global Warming Potential (GWP)						
	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	
	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	1.8000e-004	1.3000e-004	1.2500e-003	0.0000	3.7000e-004	0.0000	3.8000e-004	1.0000e-004	0.0000	1.0000e-004	0.3445	0.3445	1.0000e-005	0.0000	0.0000	0.3447	
Total	1.8000e-004	1.3000e-004	1.2500e-003	0.0000	3.7000e-004	0.0000	3.8000e-004	1.0000e-004	0.0000	1.0000e-004	0.3445	0.3445	1.0000e-005	0.0000	0.0000	0.3447	

## Mitigated Construction On-Site

Category	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
	tons/yr										MT/yr					
Archit. Coating	0.7940						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	6.7000e-004	4.5900e-003	4.6000e-003	1.0000e-005			3.2000e-004	3.2000e-004	0.04	3.2000e-004	0.6383	0.6383	5.0000e-005	0.0000	0.6397	
Total	<b>0.7946</b>	<b>4.5900e-003</b>	<b>4.6000e-003</b>	<b>1.0000e-005</b>			<b>3.2000e-004</b>	<b>3.2000e-004</b>	<b>0.04</b>	<b>3.2000e-004</b>	<b>0.6383</b>	<b>0.6383</b>	<b>5.0000e-005</b>	<b>0.0000</b>	<b>0.6397</b>	

Mitigated Construction Off-Site



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
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
Worker	1.8000e-004	1.3000e-004	1.2500e-003	0.0000	3.7000e-004	0.0000	3.8000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3445	1.0000e-005	0.3447
Total	1.8000e-004	1.3000e-004	1.2500e-003	0.0000	3.7000e-004	0.0000	3.8000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3445	1.0000e-005	0.3447

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

Category	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
	tons/yr														MT/yr	
Mitigated	0.2338	0.7576	2.5124	8.0100e-003	0.7223	8.4800e-003	0.7308	0.1938	7.9500e-003	0.2018	0.0000	731.6835	731.6835	0.0257	0.0000	732.3262
Unmitigated	0.2338	0.7576	2.5124	8.0100e-003	0.7223	8.4800e-003	0.7308	0.1938	7.9500e-003	0.2018	0.0000	731.6835	731.6835	0.0257	0.0000	732.3262

### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated Annual VMT		Mitigated Annual VMT	
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT	Annual VMT	Annual VMT
Apartments Mid Rise	798.00	766.80	703.20	1,801,494	1,801,494	1,801,494	1,801,494
Enclosed Parking Structure	0.00	0.00	0.00				
Enclosed Parking with Elevator	0.00	0.00	0.00				
Health Club	9.19	5.82	7.46	14,616	14,616	14,616	14,616
Supermarket	99.07	172.08	161.28	134,660	134,660	134,660	134,660
Total	906.26	944.71	871.94	1,950,769	1,950,769	1,950,769	1,950,769

### 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-C	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by	MCY	SBUS	MH
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3	0.000685	0.000685	0.000685
Enclosed Parking Structure	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0	0.000685	0.000685	0.000685
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0	0.000685	0.000685	0.000685
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9	0.000685	0.000685	0.000685
Supermarket	9.50	7.30	7.30	6.50	74.50	19.00	34	30	36	0.000685	0.000685	0.000685

#### 4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.589733	0.041719	0.200019	0.112200	0.017267	0.005142	0.010289	0.010289	0.002023	0.003460	0.005638	0.005638	0.0000758
Enclosed Parking Structure	0.589733	0.041719	0.200019	0.112200	0.017267	0.005142	0.010289	0.010289	0.002023	0.003460	0.005638	0.005638	0.0000758
Enclosed Parking with Elevator	0.589733	0.041719	0.200019	0.112200	0.017267	0.005142	0.010289	0.010289	0.002023	0.003460	0.005638	0.005638	0.0000758
Health Club	0.589733	0.041719	0.200019	0.112200	0.017267	0.005142	0.010289	0.010289	0.002023	0.003460	0.005638	0.005638	0.0000758
Supermarket	0.589733	0.041719	0.200019	0.112200	0.017267	0.005142	0.010289	0.010289	0.002023	0.003460	0.005638	0.005638	0.0000758

#### 5.0 Energy Detail

Historical Energy Use: N

##### 5.1 Mitigation Measures Energy

Category	tons/yr										MT/yr					
	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
Electricity Mitigated					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	198.9581	198.9581	9.0000e-003	1.8600e-003	0.003	199.7377
Electricity Unmitigated					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	198.9581	198.9581	9.0000e-003	1.8600e-003	0.003	199.7377
Natural Gas Mitigated	5.8800e-003	0.0504	0.0223	3.2000e-004	4.0600e-003	4.0600e-003	4.0600e-003	0.0000	0.0000	58.1998	58.1998	1.1200e-003	1.0700e-003	0.003	58.5457	



## 5.2 Energy by Land Use - NaturalGas

### Unmitigated

NaturalGas	5.8800e-003	0.0504	0.0223	3.2000e-004	4.0600e-003	58.1998	1.1200e-003	1.0700e-003	58.5457							
------------	-------------	--------	--------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	---------	-------------	-------------	---------

