

APPENDIX L: CONSTRUCTION HEALTH RISK ASSESSMENT

HEALTH RISK ASSESSMENT

Olympic and Hill Project

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1.0 Executive Summary

1.1 Findings

This report provides an analysis of potential health risk impacts related to the proposed construction of the Olympic and Hill Project (Project) in the City of Los Angeles, California. The analysis evaluated the incremental change in health risk concentration exposure from diesel exhaust/diesel particulate matter (DPM) emitted by heavy-duty construction equipment during Project construction. The findings of the analysis are as follows:

- For carcinogenic exposures, the increase in risk is calculated to be 4.3 in one million, which is less than the applicable threshold of 10 in one million for sensitive receptors in close proximity to the Project Site, resulting in a less than significant impact.
- For chronic non-carcinogenic exposures, the increase in the respiratory hazard index was estimated to be less than the applicable threshold of one for sensitive receptors in close proximity to the project site, resulting in a less than significant impact.

2.0 Introduction

The Office of Environmental Health Hazard Assessment (OEHHA) adopted a new version of the Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual) in March of 2015.¹ The Guidance Manual was developed by OEHHA, in conjunction with the California Air Resources Board (CARB), for use in implementing the Air Toxics “Hot Spots” Program (Health and Safety Code Section 44360 et. seq.). The Air Toxics “Hot Spots” Program requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics “Hot Spots” Program are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels. CARB acknowledges that the Guidance Manual does not include guidance for CEQA and that it would be “handled by individual [Air Pollution Control] Districts.”²

The intent in developing the Guidance Manual was to provide health risk assessment (HRA) procedures for use in the Air Toxics Hot Spots Program or for the permitting of new or modified stationary sources. Air districts are to determine which facilities will prepare an HRA based on a prioritization process. The Guidance Manual provides recommendations related to cancer risk evaluation of short-term projects. As discussed in Section 8.2.10 of the Guidance Manual, “[t]he local air pollution control districts sometimes use the risk assessment guidelines for the Hot Spots program in permitting decisions for short-term projects such as construction or waste site remediation.” Short-term projects that would require a permitting decision by South Coast Air Quality Management District (SCAQMD) typically would be limited to site remediation (e.g., stationary soil vapor extractors) and would not be applicable to the Project. The new Guidance Manual does not provide specific recommendations for evaluation of short-term use of mobile sources (e.g., heavy-duty diesel construction equipment).

Eyestone Environmental, LLC (Eyestone) coordinated with the SCAQMD to determine whether the SCAQMD had any available guidance on use of the new Guidance Manual. According to Li Jin Sun, SCAQMD CEQA Program Supervisor, SCAQMD is

¹ Office of Environmental Health Hazard Assessment, *Air Toxicology and Epidemiology, Adoption of Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. March 6, 2015, www.oehha.ca.gov/air/hot_spots/hotspots2015.html.

² CARB, *Risk Management Guidance for Stationary Sources of Air Toxics*, July 23, 2015, p. 19, www.arb.ca.gov/toxics/rma/rmgssat.pdf.

currently evaluating the new Guidance Manual and they have not developed any recommendations on its use for CEQA analyses for potential construction impacts.³

Per SCAQMD's recommendation, consultation with the lead agency was conducted. The *L.A. City CEQA Thresholds Guide* (Thresholds Guide) states that "impacts from toxic air contaminants can occur during either the construction or operational phases of a project. During certain construction activities, potential releases of toxic air contaminants could occur during site remediation activities or during building demolition. Toxic air contaminants may also be released during industrial or manufacturing processes, or other activities that involve the use, storage, processing, or disposal of toxic materials."⁴ The Thresholds Guide does not specifically recommend an HRA for short-term DPM emissions from construction activities. The Thresholds Guide also sets forth the following factors for consideration on a case-by-case basis in making a determination of significance with regard to toxic air contaminants: the regulatory framework for the toxic material(s) and process(es) involved; the proximity of the toxic air contaminants to sensitive receptors; the quantity, volume, and toxicity of the contaminants expected to be emitted; the likelihood and potential level of exposure; and the degree to which project design will reduce the risk of exposure. Based on this information, the methodology utilized in the Draft EIR remains consistent with City of Los Angeles guidance for preparation of HRAs.

OEHHA's new Guidance Manual provides Age Sensitivity Factors (ASFs) to account for potential increased sensitivity of early-in-life exposure to carcinogens. A review of relevant guidance was conducted to determine applicability of the use of early life exposure adjustments to identified carcinogens. For risk assessments conducted under the auspices of The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly, Statutes of 1987; Health and Safety Code Section 44300 et seq.) a weighting factor is applied to all carcinogens regardless of purported mechanism of action. The use of these factors would not be applicable to this HRA as neither the Lead Agency nor SCAQMD have developed recommendations on whether these factors should be used for CEQA analyses of potential DPM construction impacts. For this assessment, the HRA relied upon United States Environmental Protection Agency (USEPA) guidance relating to the use of early life exposure adjustment factors (Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens, EPA/630/R-003F) whereby adjustment factors are only considered when carcinogens act "through the mutagenic mode of action." The USEPA has identified 19 compounds that elicit a mutagenic mode of action for carcinogenesis. For DPM, polycyclic aromatic hydrocarbons (PAHs) and their derivatives, which are known to exhibit a mutagenic mode of action, comprise less than one percent of

³ Lijin Sun., SCAQMD CEQA Program Supervisor, Personal Communication via email, May 16, 2018.

⁴ City of Los Angeles, *CEQA Thresholds Guide*, 2006, p. B.3-2.

the exhaust particulate mass. To date, the USEPA reports that whole diesel engine exhaust has not been shown to elicit a mutagenic mode of action. Therefore, early life exposure adjustments were not considered in this HRA.

Although a construction HRA is not required per the Thresholds Guide, for informational purposes only, an HRA has been prepared in accordance with current SCAQMD Guidance in response to public comments and to provide the City with additional supporting evidence that the Project would result in a less than significant health risk impact from construction of the Project.

3.0 Health Risk Assessment

This section of the HRA includes a discussion of the assessment process, source identification and characterization, identification of chemicals of concern, risk characterization, and conclusions. As discussed above in Section 2.0, the HRA was conducted in accordance with SCAQMD Guidance and Final-Localized Significance Threshold Methodology (LST Guidelines).^{5,6} DPM modeled concentrations were used to calculate cancer risk and chronic hazard index at each relevant receptor. The acute hazard index was not quantified since an inhalation Reference Exposure Level (REL) has not been determined by the OEHHA for DPM.

3.1 The Assessment Process

The risk assessment process is typically described as consisting of four basic steps: (1) hazard identification; (2) exposure assessment; (3) dose-response assessment; and (4) risk characterization. In the first step, hazard identification involves determining the potential health effect which may be associated with emitted pollutants. The purpose is to identify qualitatively whether a pollutant is a potential human carcinogen or is associated with other types of adverse health effects. Depending on the chemical, these health effects may include short-term ailments or chronic diseases. The dose-response assessment is designed to characterize the relationship between the amount or dose of a chemical and its toxicological effect on the human body. Responses to toxic chemicals will vary depending on the amount and length of exposure. For example, short-term exposure to low concentrations of chemicals may produce no noticeable effect, but continued exposure to the same levels of chemicals over a long period of time may eventually cause harm. The purpose of the exposure assessment is to estimate the extent of exposure to each substance for which risk will be evaluated. This involves emission quantification, modeling of environmental transport, identification of chemicals of concern, identification of exposure routes, identification of exposed populations, and estimation of long-term exposure levels. Risk characterization is an integration of the health effects and public exposure information developed for emitted pollutants to provide a quantitative probability of adverse health effects.

⁵ SCAQMD, *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*, 2003, www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.

⁶ SCAQMD, *Final-Localized Significance Threshold Methodology*, 2008.

3.2 Source Identification and Characterization

3.2.1 Source Identification

As indicated above, the primary source of potential air toxics associated with proposed Project construction is DPM from on-site heavy-duty construction equipment. The SCAQMD recommends that an HRA be conducted for substantial sources of long-term DPM operational sources (e.g., truck stops and warehouse distribution facilities) and has provided guidance for analyzing mobile source diesel emissions.⁷ While Project construction would not represent a long-term source of DPM emissions⁸, the SCAQMD Guidance was used for purposes of modeling parameters and assumptions.

3.2.2 Source Characterization

As described in detail in Section II, Project Description, of the Draft MND, Project construction would commence with demolition of the existing surface parking lot, followed by grading and excavation for the subterranean parking garages. Building foundations would then be placed, followed by building construction, paving/concrete installation, and landscape installation. Project construction is anticipated to occur over approximately 30 months and be completed in 2022. It is estimated that approximately 206,100 cubic yards (cy) of soil would be hauled from the Project Site during the grading and excavation phase

Total DPM emissions over the duration of Project construction were calculated using the SCAQMD recommended California Emissions Estimator Model (CalEEMod) and consistent with the methodology for calculating criteria pollutant emissions provided in Section IV.C, Air Quality, of the Draft EIR. The calculations of the emissions generated during Project construction activities reflect the types and quantities of construction equipment and haul trucks that would be used to complete the proposed construction activities. As the assumptions used in the air quality analysis were developed to characterize a worst-case peak day of construction by phase, equipment usage assumptions were modified to reflect average daily use. As an example, the heavy-duty construction equipment mix provided in the air quality analysis for the foundation phase reflects all equipment needed for the largest concrete pour day. Thus, average daily DPM emissions from building foundation would be substantially less since maximum pour days would not occur every day during that phase.

⁷ SCAQMD, *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions*, August 2003.

⁸ *Project construction is short term—30 months. Moreover, the Project is residential, commercial, and open spaces uses, none of which are associated with heavy-duty truck use or significant DPM emissions.*

The calculation of DPM emissions was based on the Olympic and Hill Construction Annual CalEEMod output file provided in Appendix D, Greenhouse Gas Emissions, of the Draft MND. An adjustment was made to the regional emissions inventory to reflect on-site activity (diesel off-road equipment and diesel truck travel and idling time). The updated modeling is provided in Appendix A of this HRA.

3.3 Identification of Chemicals of Concern

DPM was evaluated for potential health effects in two categories, carcinogenic and non-carcinogenic. Most regulatory agencies consider carcinogens to pose a risk of cancer at all exposure levels (i.e., a “no-threshold” assumption); that is, any increase in dose is assumed to be associated with an increase in the probability of developing cancer. In contrast, non-carcinogens generally are thought to produce adverse health effects only when some minimum exposure level is reached (i.e., a threshold).

3.4 Exposure Quantification

Consistent with SCAQMD’s Localized Significance Threshold (LST) Methodology, this HRA used USEPA’s Regulatory Model AERMOD to assess the downwind extent of DPM concentrations from proposed construction activities. AERMOD accounts for a variety of refined, site-specific conditions that facilitate an accurate assessment of Project impacts. AERMOD’s air dispersion algorithms are based upon a planetary boundary layer turbulence structure and scaling concepts, including the treatment of surface and elevated sources in simple and complex terrain.

Exhaust emissions from construction equipment were treated as a set of side-by-side elevated volume sources. The release height was assumed to be 12 feet. This represents the mid-range of the expected plume rise from frequently used construction equipment during daytime atmospheric conditions. All construction exhaust emissions were assumed to take place over a 30 month (2.5 year) duration on weekdays between 7 A.M. to 6 P.M. (11-hour period).

Air dispersion models require additional input parameters including local meteorology and receptors. Due to the sensitivity to individual meteorological parameters such as wind speed and direction, the USEPA recommends that meteorological data used as input into dispersion models be selected on the basis of relative spatial and temporal conditions that exist in the area of concern. In response to this recommendation, meteorological data from the SCAQMD Downtown Los Angeles monitoring station (Source Receptor Area 1) were used to represent local weather conditions and prevailing winds.

Cartesian receptor grids were used to represent adjacent and nearby sensitive land uses. The Cartesian receptor grids were placed at each sensitive use with a built in 20 meter spacing. All receptors were placed within the breathing zone at ground level, which is recommended by SCAQMD for AERMOD modeling. Elevations for both sources and receptors were provided by the U.S. Geological Survey (USGS) and included using the AERMOD terrain processor AERMAP.

A graphical representation of the source-receptor grid network is presented in Appendix C.

3.5 Risk Characterization

3.5.1 Carcinogenic Chemical Risk

As discussed above, carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. Health risks associated with exposure to carcinogenic compounds at sensitive land uses in close proximity to the proposed Project can be defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Under a deterministic approach (i.e., point estimate methodology), the cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF). The URF is a measure of the carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It represents an upper bound estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu\text{g}/\text{m}^3$) over a 70-year lifetime.

The equation used to calculate the potential excess cancer risk is:

$$\text{Risk}_i = C_i \times \text{CP}_i \times \text{DBR} \times \text{EVF}$$

Where:

- Risk_i = Lifetime Excess Cancer Risk from exposure to chemical_i
- C_i = Representative Air Concentration for chemical_i ($\mu\text{g}/\text{m}^3$)
- CP_i = Cancer Potency_i ($\text{mg}/\text{kg}\text{-day}$)⁻¹
- DBR = Daily Breathing Rate (L/kg body weight-day)
- EVF = Exposure Value Factor (unitless)

An estimate of an individual's incremental excess cancer risk from exposure to Project construction DPM emissions is calculated by summing the chemical-specific excess cancer risks.

3.5.2 Non-Carcinogenic Chemical Risk

The potential for chronic non-carcinogenic health effects is evaluated by calculating the total hazard index (HI) for the Project construction DPM emissions. This HI represents the sum of the hazard quotients (HQs) developed for each individual project-related chemical, where a HQ is the ratio of the representative air concentration of the chemical to the chemical specific non-cancer REL. The non-cancer RELs represent the daily average exposure concentration at (or below) which no adverse health effects are anticipated. The equations used to calculate the chemical-specific HQs and HIs are:

$$\begin{aligned} \text{HQ}_i &= C_i/\text{REL}_i \\ \text{HI} &= \sum \text{HQ}_i \end{aligned}$$

Where:

$$\begin{aligned} \text{HQ}_i &= \text{Hazard Quotient for chemical}_i \\ C_i &= \text{Average Daily Air Concentration for chemical}_i \text{ (}\mu\text{g/m}^3\text{)} \\ \text{REL}_i &= \text{Noncancer Reference Exposure Level for chemical}_i \text{ (}\mu\text{g/m}^3\text{)} \\ \text{HI} &= \text{Hazard Index} \end{aligned}$$

3.6 Conclusions

The results from the health risk calculations provide an estimate of the potential risks and hazards to individuals through inhalation of Project construction DPM emissions over a 30 month duration. The estimated risks and hazards include: lifetime excess cancer risk estimates, and cumulative chronic HI estimates for the receptor locations of concern.