Land Use	kBTU/yr	tons/yr												MT/yr				
		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
Apartments Mid Rise	1.04765e+006	5.6500e-003	0.0483	0.0205	3.1000e-004	0.003	3.9000e-003	0.003	3.9000e-003	0.003	3.9000e-003	0.003	0.0000	0.0000	55.9067	1.0700e-003	1.0200e-003	56.2389
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Health Club	6905.25	4.0000e-005	3.4000e-004	2.8000e-004	0.0000	0.04	3.0000e-005	0.005	3.0000e-005	0.005	3.0000e-005	0.005	0.3685	0.3685	1.0000e-005	1.0000e-005	0.05	0.3707
Supermarket	36066.2	1.9000e-004	1.7700e-003	1.4900e-003	1.0000e-003	0.005	1.3000e-004	0.004	1.3000e-004	0.004	1.3000e-004	0.004	0.0000	0.0000	1.9246	4.0000e-005	4.0000e-005	1.9361
<b>Total</b>		<b>5.8800e-003</b>	<b>0.0504</b>	<b>0.0223</b>	<b>3.2000e-004</b>		<b>4.0600e-003</b>	<b>4.0600e-003</b>	<b>4.0600e-003</b>	<b>4.0600e-003</b>	<b>4.0600e-003</b>		<b>0.0000</b>	<b>4.0600e-003</b>	<b>56.1998</b>	<b>1.1200e-003</b>	<b>1.0700e-003</b>	<b>58.5457</b>

### Mitigated

Land Use	kBTU/yr	tons/yr												MT/yr				
		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
Apartments Mid Rise	1.04765e+006	5.6500e-003	0.0483	0.0205	3.1000e-004	0.003	3.9000e-003	0.003	3.9000e-003	0.003	3.9000e-003	0.003	0.0000	0.0000	55.9067	1.0700e-003	1.0200e-003	56.2389
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Health Club	6905.25	4.0000e-005	3.4000e-004	2.8000e-004	0.0000	0.04	3.0000e-005	0.005	3.0000e-005	0.005	3.0000e-005	0.005	0.3685	0.3685	1.0000e-005	1.0000e-005	0.05	0.3707



	Total	Supermarket	1.9000e-004	1.7700e-003	1.4900e-003	1.0000e-005	1.3000e-004	1.3000e-004	1.3000e-004	1.9246	4.0000e-005	1.9361	
			5.3800e-003	0.0504	0.0223	3.2000e-004	0.003	4.0600e-003	4.0600e-003	0.0000	58.1998	1.0700e-003	58.5457

### 5.3 Energy by Land Use - Electricity

### Unmitigated

Land Use	Electricity Use	Total CO2	CH4	N2O	CO2e
	kWh/yr	Mt/yr			
Apartments Mid Rise	506639	147.3870	6.6600e-003	1.3800e-003	147.9645
Enclosed Parking Structure	13375.8	3.8912	1.8000e-004	4.0000e-005	3.9064
Enclosed Parking with Elevator	125568	36.5291	1.6500e-003	3.4000e-004	36.6723
Health Club	2109.24	0.6136	3.0000e-005	1.0000e-005	0.6160
Supermarket	36221.2	10.5372	4.8000e-004	1.0000e-004	10.5785
<b>Total</b>		<b>198.9581</b>	<b>9.0000e-003</b>	<b>1.8700e-003</b>	<b>199.7377</b>

## Mitigated

	Electricity Use kWh/yr	Total CO2 Mid Rise	CH4	N2O	CO2e MT/yr
Land Use					
Apartments Mid Rise	506639	147.3870	6.6600e- 003	1.3800e- 003	147.9645
Enclosed Parking Structure	13375.8	3.8912	1.8000e- 004	4.0000e- 005	3.9064
Enclosed Parking with Elevator	125588	36.5291	1.6500e- 003	3.4000e- 004	36.6723



Health Club	2109.24	0.6136	3.0000e-005	1.0000e-005	0.6160
Supermarket	36221.2	10.5372	4.8000e-004	1.0000e-004	10.5785
Total		198.9581	9.0000e-003	1.8700e-003	199.7377

## 6.0 Area Detail

## 6.1 Mitigation Measures Area

Category	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
							tons/yr									MT/yr
Mitigated	0.8240	0.0167	1.2753	8.1000e-004	0.0594	0.0594	0.0594	0.0594	0.0594	0.0594	5.4708	3.7048	9.1755	0.0102	3.6000e-004	9.5376
Unmitigated	0.8240	0.0167	1.2753	8.1000e-004	0.0594	0.0594	0.0594	0.0594	0.0594	0.0594	5.4708	3.7048	9.1755	0.0102	3.6000e-004	9.5376