As shown in Appendix B, the results of the HRA yields a maximum off-site individual cancer risk of 4.3 in a million at the residences located north-east of the Project site. The maximum chronic risk of 0.057 occurs within this same residential area. As the Project would not emit carcinogenic or toxic air contaminants that result in impacts which exceed the maximum individual cancer risk of ten in one million or the chronic index of 1.0, Project-related toxic emission impacts would be less than significant.

4.0 Uncertainty Assessment

Evaluating carcinogenic pollutant concentrations based on OEHHA methodology and SCAQMD Guidance has an implied uncertainty. These methodologies were developed to provide a conservative health risk estimate. The conservative nature of this methodology relies on a number of inputs designed to prevent an underestimation of risk. The following discusses the conservative nature of the risk assessment analysis assumptions utilized in this analysis.

The cancer risk from DPM occurs mainly through inhalation. Output from the dispersion analysis was used to estimate the DPM concentrations. The cancer risk estimate is then calculated based on those estimated DPM concentrations using the risk methodology promulgated by OEHHA. The risk assessment guidelines established by SCAQMD and included in the analysis are designed to produce conservative (high) estimates of the risk posed by DPM, due to the following factors:

- As a conservative measure, the SCAQMD does not recognize indoor adjustments for residential uses. However, studies have shown that the typical person spends approximately 87 percent of their time indoors, 5 percent of their time outdoors, and 7 percent of their time in vehicles. A DPM exposure assessment showed that an average indoor concentration was 2.0 $\mu\text{g}/\text{m}^3$, compared with an outdoor concentration of 3.0 $\mu\text{g}/\text{m}^3$.⁹
- OEHHA has a toxicity database that lists TACs and their URFs. A URF describes the cancer potency of a particular TAC and is used to estimate cancer risk.⁴ Most of these URFs are extrapolated from animal studies based on continuous exposure to particular toxin. This method can have some significant uncertainties. For example, a chemical that is carcinogenic by one route of exposure is considered to be carcinogenic for all routes of exposure at its maximum potency. Also, it is not realistic for a receptor to be exposed to a continuous concentration of TACs over time. In reality, receptors are exposed to constantly changing concentration levels that would expose receptors to lower levels of TACs over time than analyzed in this analysis.
- The use of the SCAQMD meteorological data set and conservative exposure assumptions (e.g., assumes receptor would be located outside in the same

⁹ South Coast Air Quality Management District (SCAQMD), *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions*, 2002.

location 24 hours per day for the entire construction duration) amongst others, likely also lead to overestimated risks.

As such, uncertainty in the health risk analysis is conservative in nature and is designed to prevent any undisclosed impacts to human health. Concentrations reported in this report represent a worst-case scenario that is likely an over estimation of actual pollutant concentrations.

Appendix A

Emissions Calculations



Olympic and Hill

Construction Emissions (Annual Diesel Particulate Matter)

CalEEMod Output (tons/year)

Phase No.	Phase	Year	Mitigated	On/Off Site	Category	Exhaust PM10
2	Site Preparation	2018	Mitigated	On-site	Off-Road	0.00305
3	Grading	2018	Mitigated	On-site	Off-Road	0.028
3	Grading	2019	Mitigated	On-site	Off-Road	0.0559
4	Building Construction	2019	Mitigated	On-site	Off-Road	0.1322
4	Building Construction	2020	Mitigated	On-site	Off-Road	0.145
5	Architectural Coating	2020	Mitigated	On-site	Off-Road	0.013
5	Architectural Coating	2021	Mitigated	On-site	Off-Road	0.0161
6	Paving	2021	Mitigated	On-site	Off-Road	0.00436

Annual Totals (tons)

Daily Max to Annual Ratio	80%
Year	Totals (tons/year)
2018	0.0248
2019	0.1505
2020	0.1264
2021	0.0164
Total	0.3181
Annual Average	0.1272

Olympic and Hill Proposed Project - South Coast AQMD Air District, Annual

**Olympic and Hill Proposed Project
South Coast AQMD Air District, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	1,075.00	Space	0.00	430,000.00	0
Quality Restaurant	8.00	1000sqft	0.00	8,000.00	0
Apartments High Rise	700.00	Dwelling Unit	1.16	643,021.00	1176
Strip Mall	7.00	1000sqft	0.00	7,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	31
Climate Zone	11	Operational Year	2022		
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project data per Site Plan dated 5.5.17

Construction Phase - Approximate 30-month construction timeline.

Off-road Equipment - Architectural Coating: Equipment use on worst-case day.

Off-road Equipment - Building Construction: Equipment use on worst-case day.

Off-road Equipment - Grading: Equipment use on worst-case day.

Off-road Equipment -

Off-road Equipment - Site Preparation: Equipment use on worst-case day.

Trips and VMT - Assumes 14 cy haul truck capacity and 100 haul trips per grading day. Soil export to be deposited at Azusa Landfill (47 mi roundtrip)

Demolition -

Grading - Approximate 1,000 cy asphalt and 206,100 cy of soil export for 4-level subterranean garage.

Vehicle Trips - Trip rates were adjusted to incorporate trip reductions (internal capture and transit credit). Trip reductions per Traffic Study (5.3.17)

Woodstoves - No wood fireplaces or woodstoves are proposed.

Sequestration - 175 trees proposed on-site.

Construction Off-road Equipment Mitigation -

Area Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	NumDays	4.00	146.00
tblConstructionPhase	NumDays	200.00	400.00
tblConstructionPhase	NumDays	10.00	96.00
tblConstructionPhase	NumDays	10.00	21.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblFireplaces	NumberGas	595.00	700.00
tblFireplaces	NumberNoFireplace	70.00	0.00
tblFireplaces	NumberWood	35.00	0.00
tblGrading	AcresOfGrading	54.75	1.16
tblGrading	MaterialExported	0.00	206,100.00
tblGrading	MaterialExported	0.00	1,126.00
tblLandUse	LandUseSquareFeet	700,000.00	643,021.00
tblLandUse	LotAcreage	9.67	0.00
tblLandUse	LotAcreage	0.18	0.00
tblLandUse	LotAcreage	11.29	1.16
tblLandUse	LotAcreage	0.16	0.00
tblLandUse	Population	2,002.00	1,176.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblSequestration	NumberOfNewTrees	0.00	175.00
tblTripsAndVMT	HaulingTripLength	20.00	24.00
tblTripsAndVMT	HaulingTripLength	20.00	24.00
tblTripsAndVMT	HaulingTripNumber	111.00	142.00
tblTripsAndVMT	HaulingTripNumber	25,763.00	29,443.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	148.00	100.00
tblTripsAndVMT	VendorTripNumber	0.00	50.00
tblTripsAndVMT	VendorTripNumber	0.00	25.00
tblTripsAndVMT	WorkerTripNumber	10.00	5.00
tblVehicleTrips	ST_TR	4.98	4.83
tblVehicleTrips	ST_TR	94.36	65.96
tblVehicleTrips	ST_TR	42.04	23.44
tblVehicleTrips	SU_TR	3.65	3.43
tblVehicleTrips	SU_TR	72.16	50.44
tblVehicleTrips	SU_TR	20.43	11.39
tblVehicleTrips	WD_TR	4.20	4.07
tblVehicleTrips	WD_TR	89.95	62.88
tblVehicleTrips	WD_TR	44.32	24.70
tblWoodstoves	NumberCatalytic	35.00	0.00
tblWoodstoves	NumberNoncatalytic	35.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

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					
2018	0.1099	2.3980	0.6689	5.1700e-003	0.4226	0.0377	0.4604	0.1514	0.0350	0.1864	0.0000	500.0334	500.0334	0.0504	0.0000	501.2924

2019	0.8430	8.2490	6.2130	0.0234	1.3263	0.2132	1.5395	0.4380	0.2040	0.6420	0.0000	2,176.5100	2,176.5100	0.1845	0.0000	2,181.1217
2020	1.6342	4.4201	6.1174	0.0165	0.9500	0.1711	1.1211	0.2541	0.1663	0.4204	0.0000	1,476.2951	1,476.2951	0.1002	0.0000	1,478.8008
2021	1.3371	0.5254	0.5988	1.5100e-003	0.0553	0.0211	0.0764	0.0149	0.0206	0.0355	0.0000	136.8592	136.8592	0.0127	0.0000	137.1757
Maximum	1.6342	8.2490	6.2130	0.0234	1.3263	0.2132	1.5395	0.4380	0.2040	0.6420	0.0000	2,176.5100	2,176.5100	0.1845	0.0000	2,181.1217

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										M1/yr					
2018	0.1099	2.3980	0.6689	5.1700e-003	0.3317	0.0377	0.3694	0.1045	0.0350	0.1395	0.0000	500.0333	500.0333	0.0504	0.0000	501.2923
2019	0.8430	8.2490	6.2130	0.0234	1.1539	0.2132	1.3672	0.3460	0.2040	0.5500	0.0000	2,176.5095	2,176.5095	0.1845	0.0000	2,181.1212
2020	1.6342	4.4201	6.1174	0.0165	0.9500	0.1711	1.1211	0.2541	0.1663	0.4204	0.0000	1,476.2946	1,476.2946	0.1002	0.0000	1,478.8003
2021	1.3371	0.5254	0.5988	1.5100e-003	0.0553	0.0211	0.0764	0.0149	0.0206	0.0355	0.0000	136.8591	136.8591	0.0127	0.0000	137.1756
Maximum	1.6342	8.2490	6.2130	0.0234	1.1539	0.2132	1.3672	0.3460	0.2040	0.5500	0.0000	2,176.5095	2,176.5095	0.1845	0.0000	2,181.1212

	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	9.56	0.00	8.23	16.19	0.00	10.82	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	11-1-2018	1-31-2019	3.7856	3.7856
2	2-1-2019	4-30-2019	3.5953	3.5953
3	5-1-2019	7-31-2019	1.5337	1.5337
4	8-1-2019	10-31-2019	1.5397	1.5397
5	11-1-2019	1-31-2020	1.5090	1.5090
6	2-1-2020	4-30-2020	1.3888	1.3888
7	5-1-2020	7-31-2020	1.4090	1.4090
8	8-1-2020	10-31-2020	1.4144	1.4144
9	11-1-2020	1-31-2021	2.0067	2.0067
10	2-1-2021	4-30-2021	1.2080	1.2080
		Highest	3.7856	3.7856

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										M1/yr					
Area	2.8562	0.2286	7.3023	1.3100e-003		0.0517	0.0517		0.0517	0.0517	0.0000	179.9149	179.9149	0.0147	3.0800e-003	181.2000
Energy	0.0448	0.3884	0.2030	2.4400e-003		0.0310	0.0310		0.0310	0.0310	0.0000	3,640.0896	3,640.0896	0.0840	0.0238	3,649.2669
Mobile	0.9886	5.5655	12.9308	0.0491	4.0957	0.0390	4.1346	1.0975	0.0364	1.1339	0.0000	4,539.9515	4,539.9515	0.2190	0.0000	4,545.4265
Waste						0.0000	0.0000		0.0000	0.0000	68.3369	0.0000	68.3369	4.0386	0.0000	169.3018
Water						0.0000	0.0000		0.0000	0.0000	15.4041	532.9705	548.3747	1.5947	0.0400	600.1519

Total	3.8897	6.1825	20.4361	0.0529	4.0957	0.1217	4.2173	1.0975	0.1191	1.2166	83.7410	8,892.9265	8,976.6675	5.9510	0.0668	9,145.3472
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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	2.8562	0.2286	7.3023	1.3100e-003		0.0517	0.0517		0.0517	0.0517	0.0000	179.9149	179.9149	0.0147	3.0800e-003	181.2000
Energy	0.0448	0.3884	0.2030	2.4400e-003		0.0310	0.0310		0.0310	0.0310	0.0000	3,640.0896	3,640.0896	0.0840	0.0238	3,649.2669
Mobile	0.9886	5.5655	12.9308	0.0491	4.0957	0.0390	4.1346	1.0975	0.0364	1.1339	0.0000	4,539.9515	4,539.9515	0.2190	0.0000	4,545.4265
Waste						0.0000	0.0000		0.0000	0.0000	34.1665	0.0000	34.1665	2.0193	0.0000	84.6509
Water						0.0000	0.0000		0.0000	0.0000	12.3233	451.5136	463.8369	1.2764	0.0321	505.3102
Total	3.8897	6.1825	20.4361	0.0529	4.0957	0.1217	4.2173	1.0975	0.1191	1.2166	46.4918	8,811.4696	8,857.9613	3.6134	0.0589	8,965.8545

	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	44.48	0.92	1.32	39.28	11.78	1.96

2.3 Vegetation

Vegetation

Category	CO2e
New Trees	123.9000
Total	123.9000

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	11/1/2018	11/7/2018	5	5	
2	Grading	Grading	11/8/2018	4/26/2019	6	146	
3	Building Construction	Building Construction	4/27/2019	11/6/2020	5	400	
4	Architectural Coating	Architectural Coating	11/7/2020	3/22/2021	5	96	
5	Paving	Paving	3/23/2021	4/20/2021	5	21	

Acres of Grading (Site Preparation Phase): 2.5

Acres of Grading (Grading Phase): 1.16

Acres of Paving: 0

Residential Indoor: 1,302,118; Residential Outdoor: 434,039; Non-Residential Indoor: 22,500; Non-Residential Outdoor: 7,500; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Concrete/Industrial Saws	1	8.00	81	0.73
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Aerial Lifts	1	8.00	63	0.31
Building Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Generator Sets	2	8.00	84	0.74
Building Construction	Pumps	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Aerial Lifts	1	8.00	63	0.31
Architectural Coating	Air Compressors	5	6.00	78	0.48
Architectural Coating	Forklifts	1	8.00	89	0.20
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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	4	5.00	10.00	142.00	14.70	6.90	24.00	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	29,443.00	14.70	6.90	24.00	LD_Mix	HDT_Mix	HHDT
Building Construction	12	690.00	100.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	7	138.00	50.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	25.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