## 6.2 Area by SubCategory



Hearth	0.2769	6.3700e-003	0.3813	7.6000e-004		0.0545	0.0545		0.0545	0.0545	5.4708	2.2471	7.7179	8.7900e-003	3.6000e-004	8.0446
Landscaping	0.0272	0.0103	0.8941	5.0000e-005		4.9300e-003	4.9300e-003		4.9300e-003	4.9300e-003	0.0000	1.4576	1.4576	1.4200e-003	0.0000	1.4931
<b>Total</b>	<b>0.8240</b>	<b>0.0167</b>	<b>1.2753</b>	<b>8.1000e-004</b>		<b>0.0594</b>	<b>0.0594</b>		<b>0.0594</b>	<b>0.0594</b>	<b>5.4708</b>	<b>3.7048</b>	<b>9.1755</b>	<b>0.0102</b>	<b>3.6000e-004</b>	<b>9.5377</b>

### Mitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	MT/yr					
											Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Architectural Coating	0.0794						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Consumer Products	0.4405						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hearth	0.2769	6.3700e-003	0.3813	7.6000e-004		0.0545	0.0545		0.0545	0.0545	5.4708	2.2471	7.7179	8.7900e-003	3.6000e-004	8.0446
Landscaping	0.0272	0.0103	0.8941	5.0000e-005		4.9300e-003	4.9300e-003		4.9300e-003	4.9300e-003	0.0000	1.4576	1.4576	1.4200e-003	0.0000	1.4931
<b>Total</b>	<b>0.8240</b>	<b>0.0167</b>	<b>1.2753</b>	<b>8.1000e-004</b>		<b>0.0594</b>	<b>0.0594</b>		<b>0.0594</b>	<b>0.0594</b>	<b>5.4708</b>	<b>3.7048</b>	<b>9.1755</b>	<b>0.0102</b>	<b>3.6000e-004</b>	<b>9.5377</b>

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Category	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	20.0780	0.2600	6.2800e-003	28.4506



## 7.2 Water by Land Use

### Unmitigated

Unmitigated	20.0780	0.2600	6.2800e-003	28.4506
-------------	---------	--------	-------------	---------

Land Use	Mgal	MT/yr				
		Indoor/Out door Use	Total CO2	CH4	N2O	CO2e
Apartments Mid Rise	7.81848	19.8064	0.2556	6.1800e-003	28.0361	
Enclosed Parking Structure	4.92904	0 / 0	0.0000	0.0000	0.0000	
Enclosed Parking with Elevator						
Health Club	0.0165601	0.0417	5.4000e-004	1.0000e-005	0.0591	
Supermarket	0.0035980	0.2299	3.9000e-003	9.0000e-005	0.3555	
<b>Total</b>		<b>20.0780</b>	<b>0.2600</b>	<b>6.2800e-003</b>	<b>28.4506</b>	

### Mitigated

Land Use	Mgal	MT/yr				
		Indoor/Out door Use	Total CO2	CH4	N2O	CO2e
Apartments Mid Rise	7.81848	19.8064	0.2556	6.1800e-003	28.0361	
Enclosed Parking Structure	4.92904	0 / 0	0.0000	0.0000	0.0000	
Enclosed Parking with Elevator						
Health Club						
Supermarket						
<b>Total</b>		<b>20.0780</b>	<b>0.2600</b>	<b>6.2800e-003</b>	<b>28.4506</b>	



Health Club	0.0165601	0.0417	5.4000e-004	1.0000e-005	0.0591
/	/	/	004	005	/
Supermarket	0.11957	0.2299	3.9000e-003	9.0000e-005	0.3555
0.0036980	0.0036980	0.003	0.003	0.005	/
<b>Total</b>	<b>20.0780</b>	<b>0.2600</b>	<b>6.2800e-003</b>	<b>28.4506</b>	

## 8.0 Waste Detail

---

### 8.1 Mitigation Measures Waste

#### Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	12.6403	0.7470	0.0000	31.3157
Unmitigated	12.6403	0.7470	0.0000	31.3157

### 8.2 Waste by Land Use Unmitigated

Land Use	Waste Disposed tons	Total CO2 MT/yr	CH4 MT/yr	N2O MT/yr	CO2e MT/yr
Apartments Mid Rise	55.2	11.2051	0.6622	0.0000	27.7802
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000



Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Health Club	1.6	0.3248	0.0192	0.0000	0.8046
Supermarket	5.47	1.1104	0.0656	0.0000	2.7509
<b>Total</b>		<b>12.6403</b>	<b>0.7470</b>	<b>0.0000</b>	<b>31.3157</b>

### Mitigated

Land Use	Waste Disposed	Total CO2	CH4	N2O	CO2e
	tons				MT/yr
Apartments Mid Rise	55.2	11.2051	0.6622	0.0000	27.7602
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Health Club	1.6	0.3248	0.0192	0.0000	0.8046
Supermarket	5.47	1.1104	0.0656	0.0000	2.7509
<b>Total</b>		<b>12.6403</b>	<b>0.7470</b>	<b>0.0000</b>	<b>31.3157</b>

### 9.0 Operational Offroad

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

### 10.0 Stationary Equipment

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

### Fire Pumps and Emergency Generators



**Boilers**

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

**User Defined Equipment**

Equipment Type	Number
----------------	--------

**11.0 Vegetation**