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
Category	tons/yr										M1/yr					
Fugitive Dust					0.0146	0.0000	0.0146	7.3900e-003	0.0000	7.3900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.8100e-003	0.0617	0.0295	6.0000e-005		3.0500e-003	3.0500e-003		2.8600e-003	2.8600e-003	0.0000	5.2799	5.2799	1.3300e-003	0.0000	5.3131

Total	5.8100e-003	0.0617	0.0295	6.0000e-005	0.0146	3.0500e-003	0.0176	7.3900e-003	2.8600e-003	0.0103	0.0000	5.2799	5.2799	1.3300e-003	0.0000	5.3131
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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	7.2000e-004	0.0256	4.8200e-003	7.0000e-005	1.4600e-003	1.0000e-004	1.5700e-003	4.0000e-004	1.0000e-004	5.0000e-004	0.0000	6.4251	6.4251	4.3000e-004	0.0000	6.4359
Vendor	1.1000e-004	3.0900e-003	8.0000e-004	1.0000e-005	1.6000e-004	2.0000e-005	1.8000e-004	5.0000e-005	2.0000e-005	7.0000e-005	0.0000	0.6245	0.6245	4.0000e-005	0.0000	0.6256
Worker	7.0000e-005	5.0000e-005	5.8000e-004	0.0000	1.4000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1316	0.1316	0.0000	0.0000	0.1317
Total	9.0000e-004	0.0288	6.2000e-003	8.0000e-005	1.7600e-003	1.2000e-004	1.8900e-003	4.9000e-004	1.2000e-004	6.1000e-004	0.0000	7.1811	7.1811	4.7000e-004	0.0000	7.1932

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					6.5500e-003	0.0000	6.5500e-003	3.3300e-003	0.0000	3.3300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.8100e-003	0.0617	0.0295	6.0000e-005		3.0500e-003	3.0500e-003		2.8600e-003	2.8600e-003	0.0000	5.2799	5.2799	1.3300e-003	0.0000	5.3131
Total	5.8100e-003	0.0617	0.0295	6.0000e-005	6.5500e-003	3.0500e-003	9.6000e-003	3.3300e-003	2.8600e-003	6.1900e-003	0.0000	5.2799	5.2799	1.3300e-003	0.0000	5.3131

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	7.2000e-004	0.0256	4.8200e-003	7.0000e-005	1.4600e-003	1.0000e-004	1.5700e-003	4.0000e-004	1.0000e-004	5.0000e-004	0.0000	6.4251	6.4251	4.3000e-004	0.0000	6.4359
Vendor	1.1000e-004	3.0900e-003	8.0000e-004	1.0000e-005	1.6000e-004	2.0000e-005	1.8000e-004	5.0000e-005	2.0000e-005	7.0000e-005	0.0000	0.6245	0.6245	4.0000e-005	0.0000	0.6256
Worker	7.0000e-005	5.0000e-005	5.8000e-004	0.0000	1.4000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1316	0.1316	0.0000	0.0000	0.1317
Total	9.0000e-004	0.0288	6.2000e-003	8.0000e-005	1.7600e-003	1.2000e-004	1.8900e-003	4.9000e-004	1.2000e-004	6.1000e-004	0.0000	7.1811	7.1811	4.7000e-004	0.0000	7.1932

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
Category	tons/yr										MT/yr					
Fugitive Dust					0.1508	0.0000	0.1508	0.0780	0.0000	0.0780	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0547	0.6325	0.3042	7.1000e-004		0.0280	0.0280		0.0257	0.0257	0.0000	64.6873	64.6873	0.0201	0.0000	65.1908

Total	0.0547	0.6325	0.3042	7.1000e-004	0.1508	0.0280	0.1788	0.0780	0.0257	0.1037	0.0000	64.6873	64.6873	0.0201	0.0000	65.1908
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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	0.0469	1.6739	0.3151	4.2900e-003	0.2523	6.5700e-003	0.2588	0.0647	6.2800e-003	0.0710	0.0000	419.7381	419.7381	0.0283	0.0000	420.4456
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	1.5900e-003	1.3000e-003	0.0140	3.0000e-005	3.2800e-003	3.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	3.1470	3.1470	1.1000e-004	0.0000	3.1497
Total	0.0484	1.6752	0.3290	4.3200e-003	0.2555	6.6000e-003	0.2621	0.0656	6.3000e-003	0.0719	0.0000	422.8851	422.8851	0.0284	0.0000	423.5953

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					0.0679	0.0000	0.0679	0.0351	0.0000	0.0351	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0547	0.6325	0.3042	7.1000e-004		0.0280	0.0280		0.0257	0.0257	0.0000	64.6873	64.6873	0.0201	0.0000	65.1907
Total	0.0547	0.6325	0.3042	7.1000e-004	0.0679	0.0280	0.0958	0.0351	0.0257	0.0608	0.0000	64.6873	64.6873	0.0201	0.0000	65.1907

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	0.0469	1.6739	0.3151	4.2900e-003	0.2523	6.5700e-003	0.2588	0.0647	6.2800e-003	0.0710	0.0000	419.7381	419.7381	0.0283	0.0000	420.4456
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	1.5900e-003	1.3000e-003	0.0140	3.0000e-005	3.2800e-003	3.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	9.0000e-004	0.0000	3.1470	3.1470	1.1000e-004	0.0000	3.1497
Total	0.0484	1.6752	0.3290	4.3200e-003	0.2555	6.6000e-003	0.2621	0.0656	6.3000e-003	0.0719	0.0000	422.8851	422.8851	0.0284	0.0000	423.5953

3.3 Grading - 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
Category	tons/yr										MT/yr					
Fugitive Dust					0.3134	0.0000	0.3134	0.1673	0.0000	0.1673	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1122	1.2714	0.6504	1.5400e-003		0.0559	0.0559		0.0514	0.0514	0.0000	138.1703	138.1703	0.0437	0.0000	139.2632

Total	0.1122	1.2714	0.6504	1.5400e-003	0.3134	0.0559	0.3693	0.1673	0.0514	0.2188	0.0000	138.1703	138.1703	0.0437	0.0000	139.2632
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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	0.0966	3.4335	0.6698	9.2000e-003	0.2800	0.0130	0.2931	0.0748	0.0125	0.0872	0.0000	901.6093	901.6093	0.0607	0.0000	903.1278
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	3.1400e-003	2.4900e-003	0.0271	7.0000e-005	7.1300e-003	6.0000e-005	7.1900e-003	1.8900e-003	5.0000e-005	1.9500e-003	0.0000	6.6254	6.6254	2.1000e-004	0.0000	6.6306
Total	0.0997	3.4359	0.6969	9.2700e-003	0.2872	0.0131	0.3002	0.0767	0.0125	0.0892	0.0000	908.2347	908.2347	0.0610	0.0000	909.7584

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					0.1410	0.0000	0.1410	0.0753	0.0000	0.0753	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1122	1.2714	0.6504	1.5400e-003		0.0559	0.0559		0.0514	0.0514	0.0000	138.1701	138.1701	0.0437	0.0000	139.2630
Total	0.1122	1.2714	0.6504	1.5400e-003	0.1410	0.0559	0.1969	0.0753	0.0514	0.1267	0.0000	138.1701	138.1701	0.0437	0.0000	139.2630

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	0.0966	3.4335	0.6698	9.2000e-003	0.2800	0.0130	0.2931	0.0748	0.0125	0.0872	0.0000	901.6093	901.6093	0.0607	0.0000	903.1278
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	3.1400e-003	2.4900e-003	0.0271	7.0000e-005	7.1300e-003	6.0000e-005	7.1900e-003	1.8900e-003	5.0000e-005	1.9500e-003	0.0000	6.6254	6.6254	2.1000e-004	0.0000	6.6306
Total	0.0997	3.4359	0.6969	9.2700e-003	0.2872	0.0131	0.3002	0.0767	0.0125	0.0892	0.0000	908.2347	908.2347	0.0610	0.0000	909.7584

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
Category	tons/yr										MT/yr					
Off-Road	0.3014	2.2755	2.0610	3.4300e-003		0.1322	0.1322		0.1287	0.1287	0.0000	288.5740	288.5740	0.0452	0.0000	289.7036

Total	0.3014	2.2755	2.0610	3.4300e-003		0.1322	0.1322		0.1287	0.1287	0.0000	288.5740	288.5740	0.0452	0.0000	289.7036
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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	0.0348	1.0319	0.2588	2.2700e-003	0.0558	6.7500e-003	0.0625	0.0161	6.4600e-003	0.0226	0.0000	219.1004	219.1004	0.0152	0.0000	219.4794
Worker	0.2949	0.2343	2.5460	6.8900e-003	0.6700	5.3100e-003	0.6753	0.1779	4.8900e-003	0.1828	0.0000	622.4307	622.4307	0.0195	0.0000	622.9171
Total	0.3297	1.2662	2.8048	9.1600e-003	0.7258	0.0121	0.7378	0.1940	0.0114	0.2054	0.0000	841.5311	841.5311	0.0346	0.0000	842.3964

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	0.3014	2.2755	2.0610	3.4300e-003		0.1322	0.1322		0.1287	0.1287	0.0000	288.5736	288.5736	0.0452	0.0000	289.7033
Total	0.3014	2.2755	2.0610	3.4300e-003		0.1322	0.1322		0.1287	0.1287	0.0000	288.5736	288.5736	0.0452	0.0000	289.7033

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	0.0348	1.0319	0.2588	2.2700e-003	0.0558	6.7500e-003	0.0625	0.0161	6.4600e-003	0.0226	0.0000	219.1004	219.1004	0.0152	0.0000	219.4794
Worker	0.2949	0.2343	2.5460	6.8900e-003	0.6700	5.3100e-003	0.6753	0.1779	4.8900e-003	0.1828	0.0000	622.4307	622.4307	0.0195	0.0000	622.9171
Total	0.3297	1.2662	2.8048	9.1600e-003	0.7258	0.0121	0.7378	0.1940	0.0114	0.2054	0.0000	841.5311	841.5311	0.0346	0.0000	842.3964

3.4 Building Construction - 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
Category	tons/yr										MT/yr					
Off-Road	0.3411	2.6516	2.5583	4.3200e-003		0.1450	0.1450		0.1412	0.1412	0.0000	361.2498	361.2498	0.0544	0.0000	362.6093

Off-Road	0.0360	0.2683	0.3235	5.1000e-004		0.0161	0.0161		0.0159	0.0159	0.0000	44.4157	44.4157	5.0900e-003	0.0000	44.5430
Total	1.3072	0.2683	0.3235	5.1000e-004		0.0161	0.0161		0.0159	0.0159	0.0000	44.4157	44.4157	5.0900e-003	0.0000	44.5430

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	4.0500e-003	0.1379	0.0342	3.6000e-004	8.9800e-003	2.8000e-004	9.2600e-003	2.5900e-003	2.7000e-004	2.8600e-003	0.0000	34.7909	34.7909	2.2000e-003	0.0000	34.8459
Worker	0.0164	0.0121	0.1371	4.2000e-004	0.0432	3.2000e-004	0.0435	0.0115	3.0000e-004	0.0118	0.0000	37.5861	37.5861	1.0100e-003	0.0000	37.6113
Total	0.0204	0.1500	0.1713	7.8000e-004	0.0521	6.0000e-004	0.0527	0.0141	5.7000e-004	0.0146	0.0000	72.3770	72.3770	3.2100e-003	0.0000	72.4572

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	1.2713					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0360	0.2683	0.3235	5.1000e-004		0.0161	0.0161		0.0159	0.0159	0.0000	44.4156	44.4156	5.0900e-003	0.0000	44.5430
Total	1.3072	0.2683	0.3235	5.1000e-004		0.0161	0.0161		0.0159	0.0159	0.0000	44.4156	44.4156	5.0900e-003	0.0000	44.5430

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	4.0500e-003	0.1379	0.0342	3.6000e-004	8.9800e-003	2.8000e-004	9.2600e-003	2.5900e-003	2.7000e-004	2.8600e-003	0.0000	34.7909	34.7909	2.2000e-003	0.0000	34.8459
Worker	0.0164	0.0121	0.1371	4.2000e-004	0.0432	3.2000e-004	0.0435	0.0115	3.0000e-004	0.0118	0.0000	37.5861	37.5861	1.0100e-003	0.0000	37.6113
Total	0.0204	0.1500	0.1713	7.8000e-004	0.0521	6.0000e-004	0.0527	0.0141	5.7000e-004	0.0146	0.0000	72.3770	72.3770	3.2100e-003	0.0000	72.4572

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.1300e-003	0.0813	0.0930	1.4000e-004		4.3600e-003	4.3600e-003		4.0200e-003	4.0200e-003	0.0000	12.3532	12.3532	3.9200e-003	0.0000	12.4511

Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	8.1300e-003	0.0813	0.0930	1.4000e-004		4.3600e-003	4.3600e-003		4.0200e-003	4.0200e-003	0.0000	12.3532	12.3532	3.9200e-003	0.0000	12.4511

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	7.5000e-004	0.0254	6.3000e-003	7.0000e-005	1.6500e-003	5.0000e-005	1.7100e-003	4.8000e-004	5.0000e-005	5.3000e-004	0.0000	6.4089	6.4089	4.1000e-004	0.0000	6.4190
Worker	5.7000e-004	4.2000e-004	4.7600e-003	1.0000e-005	1.5000e-003	1.0000e-005	1.5100e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.3045	1.3045	3.0000e-005	0.0000	1.3054
Total	1.3200e-003	0.0258	0.0111	8.0000e-005	3.1500e-003	6.0000e-005	3.2200e-003	8.8000e-004	6.0000e-005	9.4000e-004	0.0000	7.7133	7.7133	4.4000e-004	0.0000	7.7243

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	8.1300e-003	0.0813	0.0930	1.4000e-004		4.3600e-003	4.3600e-003		4.0200e-003	4.0200e-003	0.0000	12.3532	12.3532	3.9200e-003	0.0000	12.4511
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	8.1300e-003	0.0813	0.0930	1.4000e-004		4.3600e-003	4.3600e-003		4.0200e-003	4.0200e-003	0.0000	12.3532	12.3532	3.9200e-003	0.0000	12.4511

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	7.5000e-004	0.0254	6.3000e-003	7.0000e-005	1.6500e-003	5.0000e-005	1.7100e-003	4.8000e-004	5.0000e-005	5.3000e-004	0.0000	6.4089	6.4089	4.1000e-004	0.0000	6.4190
Worker	5.7000e-004	4.2000e-004	4.7600e-003	1.0000e-005	1.5000e-003	1.0000e-005	1.5100e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.3045	1.3045	3.0000e-005	0.0000	1.3054
Total	1.3200e-003	0.0258	0.0111	8.0000e-005	3.1500e-003	6.0000e-005	3.2200e-003	8.8000e-004	6.0000e-005	9.4000e-004	0.0000	7.7133	7.7133	4.4000e-004	0.0000	7.7243

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	0.9886	5.5655	12.9308	0.0491	4.0957	0.0390	4.1346	1.0975	0.0364	1.1339	0.0000	4,539.9515	4,539.9515	0.2190	0.0000	4,545.4265
Unmitigated	0.9886	5.5655	12.9308	0.0491	4.0957	0.0390	4.1346	1.0975	0.0364	1.1339	0.0000	4,539.9515	4,539.9515	0.2190	0.0000	4,545.4265

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	2,849.00	3,381.00	2401.00	9,776,472	9,776,472
Enclosed Parking with Elevator	0.00	0.00	0.00		
Quality Restaurant	503.04	527.68	403.52	700,915	700,915
Strip Mall	172.90	164.08	79.73	301,238	301,238
Total	3,524.94	4,072.76	2,884.25	10,778,624	10,778,624

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 High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Quality Restaurant	16.60	8.40	6.90	12.00	69.00	19.00	38	18	44
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LD11	LD12	MDV	LHD1	LHD2	MHD	HHH	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Enclosed Parking with Elevator	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Quality Restaurant	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Strip Mall	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	3,196.6674	3,196.6674	0.0755	0.0156	3,203.2097
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	3,196.6674	3,196.6674	0.0755	0.0156	3,203.2097
NaturalGas Mitigated	0.0448	0.3884	0.2030	2.4400e-003		0.0310	0.0310		0.0310	0.0310	0.0000	443.4222	443.4222	8.5000e-003	8.1300e-003	446.0572
NaturalGas Unmitigated	0.0448	0.3884	0.2030	2.4400e-003		0.0310	0.0310		0.0310	0.0310	0.0000	443.4222	443.4222	8.5000e-003	8.1300e-003	446.0572

5.2 Energy by Land Use - NaturalGas

Unmitigated

	Natural Gas 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 High Rise	6.45186e+006	0.0348	0.2973	0.1265	1.9000e-003		0.0240	0.0240		0.0240	0.0240	0.0000	344.2957	344.2957	6.6000e-003	6.3100e-003	346.3417
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
Quality Restaurant	1.84608e+006	9.9500e-003	0.0905	0.0760	5.4000e-004		6.8800e-003	6.8800e-003		6.8800e-003	6.8800e-003	0.0000	98.5139	98.5139	1.8900e-003	1.8100e-003	99.0993
Strip Mall	11480	6.0000e-005	5.6000e-004	4.7000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6126	0.6126	1.0000e-005	1.0000e-005	0.6163
Total		0.0448	0.3883	0.2030	2.4400e-003		0.0310	0.0310		0.0310	0.0310	0.0000	443.4222	443.4222	8.5000e-003	8.1300e-003	446.0572

Mitigated

	Natural Gas 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 High Rise	6.45186e+006	0.0348	0.2973	0.1265	1.9000e-003		0.0240	0.0240		0.0240	0.0240	0.0000	344.2957	344.2957	6.6000e-003	6.3100e-003	346.3417
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
Quality Restaurant	1.84608e+006	9.9500e-003	0.0905	0.0760	5.4000e-004		6.8800e-003	6.8800e-003		6.8800e-003	6.8800e-003	0.0000	98.5139	98.5139	1.8900e-003	1.8100e-003	99.0993
Strip Mall	11480	6.0000e-005	5.6000e-004	4.7000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6126	0.6126	1.0000e-005	1.0000e-005	0.6163
Total		0.0448	0.3883	0.2030	2.4400e-003		0.0310	0.0310		0.0310	0.0310	0.0000	443.4222	443.4222	8.5000e-003	8.1300e-003	446.0572

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.77206e+006	1,543.9286	0.0365	7.5400e-003	1,547.0884
Enclosed Parking with Elevator	2.5198e+006	1,403.4317	0.0332	6.8600e-003	1,406.3039
Quality Restaurant	353120	196.6743	4.6500e-003	9.6000e-004	197.0768
Strip Mall	94500	52.6329	1.2400e-003	2.6000e-004	52.7406
Total		3,196.6674	0.0755	0.0156	3,203.2097

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.77206e+006	1,543.9286	0.0365	7.5400e-003	1,547.0884

Enclosed Parking with Elevator	2.5198e+06	1,403.4317	0.0332	6.8600e-003	1,406.3039
Quality Restaurant	353120	196.6743	4.6500e-003	9.6000e-004	197.0768
Strip Mall	94500	52.6329	1.2400e-003	2.6000e-004	52.7406
Total		3,196.6674	0.0755	0.0156	3,203.2097

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	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	2.8562	0.2286	7.3023	1.3100e-003		0.0517	0.0517		0.0517	0.0517	0.0000	179.9149	179.9149	0.0147	3.0800e-003	181.2000
Unmitigated	2.8562	0.2286	7.3023	1.3100e-003		0.0517	0.0517		0.0517	0.0517	0.0000	179.9149	179.9149	0.0147	3.0800e-003	181.2000

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	0.2141					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4056					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0170	0.1452	0.0618	9.3000e-004		0.0117	0.0117		0.0117	0.0117	0.0000	168.0960	168.0960	3.2200e-003	3.0800e-003	169.0949
Landscaping	0.2196	0.0835	7.2406	3.8000e-004		0.0400	0.0400		0.0400	0.0400	0.0000	11.8189	11.8189	0.0115	0.0000	12.1051
Total	2.8562	0.2286	7.3023	1.3100e-003		0.0517	0.0517		0.0517	0.0517	0.0000	179.9149	179.9149	0.0147	3.0800e-003	181.2000

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	0.2141					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.4056					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0170	0.1452	0.0618	9.3000e-004		0.0117	0.0117		0.0117	0.0117	0.0000	168.0960	168.0960	3.2200e-003	3.0800e-003	169.0949
Landscaping	0.2196	0.0835	7.2406	3.8000e-004		0.0400	0.0400		0.0400	0.0400	0.0000	11.8189	11.8189	0.0115	0.0000	12.1051

Total	2.8562	0.2286	7.3023	1.3100e-003		0.0517	0.0517		0.0517	0.0517	0.0000	179.9149	179.9149	0.0147	3.0800e-003	181.2000
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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	463.8369	1.2764	0.0321	505.3102
Unmitigated	548.3747	1.5947	0.0400	600.1519

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	45.6078 / 28.7528	523.1436	1.4982	0.0376	571.7950
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	2.42827 / 0.154996	19.3398	0.0796	1.9600e-003	21.9127
Strip Mall	0.518508 / 0.317795	5.8913	0.0170	4.3000e-004	6.4443
Total		548.3747	1.5947	0.0400	600.1519

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	36.4863 / 26.9988	443.2454	1.1991	0.0302	482.2172
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	1.94262 / 0.145541	15.6051	0.0637	1.5700e-003	17.6637
Strip Mall	0.414806 / 0.29841	4.9864	0.0136	3.4000e-004	5.4293
Total		463.8369	1.2764	0.0321	505.3102

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	34.1685	2.0193	0.0000	84.6509
Unmitigated	68.3369	4.0386	0.0000	169.3018

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	322	65.3631	3.8629	0.0000	161.9343
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	7.3	1.4818	0.0876	0.0000	3.6712
Strip Mall	7.35	1.4920	0.0882	0.0000	3.6963
Total		68.3369	4.0386	0.0000	169.3018

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	161	32.6816	1.9314	0.0000	80.9671
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	3.65	0.7409	0.0438	0.0000	1.8356
Strip Mall	3.675	0.7460	0.0441	0.0000	1.8482
Total		34.1685	2.0193	0.0000	84.6509

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
----------------	--------

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	123.9000	0.0000	0.0000	123.9000

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	175	123.9000	0.0000	0.0000	123.9000
Total		123.9000	0.0000	0.0000	123.9000

Appendix B

Carcinogenic and Non-Carcinogenic Risk Calculations



Olympic and Hill

Health Risk Calculations - Project Construction

Diesel Particulate Matter Emission Rate Calculation / Scaler

Emission Rate (lbs/year)	254.5	
Hours per Day	11	7AM-6PM
Seconds per Year	14,454,000	
Average Annual Emission Rate (g/s)	0.0080	
Scaler Concentration (ug/m3) ^a	35.91	AERMOD Output
Diesel Particulate Concentration (ug/m3)	2.87E-01	

^a Scaler concentration based on a 1 g/s emission rate

Scaler Health Risk Calculations (1 ug/m3)

Source (a)	Mass GLC				Weight Fraction (d)	Contaminant (e)	Carcinogenic Hazard		
	(ug/m3) (1 g/s)	DPM Emissions (g/s)	Adjusted Concentration (ug/m3) (mg/m3)				URF (ug/m3) ⁻¹ (f)	CPF (mg/kg/day) ⁻¹ (g)	RISK (h)
Construction DPM (Construction Duration)	1.00	1.00000	0.28673	2.9E-04	1.00E+00	Diesel Exhaust Particulate	3.0E-04	1.1E+00	4.25E-06
Total						DPM Total			4.25

in a million

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	2.5
inhalation rate (m3/kg-day)	0.393
averaging time(cancer) (days)	25550
averaging time(noncancer) (days)	14600

Chronic Risk Calculations - DPM

Receptor	Annual Concentration (ug/m3)	Chronic Inhalation REL (ug/m3)	Chronic Risk (HI)
Residential	2.9E-01	5	5.7E-02

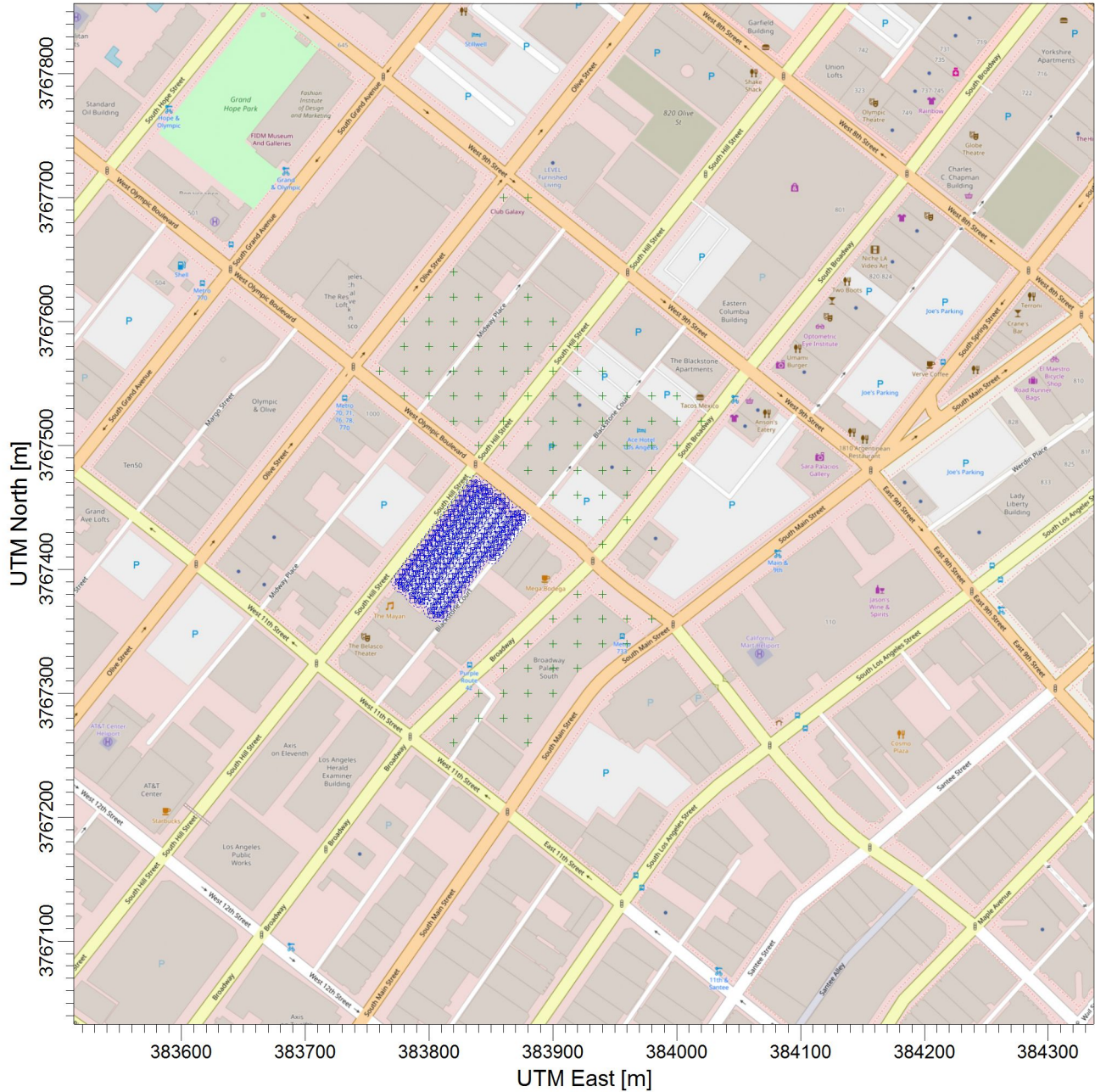
Appendix C

AERMOD Source Receptor Configuration



PROJECT TITLE:

C:\AERMOD\Olympic_Hill\Olympic_Hill.isc



COMMENTS:

Olympic and Hill
Source Receptor Diagram

SOURCES:

1

COMPANY NAME:

RECEPTORS:

104

MODELER:

SCALE:

1:5,182

0  0.1 km

DATE:

11/27/2018

PROJECT NO.: