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AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Area Q Quarry Project
San Bernardino County, California

April 8, 2020

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EXECUTIVE SUMMARY

This Air Quality, Health Risk, and Climate Change Impact Assessment (Report) has been prepared to quantify and determine the significance of air quality, health risk, and climate change impacts associated with the proposed Area Q Quarry Project (Project). The Project site is adjacent to Vulcan's existing Cajon Creek Quarry Area L near San Bernardino, California (Figure 1, Appendix A).

The Project would maintain historical production levels achieved at the adjacent Cajon Creek Quarry Area L by relocating existing Cajon Creek Quarry Area L mining operations and ancillary activities to the adjacent 196.0-acre property known as Area Q. Specifically, the Project proposes that the County of San Bernardino approve a Conditional Use Permit (CUP) authorizing the following uses and activities on the Project site, for periods no longer than 12-hours in duration between 6:00 a.m. and 10:00 p.m., Monday through Saturday (except holidays). Operations span 8 hours on a typical operating day:

- Mineral resource extraction activities would occur in one (1) phase over the 182.1-acre portion of the 196.0-acre Area Q property as shown on Figure 2 (see Appendix A). The maximum depth of mining would be 120 feet below natural ground surfaces. The design incorporates a standard final reclaimed slope configuration of 2:1 (horizontal to vertical).
- Construction of an approximately 10-foot tall berm along the southern portion of the Project site, just north of the Devil Creek Diversion Channel, using topsoil and overburden from the Project site, and planting of landscape screening along the berm.
- Construction and operation of an elevated conveyor system arm with a catch tray across the Project site, connecting with the existing conveyor system that originates in Cajon Creek Quarry Area L and terminates at the overhead truck loading hoppers west of the Project site.
- Construction and maintenance of onsite roads.
- Operation of, loaders, conveyors, and related equipment as necessary to move excavate and feed material through the Project conveyor system to the Cajon Creek Quarry Area L conveyor system and off-road haul trucks. As is currently being done, the material would be transported to the other Vulcan permitted facilities for processing.

This Report assumes that off-site truck trips and related production amounts would continue at existing rates as necessary to meet market demand. No off-site haul truck would enter or leave the Project site by public roadways. Project emissions were determined by subtracting existing Cajon Creek Quarry Area L site emissions (Baseline) from forecasted Project emissions post-relocation (Future). Baseline emissions were quantified using historical records of fuel burned in off-road vehicle engines, aggregates production, and other specifications (e.g., engine information) provided by Vulcan. Predictions of future emissions with the Project include reasonably foreseeable changes in operation procedures and equipment that are determined to reduce emissions from affected sources (e.g., CARB in-use diesel engine regulations). Because emissions characteristics of Project sources will be reduced over time until rules are completely phased in, future emissions with the Project are less than Baseline emissions and the net impact of the Project on emissions would be beneficial.

The Report uses South Coast Air Quality Management District (SCAQMD) approved methods in combination with current best practices, including methods from the Health Risk Assessment (HRA) Guidelines (OEHHA, 2015) to quantify the impacts associated with the Project. Forecasted Project emissions are compared to applicable pollutant thresholds, and analyzed with EPA AERMOD and HARP2 health risk assessment modeling software.

The Report has the following findings with respect to Air Quality and Greenhouse Gasses (GHG), which address the specific impact statements within the 2019 CEQA Guidelines Appendix G Environmental Checklist Form (California Code of Regulations, Title 14):

1. Air Quality

a) The Project would not conflict with or obstruct implementation of any applicable air quality plan.

Potential conflicts with applicable air quality plans were considered and ruled out (see Section 3.5.1). The Project may be affected by air quality plans indirectly because of actions taken, or rules implemented by, the SCAQMD. Literature on economics of aggregates production (Appendix B) describes the demand for aggregates to be inelastic and incapable of causing population to grow. In fact, aggregates consumption is proportional to population growth which is commonly used to predict future demand and accounted for in air quality plans. Thus, SCAQMD Air Quality Plan goals would be unaffected by the Project and this impact is less than significant.

b) The project does not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard.

Project criteria pollutant impacts are assessed by comparing peak day emissions in the existing setting and in the future with the Project. The difference in emissions between the historical peak day and predicted peak day emissions with the Project is the Project impact. Emissions are quantified for construction and operation phases of the Project as shown in Tables ES-1 and ES-2 below. Each table also compares the change in emissions from the Project (i.e., the impact) to the SCAQMD Air Quality Significance Thresholds (see Section 3.5.2).

ES-1. Construction Phase Criteria Pollutant Impacts

	ROG (lb/day)	NO_X (lb/day)	CO (lb/day)	SO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Construction Emissions	7.2	81.9	51.1	0.10	16.0	10.0
Significance Threshold	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Sources: Appendix F. County CEQA Significance Threshold criteria are equal to those published by SCAQMD.

Note: Lead is present in fugitive dust at concentration of approximately 130 ppm (see Table 18). Thus, compliance with PM_{10} threshold of 150 lb/day also ensures that lead emissions do not exceed the three (3) lb/day threshold.

ES-2. Operation Phase Criteria Pollutant Emissions Impacts

	ROG (lb/day)	CO (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	SOx (lb/day)
Future Emissions with Project	17.5	108.8	333.1	76.5	28.5	0.2
Baseline Emissions	16.8	133.8	319.2	78.3	30	0.2
Project Emissions Net Change	0.7	-25	13.9	-1.8	-1.5	0
Significance Threshold	55	550	55	150	55	150
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Appendix G (Emissions are based on an estimated maximum annual extraction rate of 3.1 million tons/year. Refer to Appendix G, dataset G.3 for calculations). County CEQA Significance Threshold criteria are equal to those published by SCAQMD.

Note: There would be no concurrent mining operations between Area L and the Project site (Area Q) because mining would not be initiated until the mining in Area L is completed.

As shown in Tables ES-1, Project would increase emissions of each pollutant by an amount less than the applicable CEQA Significance Threshold criteria. County CEQA Significance Threshold criteria are equal to those published by SCAQMD. Table ES-2 shows that Project operations may slightly increase emissions of NOx and ROG but in amounts less than the applicable Significance Threshold. Other pollutant emissions are predicted to decrease. Thus, depending upon which pollutant is considered, the Project impact on some pollutants is predicted to be beneficial and the Project would result in less than significant impact for each pollutant assessed.

c) The Project would not expose sensitive receptors to substantial pollutant concentrations.

The US EPA and SCAQMD recommended gaussian plume dispersion model software, AERMOD, was used to determine ground level concentrations of toxic air contaminants (TAC) at receptors near the Project. Concentrations of TACs were input to the HARP2 Risk Module software published by CARB and required by CARB and SCAQMD to be used for air quality health risk assessments in California. Table ES-3 summarizes

health risk impacts at receptor locations that were predicted to experience maximum increase in health risk with the Project (see Section 3.5.3).

Table ES-3. Health Risk Impacts

Model Receptor # – Type	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
392 – Residence	5.46	0.0381	0.01
393 – Residence	5.33	0.0370	0.008
387 – Residence	0.475	0.00267	0.0016
435 – Residence	-2.84	0.00128	0.0015
436 – School	-0.0120	0.00161	0.0011
445 – Rehabilitation Center	-2.36	< 0	< 0
438 – School	-2.65	< 0	< 0
317 – School	-0.774	< 0	< 0
532 – Worker	1.24	0.11	0.019
530 – Worker	1.23	0.11	0.024
Point of Maximum Impact (PMI)	n/d	n/d	0.024
Significance Threshold	**10**	**1.0**	**1.0**
Exceeds Threshold?	**No**	**No**	**No**

Source: Appendix G.

Note: This table provides results for 8 of the 1073 receptors analyzed, however no off-site receptors in the model demonstrated significant Cancer, Chronic, or Acute risk. Results for all receptors can be found in Appendix G. PMI for acute health risk occurs at UTM Zone 11 coordinate (466921.99 m E, 3780804.6 m N).

As shown in Table ES-3, the maximum exposed individual receptor (MEIR) is predicted to experience slightly greater than five excess cancer cases per million exposures and chronic non-cancer risk of less than 0.04 hazard index (H.I.). These maximum risk levels are less than the significance thresholds recommended by SCAQMD. In addition, acute risk at the PMI (0.018 H.I.) is much less than its associated threshold (1.0 H.I.). Individual public receptor (e.g., residential) health risk is always greater than worker health risk for exposure to an equivalent concentration. Thus, determination that public receptor health risk levels are less than the significance threshold necessarily corresponds with even less health risk impact to workers. Nevertheless, worker health risk was assessed for disclosure purposes. Finally, cancer burden was calculated as discussed in Section 3.5.3 and determined to be less than the SCAQMD significance threshold of 0.5. Therefore, health risk assessment performed shows that the Project impacts on health risks would be less than significant.

d) The Project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions. Diesel exhaust from mobile equipment/vehicles has a slight odor. Odor intensity would decrease rapidly with distance and is not expected to be frequently (or at all) detectable at locations outside of the Project site boundary. Given the large site upon which the diesel engines will traverse, and the

fact that the existing mining operation produced up to the levels currently proposed without receiving odor complaints; the Project would result in a less than significant impact (Section 3.5.4).

2. Greenhouse Gasses

a) The Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

There is general agreement that only the largest conceivable projects could, by themselves, have a significant impact on the environmental due to GHG emissions. However, each project resulting in an emissions increase would contribute to the cumulative impact that emissions occurring planet-wide have on global climate change. Thus, determination of whether the Project contribution is cumulatively considerable is required to evaluate this impact. Table ES-4 shows that GHG emissions increases from the Project would be nearly zero and much less than the SCAQMD and County of San Bernardino screening thresholds (see Section 4.5.1). Thus, the Project would increase GHG emissions by an amount that is less than cumulatively considerable and the Project impact in this respect is less than significant.

ES-4. Greenhouse Gas Emissions

Source	CO_2e (MT/yr)
Construction Phase Emissions (amortized over 30-year period)	72
Operation Phase Emissions	2,130
Baseline Emissions	2,178
Project Emissions	24
San Bernardino Green House Gas Reduction Plan Screening Threshold[1]	3,000
SCAQMD Screening Threshold[2]	10,000
Exceeds Screening Threshold(s)?	No

[1]See Section 4.1.5
[2]See Section 4.3.2

b) The Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

As discussed in Impact 2.a) the Project would increase GHG emissions in an amount determined to be less than significant. However, there may be plans established that require Project sources go beyond little to no increase in GHG emissions. In fact, there are many such requirements for sources to reduce GHG emissions and most originate from the AB 32 Scoping Plan and associated programs administrated by CARB. The Scoping Plan is the State's blueprint for how GHG reductions will be achieved. Local jurisdictions may have requirements as well, but the overall effort is centralized with CARB. Therefore, this impact evaluates whether the Project may conflict with the Scoping Plan (see Section 4.5.2). The SCAQMD Interim GHG Significance Threshold takes a tiered approach whereby Projects can screen-out by one of the following five methods:

exemption from CEQA, GHG emissions already analyzed in GHG budgets from in approved regional plans, having emissions less than the 10,000 $MTCO_2e$/yr screening level, meeting best performance standards, or purchase GHG emissions offsets by funding projects or buying them outright.
In the decade after SCAQMD adopted the Interim GHG Significance Threshold, several new laws and executive orders were adopted that require additional reductions in years after 2020. For instance, Senate Bill 32 (Lara, 2016) requires that GHG emissions be 40% less than 1990 levels by 2030. More drastic still, Senate Bill 100 (de Leon, 2018) which was signed by the Governor recently requires 100% zero-carbon electricity by 2045. On the day SB 100 was signed into law, the Governor also signed Executive Order B-55-18 which commits California to total, economy-wide carbon neutrality by 2045. Clearly, the 2008 Guidance is may be somewhat inadequate in producing a meaningful comparison by today's standards which propose a grand vision that, if achieved, would fundamentally change how business is conducted and citizens live in the State. Thus, as discussed in the most recent updates to the Scoping Plan, objectives of the Scoping Plan affect entire sectors of the economy and it no longer makes sense to evaluate GHG emissions on a project-level.

As stated previously, Project GHG emissions levels presented in Table ES-4 are primarily for disclosure purposes because impact analysis for the Project follows the approach certified by SCAQMD in the Final Negative Declaration for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project on December 12, 2014 (SCAQMD, 2014). The approach used by SCAQMD to assess GHG impacts from that project recognizes that consumers of electricity and transportation fuels are, in effect, regulated by requiring providers and importers of electricity and fuel to participate in the GHG Cap-and-Trade Program and other Programs (e.g., low carbon fuel standard, renewable portfolio standard, etc.). Each such sector-wide program exists within the framework of AB 32 and its descendant laws the purpose of which is to achieve GHG emissions reductions consistent with the AB 32 Scoping Plan.

In summary, the Project would generate GHGs from electricity use and combustion of transportation fuels, each of which is regulated near the top of the supply-chain. As such, each citizen of California (including the operator of the Project) will have no choice but to purchase electricity and fuels produced in a way that is acceptable to the California market. Thus, Project GHG emissions will be consistent with the relevant plan (i.e. AB 32 Scoping Plan). The Project would meet its fair share of the cost to mitigate the cumulative impact of global climate change because Vulcan is purchasing energy from the California market. Thus, the Project would have a less than significant impact on applicable GHG reduction plans.

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Air Quality, Health Risk, and Climate Change Impact Assessment
Area Q Quarry Project
San Bernardino County, California

April 8, 2020

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1.0 INTRODUCTION

Vulcan Materials Company – Western Division (Vulcan) is submitting an application for a Conditional Use Permit (CUP), Reclamation Plan, and General Plan Land Use Zoning Designation change to conduct aggregate material extraction and ancillary activities, and post-mining reclamation on 187.6-acre portion of the Area Q property, which is 196.0-acres in size (the "Project"). The Project site is in the County of San Bernardino (County), west of Cajon Boulevard and adjacent to the Vulcan's existing Cajon Creek Quarry Area L (Figure 1, Appendix A). Section 3.2 – Environmental Setting provides information regarding the Project site vicinity and region.

Vulcan currently operates The Cajon Creek Quarry Area L, which is adjacent to the Project site. Vulcan transports pit run material from its Cajon Creek Quarry Area L, located within the City of San Bernardino, to their San Bernardino facility, located within the County, for processing. These existing operations constitute the Project's baseline conditions.

The Project will provide a high-quality source of local aggregate materials to serve the regional market. Mined materials will be transported via conveyor from the Project site to Vulcan's existing Cajon Creek Quarry. Material will then be processed at and shipped from Vulcan's existing permitted locations. No haul trucks would enter or leave the Project site onto public roadways, and the Project would not result in any new transportation impacts.

The proposed actions are analyzed in this Air Quality and Climate Change Impact Report (AQCCIA) and, heretofore referred to as the "Project", though they include only the features of the Project that affect air quality.

This AQCCIA presents technical information and analysis describing reasonably foreseeable changes to the environment that would occur with the Project (Figure 2, Appendix A). Project impacts on regional and local environmental setting are assessed for construction and operation using current standard practices and the State CEQA Guidelines (14 CCR §15000 et. seq.). This AQCCIA primarily follows the *Air Quality Analysis Handbook* (SCAQMD, 2018), *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA, 2015), and *Risk Assessment Procedures for Rules 1401 and 212 – Standards for Approving Permits* (SCAQMD, 2015).

This report has two primary sections; air quality and GHG, each of which are divided into the following sub-sections:

- **Regulatory Setting**. This subsection describes the characteristics of pollutants as well as federal, state, and local regulations that apply to the Project.
- **Environmental Setting**. This subsection describes the existing physical environment (i.e., CEQA baseline)[1] for the region and areas adjacent to the Project site.

[1] The word "baseline" is capitalized in this report when referring to the Project Baseline and is not capitalized when referring to the concept of baseline under CEQA and/or baselines for other projects, plans, regulations, etc.

- **Significance Thresholds**. This subsection presents the state CEQA Guidelines Appendix G checklist items which are the primary thresholds used along with the SCAQMD significance criteria that are applied to determine the significance of the Project.
- **Methodology**. This subsection describes the design features of the Project, emissions calculation methods, emissions that are in the Baseline for the Project, and health risk assessment (HRA) methods used for this Project.
- **Project-Level Impacts and Mitigation Measures**. This subsection presents the results of Project impact analyses prepared using the methodology; compares each impact to significance criteria; makes a determination of significance; proposes mitigation measures to reduce significant impacts to less than significant levels or the maximum extent feasible.

2.0 PROJECT DESCRIPTION

The proposed physical activities associated with the Project being evaluated under CEQA include the following:

- **Demolition of Structures:** Existing housing units and various auxiliary structures will be demolished and removed from the Area Q site.
- **Clearing of Site:** Scrapers and dozers will be used to clear vegetation.
- **Construction of a Berm:** Construction of an approximately 10-foot tall berm along the southern portion of the Project site (just north of the Devil Creek Diversion Channel) using scrapers, dozers, and overburden from the Project site. Additionally, vegetation will be used to provide landscape screening along the berm.
- **Relocation to Area Q**: Relocate the existing mining operation to a 196.0-acre property directly south of the Cajon Creek Quarry Area L. This area is referred to as the Area Q Quarry. Mineral resource extraction activities will occur in one (1) phase over a 182.1-acre area. The maximum depth of mining would be 120-feet below natural ground surfaces. The design incorporates a standard final reclaimed slope configuration of 2:1 (horizontal to vertical).
- **Transportation of Aggregates Materials:**
    - Construction and operation of an elevated conveyor system arm with a catch tray across the Project site, connecting with Vulcan's existing conveyor system located on the Cajon Creek Quarry site;
    - Construction and maintenance of onsite roads; and
    - Operation of loaders, conveyors, and related equipment as necessary to move material from the Project site to the conveyor system that will transport materials to Vulcan's existing conveyor system located on the Cajon Creek Quarry site.
- **Reclamation**: Site will be reclaimed as open space.

The Project would involve the excavation and transportation of raw aggregates to the Cajon Creek Quarry and on to Vulcan's processing facility for processing. The overall production rate and activity levels at the site would remain unchanged from the Cajon Creek Quarry production rate and activity levels, and are summarized in

Table 1. Specifically, the excavation and truck trip rates associated with historical operation of Cajon Creek Area L are assumed to occur on Area Q. Thus, the production rates that are proposed would remain unchanged from those that have occurred in the past and were, in fact, derived from historical levels of production using information provided by Vulcan (Appendix C).

Table 1. Area Q Quarry Project Summary

Activity	Description
Construction/Site Preparation (approximately 3 months)	
Demolition	Demolition of approximately 15 structures, including residential housing and auxiliary structures such as sheds. Removal of concrete pads and other debris. Anticipated schedule: 1 month
Clearing of Vegetation	Use of scrapers and dozers to clear site of vegetation. Anticipated schedule: 10 days
Excavation of Topsoil and Creation of Berm	Use of scrapers and dozers to remove topsoil and create an approximately 10-foot perimeter berm along the facility southern boundary. Anticipated schedule: 1 month
Area Q Quarrying	
Area Q Quarry Area	The Area Q Quarry would be located on approximately 187.6 acres within a 196.9-acre Area Q property. Approximately 182.1 acres would be disturbed by mining/excavation activities, with the balance dedicated to setbacks and construction of a berm along the southern site boundary.
Resource Recovery and Processing	
Mining Method	Existing Quarry operations will remain unchanged and consist of excavation by hydraulic shovel or front-end loader working exclusively at an elevation above the groundwater table. Dredging, dewatering, and blasting will not occur.
Processing	Extracted resources transported in the same manner as currently be done from the Cajon Creek Quarry to the existing San Bernardino processing facility.
Estimated Annual Production	Existing rate of aggregate extraction would remain unchanged from existing levels reported in Surface Mining and Reclamation Act records for Cajon Creek Quarry Area L.
Hours of Operation	No more than a 12-hour period (between 6:00 a.m. and 10:00 p.m.). Operations span 8 hours on a typical operating day.
Reclamation	
End Use	Open Space
Off-site Traffic	
Daily Truck Trips	No change (same as historical trips).
Number Mining Operation Employee Trips	No change (same as historical trips).
Project Evaluated	
Area Q Property / Project Site (acres)	Approximately 196.0 acres.
Reclamation Area Including Setbacks (acres)	Approximately 187.6 acres.

Activity	Description
Mining/Excavation Area (acres)	Approximately 182.1 acres.
Mining Method	Use of excavators, scrapers, dozers, loaders, etc. No blasting would be required.
Mining Depth	Approximately 120-feet bgs.
Processing	No processing would occur on the Project site.
Estimated Total Net (salable) Aggregate Volume	40 million tons.
Estimated Average Annual Extraction Rate	1.9 to 2.6 million tons/year, based on market demand.
Estimated Maximum Annual Extraction Rate	3.1 million tons/year, based on market demand.
Water Use (dust control)	Approximately 19.5 AF per year obtained from groundwater well west of Area M.
Project Life	Approximately 30 years depending on market demand.
Hours of Operation	12-hour period between 6:00 a.m. and 10:00 p.m., Monday through Saturday.
Material Transport Method	Conveyor system from Project site to existing conveyance infrastructure in place at southern edge of Area L (northern Project site boundary) where the materials would be transported off-site for processing by the same method currently being used for Cajon Creek Quarry. No haul trucks would enter or leave from public roads or streets.

Source: Vulcan Materials Company.
SMARA – Surface Mining and Reclamation Act

Mining equipment used at the Project site would be the existing equipment or equipment types that operated in Cajon Creek Quarry Area L; Project equipment may however utilize cleaner engines that would be and/or have been implemented to comply with California Air Resources Board (CARB) regulations that effect in-use off-road diesel engines.

Aggregate on the Project site would be removed using existing equipment including a hydraulic excavator, bulldozers, and front-end loaders. The excavated aggregate ore would be transported by loaders, and an existing extendable electrified conveyor system. Other existing mobile equipment that may be used includes a motor-grader, a water truck, and service truck. This report also assumes a backup generator may be needed.

Table 2 provides a list of off-road vehicles that have operated in Area L and would continue to operate with the Project in Area Q. Some off-road vehicles and/or diesel engines that power the vehicles may be replaced or retrofit as needed to comply with the In-Use Off-road Diesel Engine Air Toxic Control Measure (ATCM) and discussed in Section 3.1.3.2.

Table 2. Representative Off-road Vehicle List

Equipment	Make & Model[1]	Quantity	Average Horsepower	Average Hours/Day[2]	Average Days/Year[2]
Loader	Cat 990 or 992	1	764	8 to 12	250 to 312
Water Truck	Cat 773 & Peterbilt 357	2	537	8 to 12	250 to 312
Dozer	Cat D9	1	410	6 to 10	200 to 300
Grader	Cat 14H	1	240	4 to 6	150 to 250

1. Appendix C contains a list of equipment that operated in Area L during the Baseline and would move from Area L to Area Q with the Project. Actual units may be slightly different given natural fleet turnover and need to upgrade diesel engines to comply with CARB regulation.
2. Historical fuel use for each unit and the coincident production rate from operation in Area L operation were used to evaluate emissions from off-road equipment. Horsepower and hours of operation would produce less accurate emissions estimates than fuel use and are estimates provided for informational purposes. Values in this table are not used for calculating emissions.

3.0 AIR QUALITY

This AQCCIA primarily follows the *Air Quality Analysis Handbook* (SCAQMD, 2018), *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA, 2015), and *Risk Assessment Procedures for Rules 1401 and 212 – Standards for Approving Permits* (SCAQMD, 2015).

3.1 Regulatory Setting

3.1.1 Characteristics of Air Pollutants

Both the State and the Federal government have established health-based criteria called Ambient Air Quality Standards (AAQS) for common air pollutants. The two main categories of air pollutants are criteria, and toxic air contaminants (TACs).

Criteria pollutants are common and thus affect an entire region during episodic events generally coinciding with meteorological conditions that retard dispersion and or promote formation of secondary pollutants in the atmosphere (e.g. sunlight plays a role in the formation of Ozone from Oxides of nitrogen, carbon monoxide, and volatile organic compounds.) These “criteria pollutants” include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter ($PM_{2.5}$ and PM_{10}). Each criteria pollutant is described more fully below and associated AAQS are presented in Table 3.

TACs may result in health effects from localized concentrations and are regulated by health risk assessment (HRA) which determines cumulative impact by considering toxicity, end-point, and receptor distance, rather than comparing the amount or concentration of each pollutant emitted by a project to a value. Diesel particulate matter (DPM) and respirable crystalline silica (RCS) are two TACs of concern associated with Project sources and are also discussed below. Appendix D contains information from the American Thoracic Society (ATS) describing what constitutes an adverse health effect from air pollution which is the standard used by the Office of Environmental Health Hazard Assessment (OEHHA) and CARB in setting AAQS and TAC risk factors/exposure levels.

Ozone – Ozone (smog) is formed by photochemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOC), in the atmosphere. O_3 is a pungent, colorless gas typical of photochemical smog. Elevated O_3 concentrations may result in reduced lung function, particularly during vigorous physical activity. This health effect is particularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3 levels peak during summer and early fall.

Breathing ground-level ozone can result in a number of health effects that are observed in broad segments of the population. Some of these effects include: induction of respiratory symptoms; decrements in lung function; and inflammation of airways. Respiratory symptoms may include: coughing; throat irritation; pain, burning, or discomfort in the chest when taking a deep breath; and chest tightness, wheezing, or shortness of breath. In addition to these effects, evidence from observational studies indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that ozone can make asthma symptoms worse and can increase sensitivity to asthma triggers. (Moore K, 2008)

Carbon Monoxide – Carbon monoxide (CO) is formed by the incomplete combustion of fossil fuels. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The first signs of CO exposure include mild headache and breathlessness with moderate exercise. Continued exposure may lead to more severe headache, irritability, impaired judgment and memory, and rapid onset of fatigue. Persons that may be more sensitive to CO exposure include those having an existing cardiovascular disease or anemia; fetuses of pregnant women; smokers; and persons exposed to methylene chloride.

Nitrogen Oxides – Nitrogen oxides (NO_X) is a generic term for mono-nitrogen compounds which include nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colorless, odorless gas and NO_2 is a reddish-brown gas. NO_X is formed from fuel combustion under high temperature or pressure. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_X decreases lung function and may reduce resistance to infection. Acute exposure to NO_2 may cause pulmonary edema, pneumonitis, and bronchitis. NO_2 is considered a relatively insoluble, reactive gas, such as phosgene and ozone. Once inhaled, NO_2 reaches the lower respiratory tract, affecting mainly the bronchioles and the adjacent alveolar spaces, where it may produce pulmonary edema within hours.

Sulfur Dioxide – Sulfur dioxide (SO_2) is a colorless, irritating gas formed primarily from combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. People with asthma and children are particularly sensitive to and are at increased risk from the effects of SO_2 air pollution. SO_2 is both a criteria pollutant and a TAC.

Lead – Lead (Pb) was phased out of use in gasoline and paint. It is present at trace concentrations in a variety of other materials including most natural materials extracted from the earth's crust. Once in the bloodstream, Pb can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of Pb. Lead is both a criteria pollutant and a TAC.

Particulate Matter – Particulate matter (PM) pollution consists of small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset of PM_{10}.

There are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles, power plants, industrial processing, wood burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, and agriculture, and fugitive windblown dust. Because PM originates from a variety of sources, its chemical and physical compositions vary widely. In addition, it is now believed that $PM_{2.5}$ concentrations are highly dependent on several precursors which, like NOx and ROG for ozone, undergo chemical reactions in the environment that changes them to $PM_{2.5}$.

PM_{10} and $PM_{2.5}$ particles are small enough to be inhaled into, and lodge in, the deepest parts of the lung, evading the respiratory system's natural defenses. Natural particles are generally greater than 10 microns in diameter and are therefore abated by natural defense mechanisms. Health problems may occur as the body reacts to foreign particles

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non health-related effects include reduced visibility and soiling of buildings. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. PM_{10} and $PM_{2.5}$ can aggravate respiratory disease, and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of PM_{10}. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link PM_{10} exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic PM_{10} can also damage manmade materials and is a major cause of reduced visibility in many parts of the United States.

Respirable Crystalline Silica – Respirable crystalline silica (RCS) refers to crystalline silicon dioxide with aerodynamic diameter less than four (4) microns (i.e., 0.0004 cm). Crystalline silica or quartz is ubiquitous in nature. Most dust generated by construction and mining activities including blasting produces dust particles larger than 4 microns. These particles are too large to reach the alveoli of the lungs which are the target organ. Thus, RCS constitutes a tiny fraction of the dust from these sources and does not represent a significant health risk to neighbors of these types of projects. In order to result in toxic effects the silica needs to be crystalline, smaller than 4 microns, inhaled, and not exhaled.

Inhalation of RCS may cause respiratory irritation and an inflammatory reaction in the lungs. Silicosis results from chronic exposure; it is characterized by the presence of histologically unique silicotic nodules and by fibrotic scarring of the lung. Lung diseases other than cancer associated with silica exposure include silicosis, tuberculosis/silicotuberculosis, chronic bronchitis, small airways disease, and emphysema. Ambient air exposures do not cause concern but levels to which workers (e.g., miners, sandblasters) may be exposed have been shown to cause cancer.

Diesel Particulate Matter – Diesel particulate matter (DPM) is used as a surrogate for the mixture of compounds in diesel exhaust that have the potential to contribute to mutations in cells that can lead to cancer. These compounds include, but are not limited to, arsenic, benzene, formaldehyde, and nickel.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. People with allergies, existing cardiovascular disease, the elderly, and children considered sensitive populations for DPM exposure. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

3.1.2 Federal Laws and Regulations Applicable to Project

The Clean Air Act (CAA) is the comprehensive Federal law that regulates air emissions from stationary and mobile sources. Congress established much of the basic structure of the CAA in 1970, and made major revisions/additions in 1977 and 1990. Federal regulations include AAQS and programs to be implemented by EPA or state/local agencies meant to reduce concentrations to less than the AAQS. Table 3 presents both Federal and State AAQS. "The Clean Air Act in a Nutshell: How It Works" (EPA, 2013) contains a thorough yet concise summary of how US EPA implements the CAA. Table 4 also identifies how the CAA applies to the Project.

Regulations Affecting New Diesel Engines

US EPA regulates emissions from new non-road (i.e., off-road, portable, and stationary) internal combustion engines by tiered standards (e.g., compression-ignition engines in 40 CFR 89.112, 40 CFR 1039.101, and 40 CFR 1039.102). Emissions from new non-road engines are regulated using standards that apply by model year, class of vehicle, and fuel type (e.g. heavy-heavy duty diesel engines in 40 CFR 86.004-11, 40 CFR 86.007-11, and 40 CFR 86.099-11). These regulations affect manufacturers but are relevant to the Project because diesel engines are the primary source of Project emissions besides dust.

3.1.3 State Regulations

3.1.3.1 Criteria Pollutants

The State of California began to set California ambient air quality standards (CAAQS) in 1969. The CAAQS tend to be more stringent than the NAAQS (1-hr NO_2 is an exception). In addition to the criteria pollutants covered by the NAAQS, there are CAAQS standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These AAQS are also listed in Table 3.

Originally, there were no attainment deadlines for areas to meet the CAAQS. However, the California Clean Air Act (CCAA) provided a timeframe and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan. The attainment plans require a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented.

3.1.3.2 Toxic Air Contaminants

California's comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act (AB 1807, 1983) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987) requires a Statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce high risk levels.

Under AB 1807, CARB is required to use certain criteria in the prioritization for the identification and control of air toxics. In selecting substances for review, CARB must consider criteria relating to "the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community." AB 1807 also requires CARB to use available information gathered from the AB 2588 program to include in the prioritization of compounds. The list of TACs includes Federal Hazardous Air Pollutants (HAPs) (17 CCR § 93000 and §93001).

Table 3 State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3) [8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM_{10}) [9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$) [9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectro-photometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1,300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Footnotes on next page. Source: CARB, May 4, 2016

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the US EPA for further clarification and current National policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method, which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard, may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
6. Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the US EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the US EPA.
8. On October 1, 2015, the National 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the National annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing National 24- hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour National standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the National 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the National 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the National standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour National standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 National standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour National standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour National standard to the California standard the units can be converted to ppm. In this case, the National standard of 75 ppb is identical to 0.075 ppm.
12. The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The National standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Table 4 Applicability of US EPA Activities under the CAA to the Project

US EPA Activity	Applicable to Project Sources?
Establish air quality standards.	Yes, see **Impact AQ-2**.
Designate quality of air in attainment areas.	No, the Project is not an attainment area.
Administrate state implementation plans.	No, the Project is not a SIP.
Require additional programs in nonattainment areas.	Yes, the Project would comply with SCAQMD programs and rules that address nonattainment.
Provide guidance on control techniques.	No, the Project would employ standard controls.
Regulate interstate air pollution.	No, the Project is not a state.
Require plans to maintain clean air after a nonattainment area meets the standard.	Yes, the Project would comply with SCAQMD programs and rules that maintain attainment.
Preserve clean air in attainment areas.	Yes, the Project would comply with SCAQMD programs and rules that preserve attainment.
Adopt National standards for new stationary sources.	No, the Project has no new stationary sources.
Adopt National standards or guidelines for consumer and commercial products.	No, the Project does not buy products that emit air pollutant from vendors outside the country.
Adopt National standards for new vehicles and engines, and fuels.	No, the Project does not manufacture vehicles, engines, or fuels.
Regulate emissions from oil drilling on the Outer Continental Shelf.	No, the Project is not located on the Outer Continental Shelf.
Regulate hazardous air pollutants.	No, the Project has no stationary sources.
Protect visibility in National parks by regulating regional haze.	No, does not include a major stationary source.
Control acid rain by regulating NO_2 and SO_2 emissions from power plants.	No, the Project does not include a power plant or other major source of combustion pollutants.
Protect stratospheric ozone by regulating ozone-depleting compounds (e.g., chlorofluorocarbons).	No, the Project would purchase refrigerants and other classes of products from a U.S. vendor.
Regulate major sources of air pollution by administrating a Federal operating permit program.	No, the Project is a minor source that does not require a Federal operating permit.

Source: (EPA, 2013).

Under AB 2588, facilities are required to report air toxic emissions, ascertain health risks and notify nearby residents of significant risks. In September 1992, the Hot Spots Act was amended by Senate Bill 1731, which required facilities that pose a high health risk to reduce their risk through development and implementation of a risk management plan. The emissions inventory and risk assessment methodologies from the AB 2588 Program are incorporated into this AQCCIA as discussed in the methodology subchapter (Sections 3.4).

In-Use Diesel Engine Regulations

In July 2007, CARB adopted an airborne toxic control measure (ATCM) for in-use off-road diesel vehicles (13 CCR § 2449 et seq.). This regulation required that specific fleet average requirements be met for NO_x emissions

and for particulate matter emissions. Where average requirements cannot be met, BACT requirements apply. The regulation also includes several recordkeeping and reporting requirements. In response to AB 8 2X, the regulations were revised in July 2009 (effective December 3, 2009) to allow a partial postponement of the compliance schedule in 2011 and 2012 for existing fleets. On December 17, 2010, CARB adopted additional revisions to further delay the deadlines reflecting reductions in diesel emissions due to the poor economy and overestimates of diesel emissions in California. The revisions delayed the first compliance date until no earlier than January 1, 2014, for large fleets, with final compliance by January 1, 2023. The compliance dates for medium fleets were delayed until an initial date of January 1, 2017, and final compliance date of January 1, 2023. The compliance dates for small fleets were delayed until an initial date of January 1, 2019, and final compliance date of January 1, 2028. Correspondingly, the fleet average targets were made more stringent in future compliance years. The revisions would also accelerate the phase-out of equipment, preventing older equipment from being added to fleets over time.

On October 28, 2011 (effective December 14, 2011), the Executive Officer of CARB approved amendments to the ATCM regulation. The amendments included revisions to the applicability section and modification of the definitions. The regulation was amended to combine the PM and NO_x fleet average targets under one, instead of two, sections. The amended fleet average targets are based on the NO_x fleet average emissions factors from previous versions of the rule with credit given for PM reduction, and the section regarding PM performance requirements was deleted completely. The BACT requirements were restructured and clarified. Other amendments to the regulations included minor administrative changes to the regulatory text.

Naturally Occurring Asbestos (NOA)

- Two ATCMs for naturally-occurring asbestos (NOA) have been adopted by CARB and each allows the Air Pollution Control Officer of the local air district to exempt alluvial sand and gravel operations, like the Project. The ACTM states:Asbestos ATCM for Surfacing Applications (17 CCR § 93106) restricts the asbestos content of material used in surfacing applications such as unpaved roads, parking lots, driveways, and walkways. The ATCM excludes “sand and gravel operations” from requirements in the ATCM except for the section allowing the Air Pollution Control Officer (APCO) to require geologic evaluation or asbestos testing. "Sand and gravel operation" means any aggregate-producing facility operating in alluvial deposits.
- Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) requires the implementation of mitigation measures to minimize emissions of asbestos-laden dust unless an exemption in the ATCM applies. Applicable to this Project, the ATCM states that the “APCO may provide an exemption for crushing, screening and conveying equipment, stockpiles, and off-site material transport at a sand and gravel operation if the operation processes only materials from an alluvial deposit.”

Given that the Project is exempt from the ATCMs noted above, and the geotechnical report indicates the presence of asbestos is not likely for this alluvial sand and gravel operation, this EIR assumes that there is no asbestos in dust generated by the Project.

Assembly Bill 617

On July 26, 2017, Governor Brown approved Assembly Bill No. 617 ("AB 617"). AB 617 added and amended various sections of the California Health and Safety Code. The intent of AB 617 is to develop a collaborative relationship between CARB and local air districts to facilitate community participation, provide a science-based foundation supporting the identification of communities with high cumulative exposure burdens, accelerate the development and use of advanced air monitoring methods and equipment, and support the use of new mobile and stationary source technology. To achieve those goals, AB 617 requires six significant measures: (1) Annual Reporting; (2) Best Available Retrofit Control Technology ("BARCT"); (3) a Statewide Clearinghouse of BARCT; (4) Community Air Monitoring; (5) Community Emissions Reduction Programs; and (6) Increased Penalties. Discussion of those measures potentially applicable to the Project is provided in Section 3.5.1 below.

3.1.4 South Coast Air Quality Management District

The Project is in the San Bernardino portion of the South Coast Air Basin (SCAB) and within jurisdiction of SCAQMD. SCAQMD has developed the following plans, guidance, and rules that are potentially applicable to the Project.

3.1.4.1 Clean Air Plans

Clean air plans are the essential blueprints for action by the SCAQMD. The SCAQMD is required to update its plans on a regular basis. Updates may take the form of a new plan or an amendment. Plans range in scope from the regional Air Quality Management Plan (AQMP) to plans dealing with specific pollutants in specific geographic locales to the Air Quality Monitoring Network Plan. Included as part of many plans are documents that analyze its impact (e.g., socioeconomic and environmental analyses). The discussion below briefly highlights features of each plan produced and implemented by the SCAQMD that may apply to Project sources.

Air Quality Management Plan

In order to make progress towards attainment with the AAQS, each state and air district containing one or more federal non-attainment areas is required to develop a written plan for cleaning the air in those areas. These plans are called State Implementation Plans (SIP) and Clean Air Plans. California's SIP contains mobile source and consumer product emission control strategies proposed by CARB and a compilation of stationary and area source strategies that have been developed by local air districts under CARB supervision. Through these plans, the state and local air districts outline efforts that they will take to reduce air pollutant concentrations to levels that are less than the AAQSs.

Clean air plans are the essential blueprints for action by the SCAQMD. The SCAQMD is required to update its plans on a regular basis. Updates may take the form of a new plan or an amendment. Plans range in scope from the regional Air Quality Management Plan (AQMP) to plans dealing with specific pollutants in specific geographic locales to the Air Quality Monitoring Network Plan, which describes what pollutants are measured, when, and why. Many plans are accompanied by documents that analyze the plan's impact (e.g., socioeconomic and environmental analyses).

The AQMP, which reviews air quality improvement across the South Coast Air Basin, is updated every three years. Each version is an update of the previous plan and has a 20-year horizon. As an example, Chart 1 presents NOx emission reductions from each source category that is required to achieve the Federal 8-Hour Ozone Ambient Air Quality Standards.

> *"The 2016 AQMP seeks to achieve multiple goals in partnership with other entities promoting reductions in criteria pollutant, greenhouse gases, and toxic risk, as well as efficiencies in energy use, transportation, and goods movement….*
>
> *The 2016 AQMP includes the integrated strategies and measures needed to meet the National Ambient Air Quality Standards (NAAQS). SCAQMD recently approved on March 3, 2017 the 2016 AQMP that demonstrates attainment of the 1-hr and 8-hr ozone NAAQS as well as the latest 24-hr and annual $PM_{2.5}$ standards.*
>
> *Previous AQMPs included the 2012 AQMP for the 24-hr $PM_{2.5}$ standard along with early action measures to meet the 8-hr ozone standard." (SCAQMD, p. website).*

The SCAQMD has proposed mobile source measures to help implement CARB's "Further Development" measures. In addition, the SCAQMD is implementing several incentives funding programs that have resulted in early emission reductions (e.g., the Carl Moyer Memorial Air Quality Standards Attainment Program, the Surplus Off-Road Opt-In for NOx (SOON) program, and Proposition 1B – Goods Movement Emissions Reduction Program). The AQMP estimates that SCAQMD/CARB will need to provide $8.86 billion between now and Year 2023 (more than $1.75 billion per year) and $13.4 billion through Year 2031 (more than $1 billion per year) in order to achieve reductions necessary for attainment of AAQS. By way of comparison AQMD's General Fund budget is approximately $165 million. The June 30, 2017 Independent auditor's report states that AQMD had about $660 million on that date.

The AQMP Mobile Source Ozone Control Measures were screened for applicability to the Project. Control measures that were determined not to apply to the Project, as well as explanatory comments, can be found in Appendix J. Table 5 outlines control measures that could apply to the Project.

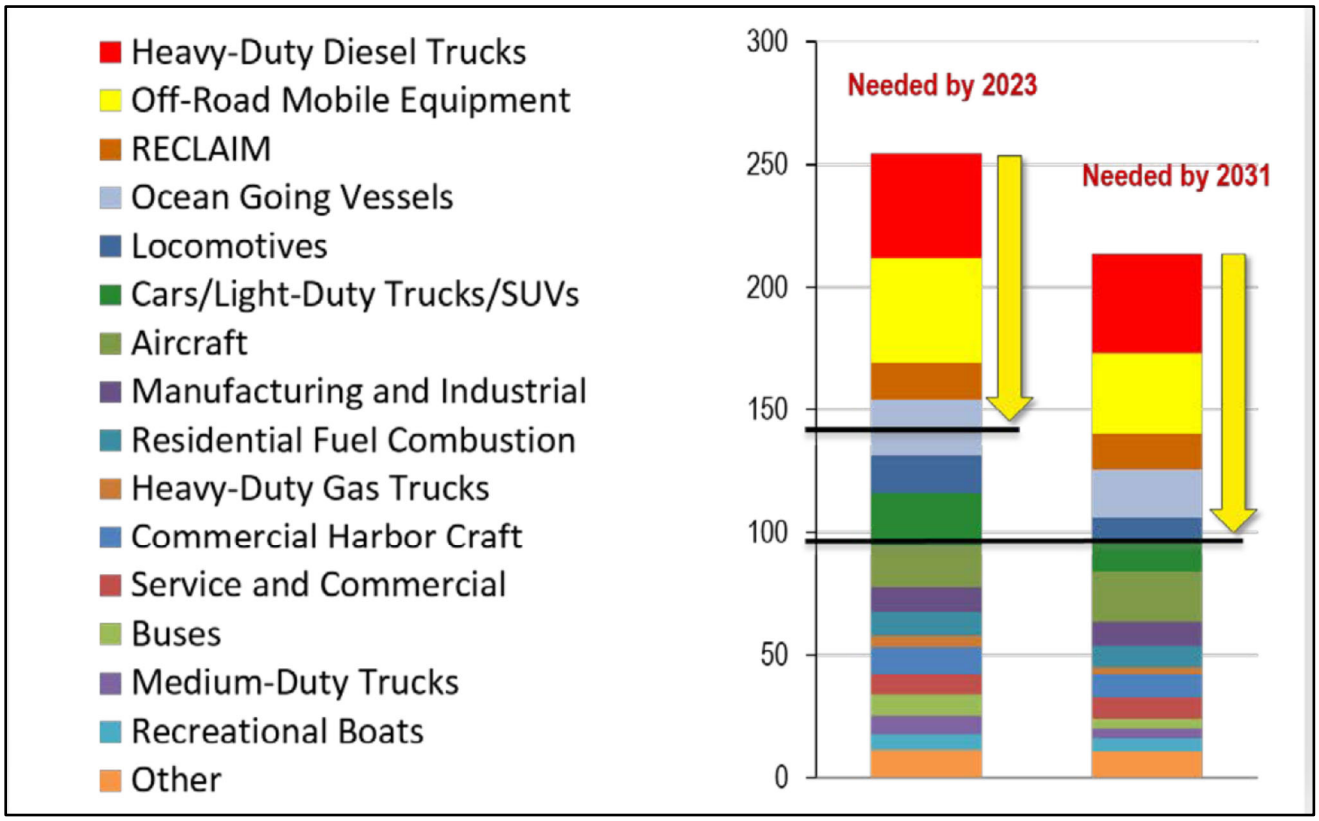
2012 Lead State Implementation Plan for Los Angeles County

This plan does not apply in San Bernardino County where the Project is located.

Coachella Valley PM_{10} State Implementation Plan

This plan does not apply because the Project is located outside Coachella Valley.

Chart 1 NO_x Reductions Needed to Achieve Federal 8-Hour Ozone AAQS



Source: (2016 Air Quality Management Plan, p. 4.8)

Table 5 Applicable 2016 AQMP Mobile Source Ozone Control Measures

ID	Title	Emission Reductions (tpd) (2023/2031)	Applies to Project?
EGM-01	Emission Reductions from New Development and Redevelopment Project [All Pollutants]	TBD [a]	Potentially, see Impact Section of AQCCIA.

[a] Emission reductions will be determined after projects are identified and implemented.
See Appendix J for comprehensive 2016 AQMP Mobile Source Ozone Control Measures list.

Clean Communities Plan

The Clean Communities Plan (CCP) (formerly named the Air Toxics Control Plan) is designed to examine the overall direction of the SCAQMD's air toxics control program. On November 5, 2010, the Governing Board approved the 2010 CCP. The CCP is an update to the 2000 Air Toxics Control Plan (ATCP) and the 2004 Addendum. The objective of the 2010 CCP is to reduce the exposure to air toxics and air-related nuisances throughout the District, with emphasis on cumulative impacts which are not addressed by facility command and control rules (e.g., TNSR AB2588). Elements of the 2010 CCP include community exposure reduction, community participation, communication and outreach, agency coordination, monitoring and compliance, source-specific programs, and nuisance. See Appendix J for more information.

Air Quality Monitoring Network Plan

The Annual Air Quality Monitoring Network Plan describes the network of ambient air quality monitors located within the SCAQMD's operating area. The Plan includes a review of actions taken during the previous fiscal year, and outlines plans for actions in the year ahead. Federal regulations require that the air quality monitoring network be reviewed annually to identify any need for additions, relocations, or terminations of monitoring sites or instrumentation. After a 30-day comment period, the Plan is submitted to the U.S. Environmental Protection Agency (U.S. EPA) by July 1 of each year.

Vision for Clean Air: A Framework for Air Quality and Climate Planning

This plan is the product of a collaborative effort by the SCAQMD, CARB and the San Joaquin Valley Air Pollution Control District (SJVAPCD). The Draft Vision for Clean Air: A Framework for Air Quality and Climate Planning, examines how those technologies can meet both air quality and climate goals over time. A public review draft of this document and its appendix were released on June 27, 2012 with no further work being posted. Regarding this document, the SCAQMD website states:

> *California's success in reducing smog has largely relied on technology and fuel advances, and as health-based air quality standards are tightened, the introduction of cleaner technologies must keep pace. More broadly, a transition to zero- and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals. Many of the same technologies will address both air quality and climate needs. As such, strategies developed for air quality and climate change planning should be coordinated to make the most efficient use of limited resources and the time needed to develop cleaner technologies.*

San Bernardino and Muscoy – Community Emissions Reduction Plan

On September 27, 2018, the Board selected San Bernardino, Muscoy (SBM) in SCAQMD to develop a community emissions reduction program and a community air monitoring plan as one of ten initial communities SCAQMD convened a community steering committee to develop the Plan. The community steering committee has 33 primary members and held ten (10) meetings between October 2018 and October 2019. SCAQMD also hosted a workshop to get the broader public's feedback on the Plan in July 2019. The Draft Final Plan was Agenda Item 25A[2] for the September 6, 2019 SCAQMD Board Meeting during which it was approved and subsequently sent to CARB for approval. On March 26, 2020, CARB staff published a Final Staff Report[3] on the Draft Final Plan that will be presented at a CARB Board Meeting soon.

According to the CARB Final Staff Report, "the Plan focuses on reducing exposure to diesel particulate matter (DPM) and oxides of nitrogen (NOx) from sources such as neighborhood truck traffic, warehouses, the OmniTrans bus yard, railyards, and concrete batch, asphalt and aggregate plants, along with actions to reduce exposure to air pollution at schools and daycare centers, with 21 actions" summarized in the Plan. SCAQMD

[2] http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2019/2019-sep6-025a.pdf
[3] https://ww2.arb.ca.gov/sites/default/files/2020-03/SBM%20CERP%20Staff%20Report_final.pdf

has also published a final boundary map for the SBM that delineates the "impacted community" and "emissions study area."[4]

The Project site is adjacent to the northern edge of the "impacted community" boundary and both the existing quarry (Area L) and Project site (Area Q) are within the final "emissions study area" boundary located north of the community. Two actions in the Plan are intended for "rock/aggregate plants" and are described as follows:

- Outreach to operators on best practices and rule requirements.
- Focused air monitoring and inspections to identify potential emissions or violations.

CARB staff found that there are elements of the Plan that need additional clarification and detail as the Plan moves from the short time frame provided for development into the implementation phase. The need to focus on strengthening the plans during implementation is a theme that CARB staff believes applies to all first-year communities, not just the San Bernardino, Muscoy community. To support implementation moving forward, CARB staff has developed a set of recommended actions in four key areas: reduction strategies, mobile and indirect sources, ensuring effective enforcement, and community-level technical foundation. The CARB Staff Report suggests that progress in implementing these recommendations should be included in the annual progress report required by the AB 617 statute.

<u>Reduction Strategies</u>

1. Prioritize project types for incentive funding based on steering committee recommendations, including use of zero emission technologies, where feasible, and identify funding sources for incentive-based and other strategies, including AB 617 incentive funds.
2. Define implementation steps and milestones for Plan actions that require further detail such as incentive funding, outreach, and exposure reduction measures for specified sensitive receptors in order to provide additional clarity on how these actions will be implemented.
3. Refine metrics for tracking progress to establish what constitutes a successful action.
4. Update the emissions reduction targets as new information becomes available for the regulatory and other strategies that currently do not have defined benefits.

<u>Mobile and Indirect Sources</u>

5. Provide ongoing reports back to the steering committee on collaboration with other agencies for designating truck routes and parking away from sensitive receptors.
6. Continue work on reducing impacts from warehouse facilities and railyards, with consideration of any additional mechanisms that may be needed to ensure anticipated exposure reductions are achieved.
7. Work with the steering committee to advance implementation of the strategies outlined in the Freight Handbook Concept Paper in the community.

[4] https://arcg.is/0nu9HL

Ensuring Effective Enforcement

8. Review the results of South Coast AQMD and CARB's enhanced enforcement activities with the community steering committee, discuss the steps taken to address any issues identified, and identify appropriate refinements to the focused enforcement activities within the community.

Community-Level Technical Foundation

9. Continue community air monitoring and the ongoing process to improve emissions inventory and air quality modeling by incorporating the newest resources and tools as they become available as part of Plan implementation and to characterize current air quality in the community.

3.1.4.2 Rules and Regulations

The following SCAQMD rules are potentially applicable to Project sources.

Rule 109 (Recordkeeping for Volatile Organic Compounds)

The provisions of this rule require daily records of VOC-containing materials to be kept by owners and/or operators of stationary sources within the District that conduct operations (which could include the use of adhesives, coatings, solvents, and/or graphic arts materials) where records are required to determine a District rule's applicability or source's exemption from a rule, rule compliance, or specifically as a Permit to Operate or Permit to Construct condition. Thus, any "exempt" VOC source may require recordkeeping and this rule is applied broadly. In emergency situations, it is possible that repair or maintenance personnel would be on-site using VOC containing solvents, degreasing equipment, etc. Such operations may be subject to source specific and/or prohibitory rules in Reg. IV and XI.

Rule 201 (Permit to Construct)

"A person shall not build, erect, install, alter or replace any equipment or agricultural permit unit, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. A permit to construct shall remain in effect until the permit to operate the equipment or agricultural permit unit for which the application was filed is granted or denied, or the application is canceled." Rule 201 would apply to the Project, as a conveyor will be constructed and operated.

Rule 203 (Permit to Operate)

"A person shall not operate or use any equipment or agricultural permit unit, the use of which may cause the issuance of air contaminants, or the use of which may reduce or control the issuance of air contaminants, without first obtaining a written permit to operate from the Executive Officer or except as provided in Rule 202." Rule 202 contains provisions for temporary Permit to Operate post-issuance of the Authority to Construct and when an application for permit to operate is filed for existing equipment.

Rule 219 (Equipment Not Requiring a Written Permit Pursuant to Regulation II)

This rule lists a variety of sources that do not require permits for construction or operation. While many could theoretically be used on the project site, examples include certain small (<50bhp) diesel engines used for electrical generation, certain kinds of power washing equipment, certain types of air conditioning units, etc.

Rule 222 (Filing Requirements for Specific Emissions Sources Not Requiring a Written Permit Pursuant to Regulation II)

This rule lists specific sources that are exempt from permit by Rule 219 but still require "filing." As with Rule 219, equipment under this rule is not necessarily intended to be used at the project site.

Rule 301 (Permitting and Associated Fees)

California Health and Safety Code Section 40510 provides authority for the South Coast Air Quality Management District to adopt a fee schedule for the issuance of permits to cover the cost of evaluation, planning, inspection, and monitoring related to that activity. This rule establishes such a fee schedule and requires that fees be paid for, among other things, permit processing for Facility Permits, Facility Registrations and Permits to Construct and/or Permits to Operate equipment that may cause air pollution or equipment intended to control air pollution; and annual operating permit renewal and emissions fees.

Rules 307 and 307.1 (Fees for Air Toxics Emissions Inventory)

These rules contain fees and possible alternative fees collected by SCAQMD for purposes of implementing the AB2588 Air Toxics "Hot Spots" program.

Rule 401 (Ringelmann Chart/Opacity)

With few exceptions that are inapplicable to the Project, Rule 401 requires that:

> *A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:*
>
> *(A) As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines; or*
>
> *(B) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subparagraph (b)(1)(A) of this rule [above].*

Rule 402 (Nuisance)

To protect the public health, Rule 402 requires that "a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

Rule 403 (Fugitive Dust)

The purpose of Rule 403 "is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions." The provisions of Rule 403 "apply to any activity or man-made condition capable of generating fugitive dust." Rule 403 contains the following requirements:

1. No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:
    - A. the dust remains visible in the atmosphere beyond the property line of the emission source; or
    - B. the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.
2. No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.
3. No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM_{10} monitoring.
4. No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.
5. No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.
    - A. Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.
    - B. Pave the surface extending at least 100 feet and at least 20 feet wide.
    - C. Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
    - D. Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
    - E. Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D) [above].

Rule 403 contains three tables of control measures which are referenced in requirements of the Rule and occur in order increasingly stringent control measures.

Table 1 – Best Available Control Measures (Applicable to All Construction Activity Sources);

Table 2 – Dust Control Measures for Large Operations; and

Table 3 – Contingency Measures Control Measures for Large Operations.

Paragraphs 1, 2, and 3 do not apply to blasting operations which have been permitted by the Division of Industrial Safety.

Paragraphs 1 and 3 above do not apply under these conditions:

A. When wind gusts exceed 25 miles per hour, provided that:
   i. The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;
   ii. records are maintained.

B. To unpaved roads, provided such roads:
   i. are used solely for the maintenance of wind-generating equipment; or
   ii. are unpaved public alleys as defined in Rule 1186; or
   iii. are service roads that meet all of the following criteria:
      a. are less than 50 feet in width at all points along the road;
      b. are within 25 feet of the property line; and
      c. have a traffic volume less than 20 vehicle-trips per day.

C. To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

Paragraph 2 does not apply to aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of the Rule at all times and implements applicable actions specified in Table 3 of the Rule when the applicable performance standards in Paragraphs 1 and 3 cannot be met through use of Table 2 actions.

"Large operations" are "any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards) or more thee times during the most recent 365-day period." Except for "any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance;" the following additional requirements apply to large operations:

1. Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards cannot be met through use of Table 2 actions; and shall:
   A. submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;
   B. include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

C. maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

D. install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

E. identify a dust control supervisor that:

   i. is employed by or contracted with the property owner or developer;
   ii. is on the site or available on-site within 30 minutes during working hours;
   iii. has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;
   iv. has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

F. notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18) [above].

Rule 404 (Particulate Matter – Concentration)

Rule 404 establishes a particulate matter concentration standard that consists of varying levels based on volumetric flow rate of the discharge. Discharge of PM from any source in excess of 450 mg/m^3 (i.e., 0.196 gr/dry standard cubic feet (dscf)) is prohibited and applies to discharges of 883 cfm or less. Higher flow rates require lower concentrations with the minimum concentration (i.e., 23 mg/m^3 or 0.01 gr/dscf) required for discharges equal to or greater than 2,472,000 cfm. For the purposes of Rule 404, emissions are averaged over one complete cycle of operation or one hour, whichever is the lesser time period.

Rule 405 (Solid Particulate Matter – Weight)

Rule 405 limits the mass of solid PM emissions by using a table of allowable emissions rates that vary based on the weight of materials processed. For instance, activities that handle 400 ton/hr (800,000 lb/hr) of material are limited to 28.4 lb/hr of PM emissions.

Rule 442 (Usage of Solvents)

The purpose of this Rule 442 is to reduce emissions of Volatile Organic Compounds (VOCs) from VOC-containing materials or equipment not subject to the VOC limits in any source specific rule. VOC-containing materials include, but are not limited to, coatings, resins, adhesives, inks, solvents, thinners, diluents, mold seal and release compounds, lubricants, cutting oils and quenching oils. Equipment and materials include, but are not limited to, coating, adhesive, and ink application equipment, metal forming, casting, or forging operations. Generally, Rule 442 requires that "a person shall not emit VOCs to the atmosphere from all VOC-containing materials, equipment or processes subject to this rule, in excess of 833 pounds per month per facility." Optionally, Rule 442 allows greater than 883 lb/mo provided that a control system is installed that reduces VOC emissions by 85% and has an output of less than 50 ppm calculated as carbon with no dilution. Notable exemptions from Rule 442 exist for sources subject to other Regulation IV rules (e.g., Rule 481 – Spray Coating Operations) and aerosol products. As previously mentioned, use of solvents does not constitute a central

element of Project processes, but potential emergency or repair situations may involve solvents that may be subject to additional rules including rule 442.

Rule 1113 (Architectural Coatings)

The purpose of Rule 1113 is to limit the VOC content of architectural coatings used in the District. Architectural coatings are any coatings applied to stationary structures or their appurtenances, or to fields and lawns. Rule 1113 applies "to any person who supplies, sells, markets, offers for sale, or manufactures any architectural coating that is intended to be field applied within the District to stationary structures or their appurtenances, and to fields and lawns; as well as any person who applies, stores at a worksite, or solicits the application of any architectural coating within the District." "Table of Standards 1 – VOC Limits" in Rule 1113 presents effective dates of VOC limits by coating category.

Rule 1122 (Solvent Degreasers)

This rule applies to all persons who own or operate batch-loaded cold cleaners, open-top vapor degreasers, all types of conveyorized degreasers, and air-tight and airless cleaning systems that carry out solvent degreasing operations with a solvent containing Volatile Organic Compounds (VOCs) or with a NESHAP halogenated solvent. Solvent degreasing operations that are regulated by this rule include, but are not limited to, the removal of contaminants from parts, products, tools, machinery, and equipment. A degreaser may be brought to site for emergency maintenance.

Rule 1157 (PM_{10} Emission Reductions from Aggregate and Related Operations)

Rule 1157 applies to all permanent and temporary aggregate and related operations. Aggregate operations are defined as operations that produce sand, gravel, crushed stone, and/or quarried rocks. Aggregate or related material means material that is produced and/or used by the aggregate and related operations. Related operations are defined as operations that use sand, gravel, cement, crushed stone, and/or quarried rocks in their products, or crush miscellaneous base, and inert landfills that handle construction/demolition debris.

Rule 1157 contains several "General Performance Standards" some of which are subject to a tolling agreement between the mining industry and AQMD and are thus not implemented at this time (e.g., SCAQMD Opacity Test Method 9B). Standards that are implemented by AQMD inspectors include the following:

- Visible fugitive dust plumes may not exceed 100 feet in any direction from any activity, equipment, storage pile, or disturbed surface area.
- Operator of a facility must promptly remove piles of material spillage on internal paved roads or maintain the spillage in a stabilized condition with dust suppressants and remove it by the end of each day.
- Maintain in a stabilized condition all other piles of material spillage and carry-back with dust suppressants until removal.
- Control loading, unloading, transferring, conveyance, crushing, screening and storage piles as necessary to meet performance standards. Some sources have prescribed control methods that would allow exceedance of performance standards where implemented.

- Re-apply dust suppressants to re-stabilize disturbed areas of the piles at the end of each work day.
- Maintain water irrigation system to stabilize open storage piles greater than eight feet in height and located within 300 feet of off-site occupied buildings or houses.
- Take all reasonable steps, including the posting of signs at exits of the facility and provision of the "Fugitive Dust Advisory" prepared by SCAQMD to trucking company/broker, to ensure that all loads on aggregate trucks are leveled and maintained with at least 6 inches of freeboard, and that the load is stabilized by applying dust suppressants in sufficient quantities so that the performance standards are met, unless the driver tarps or suitably covers the load prior to entering paved public roads or prior to the use of a rumble grate and/or wheel washer.
- Install and utilize a rumble grate, a wheel washer, or a truck washer to prevent track-out of materials onto public paved roads.
- An additional requirement to submit an emission reduction plan to SCAQMD is triggered by three (3) or more validated notices of violation within a 12-month period (i.e., recurrent violations).
- Exemptions from Rule 1157 primarily include periods of start-up, shutdown and maintenance (SSM) for equipment; blasting; periods of high wind if operations cease with exception of loadout and dust control; specific unpaved roads are exempted from the requirement to use chemical dust suppressants if use would violate water quality regulations.

Rule 1303 (New Source Review – Requirements)

Rule 1303 requires best available control technology (BACT) for relocated, new and/or modified sources that result in an emission increase of any nonattainment air contaminant, ozone depleting compound, or ammonia. BACT for sources not located at major polluting facilities are specified in the BACT Guidelines prepared by SCAQMD for such source categories. The BACT requirements apply regardless of any modeling or offset exemption that may also apply.

Rule 1303 also requires the applicant to substantiate with modeling that a new or modified facility will not cause a violation, or make significantly worse an existing violation or any state or national ambient air quality standards at any receptor in the District. In addition, Rule 1303 protects visibility in Federal Class 1 wilderness areas by requiring modeling analysis to be conducted if the net emission increase from the new or modified source exceeds 15 tons/year of PM_{10} or 40 tons/year of NO_X and the source is within the distances specified which range from 28 to 32 km depending upon the area.

Rule 1303 requires that facilities with emissions greater than four (4) tons per year of NO_X, VOC, SO_x and/or PM_{10}; or 29 tons per year of CO purchase emission reduction credits (ERC). These emissions amounts are found in the related Rule 1304 which contains exemptions from New Source Review requirements.

Rule 1401 (New Source Review of Toxic Air Contaminants)

Rule 1401 specifies limits for maximum individual cancer risk (MICR), cancer burden, and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units which

emit toxic air contaminants. The rule establishes allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.

Rule 1401 states that SCAQMD will deny applications unless the following requirements are satisfied:

- The cumulative increase in MICR which is the sum of the calculated MICR values for all toxic air contaminants emitted from the new, relocated or modified permit unit will not result in an increased MICR greater than one in one million (1.0×10^{-6}) at any receptor location, if the permit unit is constructed without T-BACT; or an increased MICR greater than ten in one million (10×10^{-6}) at any receptor location, if the permit unit is constructed with T-BACT; or a cancer burden greater than 0.5.
- The cumulative increase in total chronic HI for any target organ system due to total emissions from the new, relocated or modified permit unit owned or operated by the applicant for which applications were deemed complete on or after the date when the risk value for the compound is finalized by the state Office of Environmental Health Hazard Assessment (OEHHA) will not exceed 1.0 at any receptor location.
- The cumulative increase in total acute HI for any target organ system due to total emissions from the new, relocated or modified permit unit owned or operated by the applicant for which applications were deemed complete on or after the date when the risk value for the compound is finalized by OEHHA will not exceed 1.0 at any receptor location.

Rule 1401 contains exemptions for permit renewals, change of ownership, modifications with no increase in risk, functionally identical replacement provided there is no increase in maximum rating or emissions of any TAC, equipment previously exempt under Rule 219, emergency internal combustion engines that are exempted under Rule 1304, and cases where contemporaneous risk reductions can be demonstrated to occur.

Rule 1402 (Control of Toxic Air Contaminants from Existing Sources)

Rule 1402 applies to any facility which has been notified by the Executive Officer to prepare an Air Toxics Inventory Report, Health Risk Assessment, or Risk Reduction Plan or is subject to the AB2588 Air Toxics "Hot Spots" Act. The Rule also applies to any facility for which the impact of total facility emissions has the potential to be greater than or equal to the Notification Risk Level as indicated in a Health Risk Assessment approved or prepared by the District for the purpose of this rule for a facility or category of facilities.

Rule 1420 (Emissions Standards for Lead)

Rule 1420 applies to all persons who own or operate facilities that use or process lead-containing materials. Specifically, Rule 1420 implements AAQS for lead by prohibiting discharge of emissions which cause ambient concentrations of lead to exceed 1.5 microgram per cubic meter, averaged over 30 days, beyond the property line of a facility; or, fugitive lead dust emissions that exceed Ringelmann 0.5, or 10 percent opacity, for more than three minutes aggregate in any 60-minute period.

3.1.4.3 SCAQMD CEQA Air Quality Analysis Handbook

The SCAQMD CEQA webpage[5] links to documents prepared by the SCAQMD and others. However, many of those resources, with exception of the significance thresholds, are dated and may not be the best approach and/or standard practice. Currently accepted methods include those employed by the CalEEMod emissions inventory software. In addition, SCAQMD authors and posts letters commenting on projects as the responsible air quality agency under CEQA. The letters generally contain the most recent thinking and methods that are being recommended by SCAQMD.

3.1.5 County General Plan

The San Bernardino General Plan, Air Quality Section sets forth as its goal, "The County will ensure good air quality for its residents, businesses, and visitors to reduce impacts on human health and the economy." To achieve the goal, the Air Quality Element presents a series of policies and programs (CO 4.1 – CO 4.13 of the General Plan). Sespe has analyzed these policies and determine the Project does not conflict or interfere with them. For more information see Table J.5 in Appendix J.

3.1.6 City General Plan

The Project site is located outside the City of San Bernardino limits but within the City's sphere of influence. The City of San Bernardino General Plan contains the following Goals which are potentially applicable to the Project with respect to Air Quality:

- *Goal 12.4: Properly manage designated areas for mineral extraction to meet the needs of the area.*
- *Goal 12.5: Promote air quality that is compatible with the health, well being, and enjoyment of life.*
- *Goal 12.7: Participate in regional initiatives and programs to improve the South Coast Basin's Air quality.* (City of San Bernardino, 2005)

Within the City General plan, each goal contains a set of policies. Potentially applicable policies are analyzed individually in Table J.8 of Appendix J. Sespe has concluded that the Project does not conflict or interfere with the goals stated above or the policies they contain.

3.2 Environmental Setting

The environmental setting includes the existing physical setting against which future conditions with the Project are compared to determine the Project's impact on the environment. Besides emissions, the air quality environment is affected by terrain and meteorology (weather).

Terrain plays a role in air dispersion mechanics, and therefore, the levels of air pollutants in a given area. Mountains that surround valley areas tend to retain air within the valley and limit the dispersion of pollutants. Meteorology causes year-to-year changes in air quality trends that can mask the benefits of emission reductions. Unlike terrain, meteorology affects pollutant concentrations differently depending upon the pollutant as discussed in the following examples:

[5] http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook

- Ozone is formed in the atmosphere as sunlight initiates a complex set of chemical reactions. On hot sunny days, the abundant sunlight starts the ozone-forming processes and high temperatures promote fast chemical reactions. If the air is stagnant, the ozone formed is not dispersed or diluted by cleaner air. So, the highest ozone concentrations usually occur on hot and sunny days with light breezes or calm air. In some areas, high ozone levels may represent transport from upwind regions; local weather conditions associated with transport may differ from place to place. Since hot and sunny summer days typically lead to high ozone, it is not surprising that cold and cloudy winter days have much lower concentrations. (CARB, 2014).
- Ambient PM is comprised of primary PM that is directly emitted and secondary PM that forms in the atmosphere through chemical and physical processes. Primary PM includes dust and soot, while secondary PM includes particulate nitrates and sulfates. Some areas are subject to strong winds that lift dust into the air resulting in high concentrations of primary PM. In other situations, cold, calm, and humid air can promote the buildup of secondary PM. Relatively high PM levels in valley areas usually occur in the winter under these meteorological conditions. The lowest PM concentrations often occur on rainy winter days when winds disperse PM and rain washes PM out of the air. (CARB, 2014).

3.2.1 Regional Setting

The Project site is located within the San Bernardino County portion of the South Coast Air Basin (SCAB) and within the jurisdiction of SCAQMD. The SCAB is comprised of a single air district, specifically the SCAQMD. The Project site borders the City of San Bernardino and the City and County jurisdictional areas are shown on Figure 2 (Appendix A). The San Bernardino County General Plan describes air quality in the region of the Project as follows:

> *The air pollutants of greatest concern in San Bernardino County are O_3 and PM_{10} because of the current non-attainment status with the Ambient Air Quality Standards (AAQS). O_3 is not emitted directly, but is formed in the atmosphere through complex chemical reactions between nitrogen oxides and hydrocarbons in the presence of sunlight. These are considered as ozone precursors. Hydrocarbon is a general term to describe compounds comprised of hydrogen and carbon atoms. Hydrocarbons are classified by how photochemically reactive they are: relatively reactive or relatively non-reactive. Relatively reactive hydrocarbons, also known as ROG, are VOCs that react photochemically and contribute to the formation of O_3, as well as PM_{10} and $PM_{2.5}$, and are the primary pollutants of concern. Motor vehicle emissions and evaporation of various VOCs (i.e., solvents, fuels, etc.) are major contributors to regional O_3 problems. Pesticide use, industrial process operations, and non-highway mobile sources (i.e., off-road vehicle use and aircraft operations) are other contributors to regional O_3 problems. PM_{10} emissions come from a broad range of sources, with on-road mobile sources (i.e., re-entrained road dust, direct emissions, and secondary emission effects), and natural windblown dust generated from occasional moderate to high-wind episodes over a large region that encompasses multi-district and interstates (i.e., local and distant transport of PM_{10}) being the most prominent. (County of San Bernardino, 2007)*.

SCAQMD operates thirty-eight air monitoring sites within its jurisdictional boundaries, and twenty within the county of San Bernardino. Data collected at permanent monitoring stations are used by the United States Environmental Protection Agency (US EPA) and California Air Resources Board (CARB) to classify regions as "attainment", assigned to areas where pollutant concentrations meet the standard in question over a designated period, or "nonattainment," assigned to areas where monitored pollutant concentrations consistently and violate the standard in question. The attainment status in the South Coast Air Basin is shown in Table 6. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) exceedance records at the closest monitoring stations to the Project are presented in Table 7.

Table 6 South Coast Air Basin Attainment Status

Criteria Pollutant	Standard	Averaging Time	Designation	Attainment Date
1-Hour Ozone	NAAQS	1979 1-Hour (0.12 ppm)	Nonattainment (Extreme)	2/6/2023 [c)]
	CAAQS	1-Hour (0.09 ppm)	Nonattainment	N/A
8-Hour Ozone[d)]	NAAQS	1997 8-Hour (0.08 ppm)	Nonattainment (Extreme)	6/15/2024
	NAAQS	2008 8-Hour (0.075 ppm)	Nonattainment (Extreme)	7/20/2032
	NAAQS	2015 8-Hour (0.070 ppm)	Nonattainment (Extreme)	8/3/2038
	CAAQS	8-Hour (0.070 ppm)	Nonattainment	Beyond 2032
CO	NAAQS	1-Hour (35 ppm) 8-Hour (9 ppm)	Attainment (Maintenance)	6/11/2007
	CAAQS	1-Hour (20 ppm) 8-Hour (9 ppm)	Attainment	6/11/2007
NO_2 [e)]	NAAQS	1-Hour (0.10 ppm)	Unclassifiable/Attainment	N/A
	NAAQS	Annual (0.053 ppm)	Attainment (Maintenance)	9/22/1998
	CAAQS	1-Hour (0.18 ppm) Annual (0.030 ppm)	Attainment	---
SO_2 [f)]	NAAQS	1-Hour (75 ppb)	Designations Pending (expect Uncl./Attainment)	N/A
	NAAQS	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassifiable/Attainment	3/19/1979
PM_{10}	NAAQS	1987 24-hour (150 $\mu g/m^3$)	Attainment (Maintenance)[g)]	7/26/2013
	CAAQS	24-hour (50 $\mu g/m^3$) Annual (20 $\mu g/m^3$)	Nonattainment	N/A
$PM_{2.5}$ [h)]	NAAQS	2006 24-Hour (35 $\mu g/m^3$)	Nonattainment (Serious)	12/31/2019
	NAAQS	1997 Annual (15.0 $\mu g/m^3$	Attainment	8/24/2016
	NAAQS	2012 Annual (12.0 $\mu g/m^3$)	Nonattainment (Serious)	12/31/2025
	CAAQS	Annual (12.0 $\mu g/m^3$)	Nonattainment	N/A
Lead	NAAQS	3-Months Rolling (0.15 $\mu g/m^3$)	Nonattainment (Partial) [i)]	12/31/2015

Criteria Pollutant	Standard	Averaging Time	Designation	Attainment Date
Hydrogen Sulfide (H_2S)	CAAQS	1-Hour (0.03 ppm/42 µg/m^3)	Attainment	---
Sulfates	CAAQS	24-Hour (25 µg/m^3)	Attainment	---
Vinyl Chloride	CAAQS	24-Hour (0.01 ppm/26 µg/m^3)	Attainment	---

Source: (SCAQMD, 2016)

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable
b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for attainment demonstration
c) 1-hour O_3 standard (0.12 ppm) was revoked, effective June 15, 2005; however, the Basin has not attained this standard based on 2008-2010 data and is still subject to anti-backsliding requirements
d) 1997 8-hour O3 standard (0.08 ppm) was reduced (0.075 ppm), effective May 27, 2008; the revoked 1997 O3 standard is still subject to anti-backsliding requirements.
e) New NO2 1-hour standard, effective August 2, 2010; attainment designations January 20, 2012; annual NO2 standard retained.
f) The 1971 annual and 24-hour SO_2 standards were revoked, effective August 23, 2010; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard. Area designations are still pending, with Basin expected to be designated Unclassifiable/Attainment.
g) Annual PM_{10} standard was revoked, effective December 18, 2006; 24-hour PM_{10} NAAQS deadline was 12/31/2006; SCAQMD request for attainment redesignation and PM10 maintenance plan was approved by U.S. EPA on June 26, 2013, effective July 26, 2013.
h) Attainment deadline for the 2006 24-Hour $PM_{2.5}$ NAAQS (designation effective December 14, 2009) is December 31, 2019 (end of the 10th calendar year after effective date of designations for Serious nonattainment areas). Annual $PM_{2.5}$ standard was revised on January 15, 2013, effective March 18, 2013, from 15 to 12 µg/m^3. Designations effective April 15, 2015, so Serious area attainment deadline is December 31, 2025.
i) Partial Nonattainment designation – Los Angeles County portion of Basin only for near-source monitors. Expect to remain in attainment based on current monitoring data.

3.2.2 Local Setting

The closest air monitoring stations to the Project are San Bernardino Valley 1 and 2, which are located approximately 7 miles southwest and southeast of the project, respectively. These stations collectively measure CO, O_3 (Ozone), PM_{10}, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb. These stations are constructed to monitor at a neighborhood scale covering an area between 0.5 and 4.0 kilometers in range. Data is collected for the purpose of observing the high concentration from regional transport of pollutants. Readings from these stations are reported in Table 7. A summary of AAQS is presented in Table 3.

The wind-rose in Figure 3 (Appendix A), represents SCAQMD pre-processed meteorological data from the Redlands meteorological station, located about 14 miles southeast of the Project site (34.060N 117.147W). The data was used for dispersion modeling performed as part of the HRA for the Project discussed in Sections 3.4.6 and 3.5.3.

3.2.3 Health Effects Setting

NAAQS/CAAQS and Reference Exposure Levels (REL) that are used for health risk assessment are designated for each pollutant at a level where no "adverse health effect" would occur to sensitive populations. The OEHHA relies upon the definition of "adverse health effect" published by American Thoracic Society (ATS). ATS

published a definition in 1985 and then amended the definition in 2000 to address issues not covered by the 1985 definition. From the 1985 definition, "adverse respiratory health effect" means:

> *Medically significant physiologic or pathologic changes generally evidenced by one or more of the following:*
>
> 1. *Interference with the normal activity of the affected person or persons;*
> 2. *Episodic respiratory illness;*
> 3. *Incapacitating illness;*
> 4. *Permanent respiratory injury; and/or*
> 5. *Progressive respiratory dysfunction.* (OEHHA, 2004).

Table 7 Ambient Air Quality in the Project Area

Year	**2012**		**2013**		**2014**		**2015**		**2016**	
San Bernardino Valley Station No:	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
CO Max Conc. in ppm 1-hour	--	--	3	4	2.8	2.3	1.7	2.2	1.6	2.5
CO Max Conc. in ppm 8-hour	1.3	1.7	1.2	2.4	1.2	1.8	1	1.7	1.3	2.3
Ozone, Max. Conc. in ppm 1-hour	0.151	0.139	0.127	0.121	0.133	0.134	0.139	0.158	0.137	0.158
Ozone, Max. Conc. in ppm 8-hour	0.122	0.112	0.105	0.099	0.111	0.117	0.105	0.118	0.118	0.136
Ozone, Fourth High Conc. ppm 8-hour	0.100	0.097	0.093	0.095	0.100	0.105	0.098	0.114	0.095	0.114
Ozone, Days Exceeding Old Federal > 0.124 ppm 1-hour	2	2	1	0	3	6	3	10	2	14
Current Federal > 0.070 ppm 8-hour	--	--	52	75	57	78	49	106	49	112
Ozone, Days Exceeding 2008 Federal > 0.075 ppm 8-hour	42	36	37	51	39	57	39	76	38	88
Ozone, Days Exceeding 1997 Federal > 0.084 ppm 8-hour	--	--	14	21	20	29	16	41	16	57
Ozone, Days Exceeding Current State > 0.09 ppm 1-hour	34	22	31	38	36	52	34	70	33	81
Ozone, Days Exceeding Current State > 0.070 ppm 8-hour	68	53	52	76	59	79	52	108	49	112
NO2 Max Conc. in ppb 1-hour	81.7	72.2	70.4	72.6	89.1	71.4	71.7	60.1	69.2	65.8
NO2 98th Percentile Conc. Ppb 1-hour	60.6	54.5	63.6	56.1	66.1	52.7	56.4	51.4	58.4	56.5
NO2 Annual Average AAM Conc. ppb	20.6	17.6	20.2	18.0	18.7	15.2	18.2	16.6	18.3	15.9
SO2 Max. Conc. in ppb 1-hour	3.8	--	4.0	--	4.0	--	6.3	--	3.9	--
SO2 99th Percentile Conc. ppb 1-hour	3.1	--	2.8	--	3.1	--	2.0	--	2.1	--
PM10 Max. Conc. In µg/m3 24-hour	90	102	68	140	96	78	94	91	75	86
PM10 No. (%) Samples Exceeding Federal > 150 µg/m3 24-hour	0	0	0	0	0	0	0	0	0	0
PM10 No. (%) Samples Exceeding State > 50 µg/m3 24-hour	19 (31%)	3 (5%)	13 (22%)	18 (5%)	13 (24%)	17 (5%)	15 (25%)	33 (10%)	7 (16%)	35 (10%)
PM10 Annual. Average Conc. (AAM) µg/m3	40.6	31.3	39.7	34.2	37.8	30.7+	38.1	33.1	39.3	30.9
PM2.5 Max. Conc. In µg/m3 24-hour	43.6	55.3	78.9	73.9	47.3	53.5	30.45	32.54	39.20	38.20

Year	2012		2013		2014		2015		2016	
PM2.5 98th Percentile Conc. In µg/m3 24-hour	33.1	33.4	34.5	28.1	34.3	33.6	26.25	27.12	26.50	25.60
PM2.5 No (%) Samples Exceeding Federal Std > 35 µg/m3 24-hour	1 (0.8%)	1 (0.9%)	1 (0.9%)	1 (0.9%)	2 (1.8%)	2 (1.8%)	0	0	1 (0.8%)	1 (0.9%)
PM2.5 Annual. Average Conc. (AAM) µg/m3	12.26	11.41	13.18	11.67	10.70	10.74	12.04	10.84	12.04	11.43
Pb Max. Monthly Average Conc. µg/m3	--	0.010	--	0.012	--	0.012	--	0.010	--	0.010

Source: Source: (SCAQMD, 2016).

ND – insufficient data available to determine. Max. = Maximum. Hr = Hour. Fed. = Federal. ppm = parts per million. µg/m3 = micrograms per cubic meter. 4th high = Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. 2nd high = Not to be exceeded more than once per year on average over 3 years. 98th %ile = 98th percentile of: 1-hour daily maximum concentrations for the 1-hr NO_2 NAAQS; and of 24-hour average concentrations for PM_{10} and $PM_{2.5}$, averaged over 3 years.

ND – insufficient data available to determine

"--" – data are not available from the listed sources.

As discussed by OEHHA, the 2000 ATS publication (see copy in Appendix D) recommended that the following "dimensions" of adverse effects be considered when determining an adverse health effect:

1. *<u>Biomarkers</u>: These should be considered, however it must be kept in mind that few biomarkers have been validated sufficiently to establish their use for defining a point at which a response becomes adverse, consequently, not all changes in biomarkers should necessarily be considered adverse.*
2. *<u>Quality of life</u>: In recent years, decreased health-related quality of life has become widely accepted as an adverse health effect. The review committee concluded that reduction in quality of life, whether in healthy persons or persons with chronic respiratory disease, should be considered as an adverse effect.*
3. *<u>Physiological impact</u>: The committee recommended that small, transient reductions in pulmonary function should not necessarily be regarded as adverse, although permanent loss of lung function should be considered adverse. The committee also recommended that reversible loss of lung function in conjunction with symptoms should be considered adverse.*
4. *<u>Symptoms</u>: Air pollution-related symptoms associated with reduced quality of life or with a change in clinical status (i.e., requiring medical care or a change in medications) should be considered adverse at the individual level. At the population level, the committee suggested that any detectable increase in symptom frequency should be considered adverse.*
5. *<u>Clinical outcomes</u>: Detectable effects of air pollution on clinical measures should be considered adverse. More specifically, the ATS committee cited as examples increases in emergency department visits for asthma or hospitalizations for pneumonia, at the population level, or an increased need to use bronchodilator medication, at the individual level. The committee recommended that: "no level of effect of air pollution on population-level clinical indicators can be considered acceptable."*
6. *<u>Mortality</u>: Increased mortality should clearly be judged as adverse.*

7. *<u>Population health versus individual risk</u>: The committee concluded that a shift in risk factor distribution, and hence the risk profile of an exposed population, should be considered adverse when the relationship between the risk factor and the disease is causal, even if there is no immediate occurrence of obvious illness*. (American Thoracic Society, 1999)

Based on these recommendations, many health outcomes found to be associated with criteria pollutants could be considered adverse, including pulmonary function changes accompanied by symptoms, pulmonary function changes and respiratory symptoms that reduce quality of life, large changes in pulmonary function, clinical outcomes such as emergency department visits for asthma, hospitalization for respiratory and cardiovascular disease, and mortality. In addition, outcomes such as increase in airway reactivity and inflammation may be considered adverse if they signify increases in the potential risk profile of the population.

> *With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment.* (ATS, 2000).

Finally, according to ATS, research now shows that some highly susceptible individuals may respond to common exposures at or close to natural background pollutant levels that are often unavoidable. A copy of the relevant ATS document, "WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?" is provided in Appendix D.

3.2.4 Valley Fever

Though not an air pollutant, the southwest region of the United States is endemic for Valley Fever (Coccidioidomycosis). Valley Fever is a lung disease that results from infection with Coccidioides, a fungus which lives in dirt. It is also known as Valley Fever, cocci, California fever, desert rheumatism, and San Joaquin Valley Fever. Symptoms include fever, cough, headache, rash, muscle aches, or joint pain. In severe cases, patients develop pneumonia or meningitis, sometimes resulting in death.

The United States Geological Survey (USGS) has published "Operational Guidelines (version 1.0) for Geological Fieldwork in Areas Endemic for Coccidioidomycosis (Valley Fever)" (Open File Report 00-348, 2000) that contains a summary of ecological factors and sites favorable for the occurrence of Valley Fever within endemic areas and lists favorable conditions as follows:

1. *Rodent burrows (often a favorable site for C. immitis, perhaps because temperatures are more moderate and humidity higher than on the ground surface).*
2. *Old (prehistoric) Indian campsites near fire pits.*
3. *Areas with sparse vegetation and alkaline soils.*
4. *Areas with high salinity soils.*
5. *Areas adjacent to arroyos (where residual moisture may be available).*
6. *Packrat middens.*
7. *Upper 30 cm of the soil horizon, especially in virgin undisturbed soils.*

8. Sandy well aerated soil with relatively high water holding capacities.
(Open-File Report 00-348, 2000, p. 8)

The following discussion regarding health effects is reproduced from the San Bernardino County Valley Fever Brochure which references information from the Center for Disease Control (CDC).

How common is Valley Fever?

The number of Valley Fever cases in the United States has been steadily increasing over the past few years. There were over 11,000 reported cases in 2015, and the CDC estimates that an additional 150,000 cases go undiagnosed each year. About 28% of all cases occur in California. In 2015, there were 36 cases of Valley Fever in San Bernardino County, an incidence rate of 1.7 cases per 100,000 people. How the Spores Affect the Body Floating freely in clouds of dust, the tiny cocci spores enter the body when we breathe air into our lungs.

Who is at risk?

Anyone can get Valley Fever if living, working or traveling in endemic areas. It is most common among older adults, particularly those ages 60 and older, but more young people are getting the disease. A person is at higher risk of contracting this disease if they have frequent or high levels of exposure to dusty environments where Coccidioides is common. People who work outside are at higher risk of developing Valley Fever, including construction workers, wildland firefighters, archaeologists, military personnel, and workers in mining, gas, and oil extraction jobs. Groups that are at higher risk to develop more severe forms of Valley Fever include Asians, African Americans, women in the third trimester of pregnancy, and persons with weakened immune systems.

How do people get infected with this illness?

You get infected with this disease by inhaling fungal spores in endemic areas. Fungal spores become airborne when dust is stirred up. People exposed to the dust breathe in the microscopic spores without even realizing it. You cannot get Valley Fever from person-to-person contact.

What can be done to prevent this disease?

It is difficult to prevent Valley Fever. There is no vaccine currently available. People at risk for developing this illness should avoid being in dusty areas where Valley Fever is common. If someone is in an endemic area for their job or even recreational activity, they should avoid exposure to dust if at all possible. Dust suppression methods include wetting the soil during work or covering bare soil. The California Department of Public Health recommends stopping outside activity during conditions where the dust cannot be controlled well. Appropriate use of respiratory protection may also be needed in some circumstances.

How is the infection diagnosed?

Valley Fever can be diagnosed through a variety of tests, including chest X-rays, CT scans, urine or blood tests, and tissue biopsies. Your medical professional will choose the appropriate test(s) based on your medical history and symptoms.

How can Valley Fever be treated?

Sometimes treatment for Valley Fever is not necessary, as symptoms can resolve on their own. Many healthcare providers still prefer to prescribe antifungal medications, such as fluconazole, to prevent a more severe infection from developing. It is especially important for people at risk for severe disease, such as people infected with HIV or those with weakened immune systems, to receive treatment as quickly as possible. It is extremely important for people with severe infections to be treated with antifungal medications because advanced Valley Fever can be fatal if not treated. Sometimes in very severe cases of Valley Fever, people will need respiratory supportive therapies or hospitalization.

What are the short-term consequences?

Nearly 75% of people who get Valley Fever miss work or school due to their illness, for an average of two weeks. More than 40% of people who get Valley Fever need to be hospitalized. The average cost of a hospital stay for Valley Fever is almost $50,000.

Are there long-term consequences?

In very severe cases of Valley Fever, the nervous system can be affected and there may be long-term damage. Sometimes people with weakened immune systems or other risk factors may develop chronic pneumonia or other severe symptoms. These long-term complications are rare.

Have there been outbreaks of Valley Fever?

Outbreaks of Valley Fever do occasionally occur, particularly after events that disturb large amounts of soil. Past outbreaks have occurred among military trainees, archeological workers, and in people exposed to earthquakes and dust storms. There have been several outbreaks of Valley Fever in California in recent years.

What else should I know about Valley Fever?

More people are being exposed to Coccidioides due to increased travel and relocation to endemic areas. Changes in temperature and rainfall can affect the growth and distribution of the fungus. The number of Valley Fever cases reported nationally has more than quadrupled in the past decade. Between 1990 and 2008, there were 3,089 Valley Fever fatalities nationwide, and 47% of those deaths occurred in California.
(County of San Bernardino, 2017).

3.3 Significance Thresholds

The 2019 CEQA Guideline Appendix G checklist was used along with the SCAQMD CEQA Guidelines to determine whether the Project would result in a significant impact on the environment as compared to the existing conditions. Project emissions represent the change between baseline and the future emissions levels associated with the proposed operations. This difference is compared to thresholds to determine significance.

3.3.1 CEQA Guidelines Appendix G

The Environmental Checklist Form in Appendix G of the CEQA Guidelines presents questions about projects that, if true for a particular project, would be considered a significant impact. This document considers the following Environmental Checklist Form questions to be the Significance Thresholds against which Project air quality impacts are judged.

Would the project:

a) Conflict with or obstruct implementation of applicable air quality plan?

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?

c) Expose sensitive receptors to substantial pollutant concentrations?

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

3.3.2 SCAQMD CEQA Significance Criteria

Significance thresholds used when SCAQMD is the lead agency under CEQA are presented in Table 8.

Table 8 SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000 MT/yr CO_2eq for industrial facilities (screening threshold)	
Ambient Air Quality Standards for Criteria Pollutants [d]		

Mass Daily Thresholds [a]	
NO_2 1-hour average annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)
PM_{10} 24-hour average annual average	10.4 µg/m^3 (construction)[e] & 2.5 µg/m^3 (operation) 1.0 µg/m^3
$PM_{2.5}$ 24-hour average	10.4 µg/m^3 (construction)[e] & 2.5 µg/m^3 (operation)
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)
Sulfate 24-hour average	25 µg/m^3 (state)
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day Average Rolling 3-monthaverage	1.5 µg/m^3 (state) 0.15 µg/m^3 (federal)

Source: (SCAQMD, 2015).

[a] Source: SCAQMD CEQA Handbook (SCAQMD, 1993)

[b] Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).

[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.

[d] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.

[e] Ambient air quality threshold based on SCAQMD Rule 403.

3.4 Methodology

This assessment considered potential emissions from aggregates mining that would take place on the Project site, as well as the emissions associated with conveyorized based transport of aggregates materials to elevated loadout bins. Aggregates processing and haulage are not part of the Project. Production rates will be consistent with current operations at Area L, subject to market demand.

3.4.1 Project Design Features and Assumptions

This assessment incorporates the following general assumptions:

- The excavation and associated equipment would operate in compliance with applicable air quality regulations.
    - Diesel engines would comply with applicable state regulations (i.e., ATCM). This includes labeling of off-road equipment with registration numbers assigned by CARB, establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).

  - Fugitive dust emissions would be controlled through implementation of the controls and compliance with performance measures in Rules 403 and 1157.

- Conveyors used to transport aggregate materials would be powered by grid electricity and replace existing conveyors within the current mining site (Area L).
- The Project is in San Bernardino County, which is among the counties that are unlikely to contain serpentine and ultramafic rock (OPR, 2000). No serpentine or ultramafic rock has been found on the Project site or in the vicinity of the Project. The Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) allows the APCO from the local air district to exempt materials produced by facilities that mine alluvial deposits as would be the case for the Project. Therefore, asbestos was excluded from HRA performed for the Project.
- The Project would not store hazardous substances or acutely hazardous substances in quantities that would be subject to chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).

The following assumptions are design features of the Project:

- The Project will not result in any off-site truck trips.
- Excavation/production rate of aggregates and equipment used to excavate would remain the same or decrease from existing conditions.
- Emissions characteristics of off-road vehicle engines reflect the fleet currently operating on-site. Future year fleets considered in the cancer risk assessment incorporate engine turnover as required by the In-Use Off-road Engine ATCM.
- The assessment conservatively assumes that the Project will excavate aggregates for 15 years, but it is possible that the Project will operate up to 30 years. It is conservative to assume mining will take place in this timeframe, as a 15-year span results in higher levels of exposure concentrated on modeled receptors during periods of increased cancer risk due to age sensitivity factors (ASF) as discussed in section 3.4.6.

3.4.2 Emissions Calculations Methodologies

Emissions from combustion sources associated with the Project primarily consist of non-road diesel engines in off-road vehicles. The water truck is assumed to have an off-road engine for purposes of this analysis instead of an on-road engine that emits less pollutants as compared to an off-road engine that was manufactured in the same calendar year (i.e., an on road 2010 model year engine is cleaner than a 2010 off-road engine). Emissions from dust sources associated with Project include windblown dust, storage pile area activities (e.g., loading and handling), dozer/quarrying, and material drops. Emissions are calculated in Appendix G using the methods presented below.

Construction Phase Emissions Calculations

Construction emissions were calculated using CalEEMod. Table 9 summarizes both the phase length assumptions made by CalEEMod and the assumed phase length based on engineering evaluation of the

construction. CalEEMod estimates phase length based on site acreage and may have over-estimated the amount of time necessary for construction. Though construction phase length is expected to be much shorter due to project specifications, the CalEEMod assumed phase length was incorporated into the final model to ensure conservative HRA results. The maximum emissions from each scenario were utilized and the results are provided in Section 3.4.4. It was assumed that exposed areas would be watered for dust control at least twice per day.

Table 9 Construction Emissions Calculation Assumptions

Phase	Phase Length (Modeled)	Phase Length (expected)	Vehicle Type	Vehicle Quantity
Demolition	200 days	20 days	Concrete/Industrial Saws	1
			Excavators	3
			Rubber Tired Dozers	2
Site Preparation	120 days	10 days	Tractors/Loaders/Backhoes	4
			Rubber Tired Dozers	3
Grading	310 days	20 days	Excavators	2
			Graders	1
			Rubber Tired Dozers	1
			Scrapers	2
			Tractors/Loaders/Backhoes	2

Note: Air quality thresholds of significance are based on peak daily emissions which are assumed to occur each day during each construction phase. Length of the construction phases contributes to greenhouse gas impact analysis presented in Section 4.0. Assuming longer phases results in greater emissions which is conservative.

Baseline and Operation Phase Emissions Calculations

Non-Road Engines Emissions

Non-road engine hours from off-road vehicles were calculated based on historical fuel consumption records (Appendix C.1) which were converted into horse power hours based on the 0.367 lb fuel/hp-hr from AP-42 Appendix D. Engine specific emissions factors were based on EPA certification (Appendix C.1). Engine emissions rates decrease over time as the fleet is turned over and controls are implemented to comply with CARB regulations (i.e., In-Use Off-Road). Appendix A of the CalEEMod User Manual contains the following equation for quantifying off-road engine emissions.

$$Emissions_{DieselEx} = \sum_i (EF_i \times Pop_i \times AvgHP_i \times Load_i \times Activity_i)$$

Where:

EF = Emission factor (g/bhp-hr)
Pop = Population, or the number of pieces of equipment.
AvgHP = Maximum rated average horsepower.
Load = Load factor.
Activity = Hours of operation.
i = Equipment type.

Table 10 summarizes the Baseline and Project Fleet. Project emissions were determined by calculating emissions from newer engines using activity levels demonstrated in the Baseline fuel records (Appendix G.3).

Table 10 Baseline and Project OffRoad Vehicles

Phases	Vehicle	Horsepower (avg)	Load Factor
Baseline and Project	Loaders	764	0.36
	Water Trucks	537	0.38
	Dozers	410	0.43
	Graders	240	0.41

Source: Appendix C

Wind Erosion

Wind erosion occurs at the facility in the area disturbed on a daily basis. SCAQMD emissions inventory guidance uses factors that contain loading and vehicular movement in addition to windblown dust which accounts for 33% of total emissions from stockpile areas (US EPA, 1974, p. 102). In order to conservatively account for a variable site layout, bulldozing, quarrying, and material handling were all assumed to be part of the stockpile area emissions. Thus, the wind erosion component of stockpile emissions based upon the aggregates handling emissions below. $PM_{2.5}$ is assumed to be 29.2% of PM_{10} based on SCAQMD's *Updated California Emission Inventory Development and Reporting System (CEIDARS) Table with* $PM_{2.5}$ *Fractions* for mineral products – loading.

Bulldozing/Quarrying

Bulldozing emissions were calculated using the method in Appendix A of the CalEEMod User's Guide. Silt content of 6.9% was assumed which is the CalEEMod default. Baseline dozer operation was assumed based on historical fuel use (Appendix Table C.1) Baseline control efficiency of 80% is assumed for watering.

$$EF_{PM10}\left(\frac{lb}{hr}\right) = \frac{s^{1.5}}{7.9} \times 0.75 = \mathbf{0.34\ lb/hr}$$

$$EF_{PM2.5}\left(\frac{lb}{hr}\right) = 5.7 \times \frac{s^{1.2}}{7.9} \times 0.105 = \mathbf{0.15\ lb/hr}$$

Where: s = silt content (%)

Aggregates Handling

Each time materials are handled, dust emissions are generated. Specifically, the following emissions factor equation from AP-42 Section 13.2.4 demonstrates the PM_{10} emissions, while the $PM_{2.5}$ emission factor was assumed to be 29.2% of PM10 based on SCAQMD's Updated CEIDARS.

$$EF\ PM10 = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} = \mathbf{0.00063\ lb/ton}$$

$$EF\ PM2.5 = (EF\ PM10)0.292 = \mathbf{0.00019\ lb/ton}$$

Where: EF = emission factor (lb/ton).

k = particle size multiplier (dimensionless: 0.35 for PM_{10}).

U = mean wind speed, (miles per hour [mph]) Mean wind speed based on data for San Bernardino (South Coast) in Table 1 of CalEEMod User Manual Appendix D which states 2.2 m/s (5 mph).

M = material moisture content (%). Assumed to be 3%.

3.4.3 CEQA Baseline

The CEQA Baseline for this Project would be the environmental condition during the years leading up to the issuance of the notice of preparation of the EIR for the project, which is expected to be issued within the next six months. Sespe calculated the Baseline by analyzing fuel use data, engine information, and production records for the existing Cajon Creek Quarry (Appendix C). Project activity levels and resulting emissions can be found in Appendix G.

Data for production, fuel use, and pollutant emissions for the Cajon Creek Quarry were combined for historical years 2006 through 2017. In order to identify and remove potentially erroneous data, the tons of aggregates produced per gallon of fuel consumed was determined for each year. Years 2007 and 2009 were determined to be statistical outliers and were removed from the dataset. The remaining years were chosen to represent Baseline conditions. The vehicle list and historical records provided by Vulcan (Appendix C), were used with CalEEMod default parameters to derive the average fleet characteristics represented in Appendix G.3.

The peak historical day of excavation (33,258 tons on December 29, 2006) was assumed to be 12 hours long resulting in a baseline peak hour of 2,772 tons occurring in Area L. The peak historical year of 3,134,709 tons excavated from Area L in 2006 was also used to represent the Baseline condition. Baseline pollutant emissions were determined using these peak tonnages and historical pollutant emissions per ton of production (i.e., excavated) in Table 11 through Table 13 which are compared to peak future conditions with the Project later in this report (Section 3.5).

Table 11 Baseline Maximum Hourly Emissions

Source	ROG (lb/hr)	CO (lb/hr)	NOX (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SOx (lb/hr)
Off-road Engines	0.60	4.78	11.42	0.31	0.31	0.01
Quarry/Drops	--	--	--	3.86	1.18	--
Stockpiles/Windblown Dust	--	--	--	1.93	0.59	--
Total	**0.6**	**4.78**	**11.42**	**6.1**	**2.08**	**0.01**

Source: Appendix G.

Table 12 Baseline Maximum Daily Emissions

Source	ROG (lb/day)	CO (lb/day)	NOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	SOx (lb/day)
Off-road Engines	16.8	133.8	319.2	8.7	8.7	0.2
Quarry/Drops	--	--	--	46.4	14.2	--
Stockpiles/Windblown Dust	--	--	--	23.2	7.1	--
Total	**16.8**	**133.8**	**319.2**	**78.3**	**30**	**0.2**

Source: Appendix G.

Table 13 Baseline Maximum Annual Emissions

Source	ROG (ton/yr)	CO (ton /yr)	NOX (ton /yr)	PM10 (ton /yr)	PM2.5 (ton /yr)	SOx (ton /yr)
Off-road Engines	0.71	5.63	13.43	0.37	0.37	0.01
Quarry/Drops	--	--	--	2.27	0.74	--
Stockpiles/Windblown Dust	--	--	--	1.14	0.37	--
Total	**0.71**	**5.63**	**13.43**	**3.78**	**1.48**	**0.01**

Source: Appendix G.

3.4.4 Construction Phase Emissions

Total Construction emissions are shown in Table 14, which demonstrates the maximum day and year across all phases of Construction and predicted construction phase lengths.

Table 14 Maximum Calculated Construction Emissions

Construction	ROG	NO_X	CO	SOx	PM_{10}	$PM_{2.5}$
Pounds per Day	7.2	81.9	51.1	0.10	16.0	10.0
Tons per Year (2018)	0.87	9.5	5.9	0.011	1.9	1.2

Source: Appendix F.

3.4.5 Operation Phase Emissions

Operation phase emissions are quantified in Appendix G using the methodology and assumptions discussed above and used for the baseline. These emissions are summarized in Table 15, Table 16, and Table 17 Operation

phase emissions from off-road vehicles are projected to be lower than baseline emissions because newer, cleaner engines would be used. Significance of the operation phase emissions is determined in Section 3.5.

Table 15 Operation Phase Maximum Hour Emissions

Source	ROG (lb/hr)	CO (lb/hr)	NOX (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SOx (lb/hr)
Off-road Engines	0.64	3.98	12.20	0.27	0.27	0.01
Quarry/Drops	--	--	--	3.86	1.18	--
Stockpiles/Windblown Dust	--	--	--	1.93	0.59	--
Total	**0.64**	**3.98**	**12.2**	**6.06**	**2.04**	**0.01**

Source: Appendix G

Table 16 Operation Phase Maximum Day Emissions

Source	ROG (lb/day)	CO (lb/day)	NOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	SOx (lb/day)
Off-road Engines	17.5	108.8	333.1	7.5	7.5	0.2
Quarry/Drops	--	--	--	46	14	--
Stockpiles/Windblown Dust	--	--	--	23	7	--
Total	**17.5**	**108.8**	**333.1**	**76.5**	**28.5**	**0.2**

Source: Appendix G.

Table 17 Operation Phase Maximum Year Emissions

Source	ROG (ton/yr)	CO (ton /yr)	NOX (ton /yr)	PM10 (ton /yr)	PM2.5 (ton /yr)	SOx (ton /yr)
Off-road Engines	0.7	4.6	14.0	0.31	0.31	0.01
Quarry/Drops	--	--	--	2.3	0.7	--
Stockpiles/Windblown Dust	--	--	--	1.1	0.4	--
Total	**0.7**	**4.6**	**14**	**3.71**	**1.41**	**0.01**

Source: Emissions are based on an estimated maximum annual extraction rate of 3.1 million tons/year. Refer to Appendix G, dataset G.3 for calculations.

3.4.6 Health Risk Assessment

HRA was performed using current best practices including methods from the HRA Guidelines (OEHHA, 2015), and SCAQMD Rule 1401 guidance materials. The four steps involved in the risk assessment process are: 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization. These four steps were used to assess health risk for the Project and each is discussed in the subchapters below.

Hazard Identification and Quantification

For air toxics sources, hazard identification involves the pollutant(s) of concern emitted by a facility, and the types of adverse health effects associated with exposure to the chemical(s), including whether a pollutant is a

potential human carcinogen or is associated with other types of adverse health effects. Appendix A of the HRA Guidelines includes a list of TACs that are used for HRA in California.

DPM is the primary TAC emitted by off-road engines used in mining projects. DPM has an assigned cancer potency factor (CPF) and a non-cancer reference exposure level (REL) that are used to evaluate the health risk.

Fugitive dust is generally inert but does contain trace metals and RCS. CARB maintains chemical speciation and size profiles for various sources of particulate matter. These speciations are conservative, as they serve to estimate TAC levels in soil for which site-specific data is not available. In order to obtain the most accurate possible speciation profile, Vulcan employed Terracon Consultants, who, under the direction of a California certified Engineering Geologist, obtained and processed samples of the soil on the Area Q site. The samples were processed in such a way as to determine the levels of environmentally available Arsenic and Nickel they contained. The results of this sampling were incorporated into a report (Appendix C.3) and relevant HRA calculations (Appendix G.5).

Values in the final speciation table (Table 18) associated with fugitive dust, were multiplied by the mass emission rates of PM_{10} to quantify the mass of each toxic chemical in the mixture of dust particulates. The resulting mass of each TAC was then used as input along with the dispersion coefficients to quantitatively predict the ground level concentration (GLC) of each TAC to which individuals may be exposed (see exposure assessment subsection below). The GLCs were then combined with exposure parameters to quantify the receptor dose by exposure pathway. In the case of non-cancer risk, the exposures were then summed for each affected target organ using HARP2 to determine the maximum hazard index (HI) among the target organs. The maximum target organ HI was then compared to the non-cancer significance criteria (i.e., 1.0 HI) as discussed in the following subsections.

In addition to the TACs listed in the CARB PM profiles below (Table 18), the HRA assumed that 5.6% of fugitive dust is RCS (Richards & Brozell, 2007). The HRA considered whether health risk from asbestos should be quantified. It was determined based on review of available maps (California Department of Conservation, Division of Mines and Geology, 2000) and language in the Asbestos ATCM's (17CCR §93105 and §93106), which allow the APCO to exempt sand and gravel facilities operating in alluvial deposits, which is the condition on the Project site. Therefore, asbestos was excluded from the HRA.

Exposure Assessment

The purpose of exposure assessment is to estimate the extent of public exposure to emitted TACs. This involves emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimation of short-term (e.g., 1-hour maximum), 8-hour average, and long-term (annual) exposure levels.

Table 18 Speciation Profiles for Fugitive Dust Sources

HARP2 Pollutant ID	Chemical Name	Fraction of TAC in Fugitive Dust PM_{10}
7440382	Arsenic	0.000022
7440439	Cadmium	0.000039
7440473	Chromium	0.000261
7440508	Copper	0.000101
7782505	Chlorine	0.001452
7439921	Lead	0.000942
7439965	Manganese	0.001051
7440020	Nickel	0.000075
7439976	Mercury	0.000019
7782492	Selenium	0.000001
7440622	vanadium (fume or dust)	0.000338
1175	Silica, Crystalline	0.04

Sources: CARB Speciation Profiles (http://www.arb.ca.gov/ei/speciate/interoptvv10001.php) and the Journal of Air and Waste Management Association article in Appendix G for respirable crystalline silica (RCS) (Richards & Brozell, 2007).

Hot Spots Analysis and Reporting Program (HARP2) software developed by CARB can be used to model GLCs at specific off-site locations. HARP2 incorporates the US EPA-developed dispersion model, American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). AERMOD is a steady-state plume gaussian model based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. CARB recommends AERMOD for Hot Spots risk assessments (OEHHA, 2015).

In this HRA, the air dispersion modeling was performed using AERMOD View by Lakes Environmental (Version 9.4.0 running AERMOD executable Version 16216r). Pollutant GLC plot files were generated using the multi-chemical batcher function of AERMOD View. The HARP2 Risk Module was invoked by command line call to generate risk plot files as described in the Appendix E of the *User Manual for the Health Risk Assessment Standalone Tool* (CARB, 2015). Air dispersion modeling consisted of four steps:

1. Annual average and maximum one-hour GLCs are estimated. Air dispersion modeling results are expressed as concentration for each source receptor combination per amount of substance emitted per time in units of micrograms per cubic meter per gram per second, or ($\mu g/m^3$)/(g/s). This value, referred to as Chi over Q and sometimes written as (X/Q) is referred to as the dilution factor.

2. When multiple substances are evaluated, the X/Q is normally utilized since it is based on an emission rate of one gram per second. The X/Q at the receptor point of interest is multiplied by the substance-specific emission rate (in g/s) to yield the substance-specific GLC in units of $\mu g/m^3$. The following equations illustrate this point.

$$GLC = \left(\frac{X}{Q}\right) \times Q_{Substance}$$

$$\frac{X}{Q} = (Chi\ over\ Q)\ in\ \left(\frac{\mu g/m^3}{g/s}\right), from\ model\ results\ with\ unit\ emission\ rate$$

$$Q_{Substance} = substance\ emission\ rate\ (g/s)$$

3. The applicable exposure pathways (e.g., inhalation, soil contact, fish consumption) are identified for the emitted substances, and the receptor locations are identified. This determines which exposure algorithms are ultimately used to estimate dose. After the exposure pathways are identified, the fate and transport algorithms are used to estimate concentrations in the applicable exposure media (e.g., soil or water) and the exposure algorithms are used to determine the substance-specific dose.

4. The dose is used with cancer and noncancer health values to calculate the potential health impacts for the receptor. An example calculation using the high-end point-estimates for the inhalation (breathing) exposure pathway can be found in Appendix I of the HRA Guidelines (OEHHA, 2015).

AERMOD was used as described above to calculate a X/Q for each source-receptor combination by setting the emission rate for each modeled source to one gram per second (1 g/s). Other parameters used in AERMOD describe overall control of the model domain and functionality (e.g., coordinate system, terrain, etc.), receptors (e.g., location, height), sources (e.g., size, location, exhaust velocity, temperature, operating schedule), meteorology (files provided by SCAQMD), and output file options.

The Control Pathway of AERMOD was set to provide output in units of concentration; and both wet and dry plume depletion were disabled. Terrain Options within AERMOD were set to “Flat & Elevated” and digital terrain files were downloaded through AERMOD from the National Elevation Database in geotiff format “NED GEOTIFF”. Averaging options were set to 1-hour and the period of the meteorological data file (i.e., five years) as provided by SCAQMD. The ADJ_U* setting was used pursuant to current EPA Guidelines in Appendix W of 40 CFR Part 51 (82 FR 5182, 1/17/2017), and as included in the AQMD meteorological file. The urban dispersion coefficient was used. Algorithms to include deposition, exponential decay and low wind (beta) were not used.

459 discrete receptors and 614 fence-line receptors were modeled at ground level. The receptors, sources that existed in the Baseline, and sources proposed by the Project are illustrated on Figures 5 and 6. (Appendix A). Additionally, receptors of high concern that are identified in Figure 4 were determined to be effectively considered by existing receptors. Source parameters are summarized in Table 20. Project sources were assigned positive emissions values and Baseline sources were assigned negative values (i.e., to represent sink) so that the HRA results represent the change in health risk with the Project.

The model was segmented into two intervals based on the age sensitivity factors (ASFs) established by OEHHA and used by HARP2 to attribute increased cancer risk to early-life exposures. The intervals were chosen to coincide with the ASFs and represent years 2018 to 2019 and 2020 to 2023. Pollutant emissions were calculated for each year of the Project, averaged over each interval, and proportioned among source objects (Table 20, Appendix G). To be conservative, source object locations and source emissions densities were chosen to achieve greatest potential exposure at off-site receptors.

Output of the dispersion model in the form of plot files, one for each combination of source and averaging period, containing X/Q values were combined with pollutant emissions rates by the AERMOD View multichemical batcher to produce TAC GLC plot files. Exposure parameters discussed below were compiled into the HRACalc.exe input file (HRAInput.hra) used with GLC plot files, exposure parameters, and unit risk values to predict the cancer and non-cancer risks at each receptor. Electronic Modeling files are provided in Appendix I.

Table 19 Representative Discrete Receptors

ID Number	UTM Coordinates (meters E, meters N)	Description
392	466838,3780761	Residence
393	467040, 3780807	Residence
387	466580, 3780314	Residence
435	467580, 3781408	Residence
436	467497, 3780282	School
445	464325, 3781923	Rehabilitation Center
438	468467, 3782387	School
317	467000, 3783800	School

Note: Project is in UTM Zone 11N.

Table 20 Model Source Object Parameters

Source ID	Project Segment	Emissions Description	Type
VOL1	Baseline	Quarry/Drop	Volume Source
VOL2	Future	Stockpile, Quarry/Drop	Volume Source
VOL3	Future	Stockpile, Quarry/Drop	Volume Source
PAREA1	Future	Stockpile, Off-road Engine	Area Source
PAREA2	Baseline	Stockpile, Off-road Engine, Quarry/Drop	Area Source
PAREA3	Baseline	Stockpile, Off-road Engine, Quarry/Drop	Area Source

After emissions exit the source, the substances are dispersed in the air. In addition to being inhaled, particulates deposit on vegetation, on soil, and in water at a rate that is dependent on the particle size. A deposition rate of 0.02 m/s for emission sources that have controls is recommended and was used for the Project HRA.

The concentration of the substance in soil (Cs) is a function of the deposition, accumulation period, chemical specific soil half-life, mixing depth, and soil bulk density. Concentrations in vegetation, animal products, and mother's milk are predicated on the concentrations estimate to be in the air, water, and soil. The Project HRA includes air, soil ingestion, home grown produce, and mother's milk as pathways of exposure. Detailed

discussion of the methodologies used to determine the concentrations in various media to which receptors may be exposed is in Subchapter 5.3 of the HRA Guidelines.

Once the concentrations of substances are estimated in air, soil, water, plants, and animal products, they are used to evaluate estimated exposure to people. Exposure is evaluated by calculating the daily dose in milligrams per kilogram body weight per day (mg/kg/d). The HRA Guidelines describe the algorithms used by HARP2 to calculate this dose for exposure through inhalation, dermal absorption, and ingestion pathways. All chemicals are assessed for exposure through inhalation. Semi and non-volatile multi-pathway substances (e.g., earth metals in fugitive dust), the soil ingestion pathway and the dermal soil exposure pathway are assessed. The mother's milk pathway is used depending on the multi-pathway substance released. The Project HRA assessed each of these four pathways.

Inhalation Dose

The inhalation route dose is quantified for each TAC and for all hazard types (cancer, chronic, and acute). Both residential and off-site worker exposures are considered. Since residential exposure includes near-continuous long-term exposure at a residence and workers are exposed only during working hours (i.e., 8 hours/day), treating all receptors as residential results in a conservative assessment of health risk.

Exposure through inhalation is a function of the breathing rate, the exposure frequency, and the concentration of a substance in the air. For residential exposure, the breathing rates are determined for specific age groups, so inhalation dose (Dose-air) is typically calculated for each of these age groups: 3rd trimester, 0<2, 2<9, 2<16, 16<30 and 16-70 years though short projects may not affect all age groups. OEHHA used the mother's breathing rates to estimate dose for the 3rd trimester fetus assuming the dose to the fetus during the 3rd trimester is the same as the mother's dose. These age-specific groupings are needed in order to properly use the age sensitivity factors for cancer risk assessment. Tier 1 evaluations and the Project HRA use the high-end point estimate (i.e., the 95th percentiles) breathing rates for the inhalation pathway in order to avoid underestimating cancer risk to the public, including children. The following equation is used to determine dose for the inhalation pathway.

$$Dose_{Air} = C_{Air} \times \left\{\frac{BR}{BW}\right\} \times A \times EF \times 10^{-6}$$

Where:

$Dose_{Air}$ = Dose through inhalation (mg/kg/d)
C_{Air} = Concentration in air (µg/m^3)
{BR/BW} = Daily breathing rate normalized to body weight (L/kg body weight-day)
A = Inhalation absorption factor (unitless)
EF = Exposure frequency (unitless), days/365 days
10^{-6} = Micrograms to milligrams conversion, liters to cubic meters conversion

The breathing rate normalized to body weight term, {BR/BW}, has several values used to assess cancer risk for each age bins designated in the HRA Guidelines (i.e., third trimester, 0 to 2, 2 to 16 and 16 to 70 years). These values as well as parametric model distributions are provided in the HRA Guidelines. Exposure frequency is

recommended to be 350 days for residential exposures. Table 21 presents the mean and high end point estimates for residential intake rates that were assumed in the Project HRA.

Table 21 Point Estimates of Residential Daily Breathing Rates by Age Group

Estimate	3rd Trimester[1] (L/kg BW-day)[2]	0<2 Years (L/kg BW-day)	2<16 Years (L/kg BW-day)	16<30 Years (L/kg BW-day)
Mean (65%ile)[3]	225	658	452	210
High-End (95%ile)	361	1090	745	335

Source: (OEHHA, 2015, pp. 5-25).

1 3rd trimester breathing rates based on breathing rate of pregnant women using the assumption that the dose to the fetus during the 3rd trimester is the same as that to the mother.

2 Values are in units of liters of air per kilogram of body weight per day.

3 Mean values were not used in the HRA and are provided for informational purposes only.

Non-cancer health risks were unaffected by age and determined in HARP2 by dividing the GLC of each pollutant at each receptor by the corresponding reference exposure level (REL, units of $\mu g/m^3$) resulting in a hazard index (HI). The HIs for pollutants affecting each target organ were then summed to determine the total HI for each target organ. The target organ with the greatest HI is reported as the non-cancer health risk at each receptor.

Annual residential cancer risk dose was calculated by HARP2 using the GLC (mg/m^3), the intake rate (L/kg-day), 350 days/yr exposure frequency, and an assumption that the entire mass of pollutants inhaled is absorbed into the body of the individual exposed (i.e., no pollutants are exhaled). A fraction of time at home (FAH) of 85% was applied for individuals of any age.

Inhalation dose of each pollutant at each receptor for each year was then multiplied in HARP2 by the inhalation cancer slope factor for the pollutant to estimate annual cancer risk in units of excess cancer cases per million individuals exposed. The total cancer risk from inhalation was then calculated by summing the annual risk from each pollutant and year of exposure. Residential cancer risk assumed exposure duration of 10 years and exposure was assessed using OEHHA Derived Method.

In cancer risk assessments, the Derived Method uses the high-end point estimate (i.e., 95th percentile) for the two driving (dominant) exposure pathways (e.g., soil and breast milk) and the mean (65th percentile) point estimate for the remaining pathways. In non-cancer chronic assessments, the inhalation pathway is always considered a driving pathway, the next two risk driving pathways will use the 95th percentile, and the remaining pathways will use the mean intake rate.

Ingestion Pathway

The average concentration of pollutants in soil is a function of the deposition, accumulation period, chemical specific half-life, mixing depth, and soil bulk density. Due to the limited duration of the Project and even shorter durations of the segments into which the Project was divided (i.e., two and thirteen years for a total of fifteen years), the HARP2 default 70-year accumulation period for soil deposition was refined to 15 years, which is the expected Project duration. As discussed previously, the controlled deposition rate (0.05 m/s) was applied.

Equations and parameters used to estimate the concentration of pollutant in the soil from the GLC can be found in the HRA Guidelines (p. 5-6 to 5-8).

The exposure dose through residential soil ingestion varies by age and was calculated for each age group. The dose is calculated by HARP2 based on the concentration in soil, pollutant specific gastrointestinal relative absorption fraction (GRAF, unitless), soil ingestion rate (mg/kg-day), and exposure frequency using the equation presented in the HRA Guidelines (p. 5-43). For simplicity, GRAF was assigned a value of one which represents the entire mass of pollutant being absorbed. Soil ingestion rates vary by age and the high-end point estimates shown in Table 22 were used.

Table 22 Soil Ingestion Rate Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	0.7	20	3	0.7
High-End (95%ile)	3	40	10	3

Source: (OEHHA, 2015, pp. 5-44).

1 3rd trimester is assumed to be the mother's soil ingestion rate.

2 Values are in units of milligrams of pollutant ingested per kilogram of body weight per year.

3 Geometric mean (GM) values were not used in the HRA and are provided for informational purposes only.

Dermal Pathway

Exposure through dermal absorption (dose-dermal) is a function of the soil or dust loading of the exposed skin surface, the amount of skin surface area exposed, and the concentration and availability of the pollutant. The annual dermal load (ADL) is a composite of the body surface area per kg body weight, exposure frequency, and soil adherence to the skin. High-end point estimates of ADL for individuals located in a mixed climate were used, see Table 23.

Table 23 Annual Dermal Loading Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	1,100	2,200	5,700	1,100
High-End (95%ile)	2,400	2,900	8,100	2,400

Source: (OEHHA, 2015, pp. 5-37).

1 3rd trimester based on ADL of mother normalized to body weight assuming exposure to the mother and feus are the same.

2 Values are in units of milligrams of pollutant on skin per kilogram of body weight per year.

3 Mean values were not used in the HRA and are provided for informational purposes only.

High-end ADL was combined with the concentration of pollutant in soil, the fraction absorbed across skin (pollutant-specific factor), the exposure duration (i.e., 15 years) and the averaging time (i.e., 15 year lifetime) using equations presented in the HRA Guidelines (pg. 5-41) to estimate the dermal dose for each residential receptor.

Mother's Milk Pathway

Estimates of the concentration of pollutants in a mother's milk require the use of the air, water, and soil environmental fate evaluations. Infants would be exposed to the pollutants in concentrations equal to the concentrations at which the mother is exposed from birth up to 25 years of age when the infant is born. The exposed infant is assumed to be fully breastfed for the first year of life. The summed average dose daily dose (mg/kg-day) from all pathways is calculated for the nursing mother using equations in the HRA Guidelines (p. 5-59). Breast milk intake rates of 101 and 139 g/kg-day are used by HARP2.

Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between exposure to an agent and incidence of an adverse health effect in exposed populations. In quantitative carcinogenic risk assessment, the dose-response relationship is expressed in terms of a potency slope that is used to calculate the probability or risk of cancer associated with an estimated exposure. Cancer potency factors (CPF) are expressed as the 95th percent upper confidence limit of the slope of the dose response curve estimated assuming continuous lifetime exposure to a substance. Typically, potency factors are expressed as units of inverse dose (e.g., (mg/kg BW/day)$^{-1}$) or inverse concentration (e.g., (µg/m3)$^{-1}$). It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis. (OEHHA, 2015).

For noncarcinogenic effects, dose-response data developed from animal or human studies are used to develop acute, 8-hour, and chronic noncancer RELs. The acute, 8-hour and chronic RELs are defined as the concentration at which no adverse noncancer health effects are anticipated even in sensitive members of the general population, with infrequent one hour exposures, repeated 8-hour exposures over a significant fraction of a lifetime for workers, or continuous exposure over a year, respectively. The most sensitive health effect is chosen to develop the REL if the chemical affects multiple organ systems. Unlike cancer health effects, noncancer health effects are generally assumed to have thresholds for adverse effects. In other words, injury from a pollutant will not occur until exposure to that pollutant has reached or exceeded a certain concentration (i.e., threshold) and/or dose. The acute, 8-hour chronic, and continuous chronic RELs are air concentrations intended to be below the threshold for health effects for the general population. (OEHHA, 2015).

The actual threshold for health effects in the general population is generally not known with any precision. Uncertainty factors are applied to the Lowest Observed Adverse Effects Level (LOAEL) or No Observed Adverse Effects Level (NOAEL) or Benchmark Concentration values from animal or human studies to help ensure that the continuous chronic, 8-hour chronic, and acute REL values are less than the threshold for human health for nearly all individuals. Table 24 summarizes the health values that were used in the dose-response assessment.

Table 24 Health Values for TACs Emitted by Project

CAS	TAC Name	Inh. Cancer URF $(\mu g/m^3)^{-1}$	Inh. Cancer Slope Factor $(mg/kg\text{-}d)^{-1}$	Oral Cancer Slope Factor $(mg/kg\text{-}d)^{-1}$	Acute REL $(\mu g/m^3)$	Inh. Chronic REL $(\mu g/m^3)$	Inh. Chronic REL 8HR $(\mu g/m^3)$	Oral Chronic REL $(\mu g/m^3)$
9901	DieselExhPM	3.00E-04	1.10E+00	--	--	5.00E+00	--	--
85101	PM_{10}	(No health values for non-TACS like PM_{10} so risk from speciates of PM_{10} was assessed.)						
7440382	Arsenic	3.30E-03	1.20E+01	1.50E+00	2.00E-01	1.50E-02	1.50E-02	3.50E-06
7726956	Bromine	--	--	--	--	--	--	--
7440439	Cadmium	4.20E-03	1.50E+01	--	--	2.00E-02	--	5.00E-04
7782505	Chlorine	--	--	--	2.10E+02	2.00E-01	--	--
7440508	Copper	--	--	--	1.00E+02	--	--	--
7439921	Lead	1.20E-05	4.20E-02	8.50E-03	--	--	--	--
7439965	Manganese	--	--	--	--	9.00E-02	1.70E-01	--
7439976	Mercury	--	--	--	6.00E-01	3.00E-02	6.00E-02	1.60E-04
7440020	Nickel	2.60E-04	9.10E-01	--	2.00E-01	1.40E-02	6.00E-02	1.10E-02
7782492	Selenium	--	--	--	--	2.00E+01	--	5.00E-03
7440622	Vanadium	--	--	--	3.00E+01	--	--	--
1175	Silica, Crystln	--	--	--		3.00E+00	--	--

Source: HARP2 output file type PolDB.csv from non-cancer (NC) runs in Appendix I.

Note: greyed cells contain values that were not used in the HRA. Specifically, DPM was used to assess chronic/cancer risk from exposure to diesel exhaust. Speciates of organics in diesel exhaust were added to facilitate acute risk assessment.

Risk Characterization

Risk characterization is the final step of the HRA. In this step, information developed through the exposure assessment is combined with information from the dose-response assessment to characterize risks to the general public from emissions. In the California, OEHHA conducts the dose-response assessment during the development of CPFs and RELs. These are used in conjunction with the exposure estimates to assess cancer risk and evaluate hazard from noncancer toxicity of emitted chemicals. Under AB2588, risk characterizations present individual and, for cancer, population-wide health risks.

A general summary of the risk characterization components includes the following items and information.

- The locations of the point of maximum impact (PMI), the maximum exposed individual receptor (MEIR), and the maximum exposed individual worker (MEIW) are to be identified. The PMI, MEIW, and MEIR for cancer risk and for noncancer hazard indices (averaging times for acute 1-hour, repeated 8-hour chronic, and continuous chronic hazard indices) may not be the same location; all should be identified.
- The location of any specified sensitive receptors (e.g., schools, hospitals, daycare, or eldercare facilities - contact the District or reviewing authority for more information) should be identified.
- Estimates of population-wide cancer risk.

Cancer Risk

Excess cancer risk is calculated by multiplying the daily inhalation or oral dose, by a cancer potency factor, the age sensitivity factor, the frequency of time spent at home (for residents only), and the exposure duration divided by averaging time. As described below, the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location. A brief description of the age sensitivity factors, exposure duration, and frequency of time spent at home are included below. These factors are discussed in various technical support documents to the HRA Guidelines.

OEHHA has determined that young animals are more sensitive than adult animals to exposure to many carcinogens. Therefore, OEHHA developed age sensitivity factors (ASFs) to take into account the increased sensitivity to carcinogens during early-in-life exposure. In the absence of chemical-specific data, OEHHA recommends a default ASF of 10 for the third trimester to age 2 years, and an ASF of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood. These values manifest in the intake parameters presented below.

FAH during the day can be used to adjust exposure duration and cancer risk from a specific facility's emissions, based on the assumption that exposure to the facility's emissions are not occurring away from home. From the third trimester to age <2 years, 85% of time is spent at home. From age 2 through <16 years, 72% of time is spent at home. From age 16 years and greater, 73% of time is spent at home. Facilities with a school within the 1×10^{-6} (or greater) isopleth are directed to use FAH = 1 for the child age groups (3rd Trimester, 0<2 years, and 2<16 years).

For residential inhalation exposure, cancer risk must be separately calculated for specified age groups because of age differences in sensitivity to carcinogens and age differences in intake rates (per kg body weight). Separate risk estimates for these age groups provide a health-protective estimate of cancer risk by accounting for greater susceptibility in early life, including both age-related sensitivity and amount of exposure. The following equation illustrates the formula for calculating residential inhalation cancer risk.

$$RISK_{inh-res} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT} \times FAH$$

Where:

$RISK_{inh-res}$ = Residential inhalation cancer risk
$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)
CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for a specified age group (unitless)
ED = Exposure duration (in years) for a specified age group
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Cancer risks calculated for individual age groups are summed to estimate the total cancer risk over the exposure period of interest and/or lifetime. Cancer risk is typically expressed in "chances per million" (cancer

risk × 10^{-6}) but may also be expressed in other ways, such as "chances per 100,000" or "chances per 10 million" (cancer risk × 10^{-7}).

For assessment of off-site worker cancer risk at the MEIW, the default assumes working age begins at 16 years. The daily inhalation dose ($DOSE_{air}$) is based on the adjusted 8-hour concentration at each worker receptor (for non-continuous sources) and amount of time the off-site worker's schedule overlaps with the facility's emission schedule. Under most circumstances, cancer risk accumulated by inhalation is calculated using the following equation:

$$RISK_{inh-work} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT}$$

Where:

$RISK_{inh-work}$ = Worker inhalation cancer risk
$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)
CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for a specified age group (one for working age 16 to 70)
ED = Exposure duration (in years) for a specified age group (25 years)
AT = Averaging time for lifetime cancer risk (70 years)

As discussed previously, some substances (e.g., semi-volatile organics and metals) are carcinogenic regardless of how they enter the body. Exposures to these substances are called multipathway. HRA for a facility that emits a multipathway pollutant must, at a minimum, evaluate doses from soil ingestion and dermal exposure. If polycyclic aromatic hydrocarbons, lead, dioxins, furans, or polychlorinated biphenyls are emitted, then the breast-milk consumption pathway becomes mandatory for residential receptors. OEHHA has developed transfer coefficients for these chemicals from the mother to breast milk. The other exposure pathways (e.g., ingestion of homegrown produce or fish) are only evaluated for if the facility impacts that exposure medium and the receptor under evaluation can be exposed to that medium or pathway. For example, if the facility does not impact a fishable body of water, or the impacted water body does not sustain fish that are consumed by anglers, then the fish pathway will not be considered for that facility or receptor.

Non-inhalation residential cancer risk is calculated using the same steps as inhalation cancer risk. The pathway under evaluation (e.g., soil ingestion) is multiplied by the substance-specific oral slope factor, expressed in units of inverse dose (i.e., $(mg/kg/day)^{-1}$), the appropriate ASF, and exposure duration divided by averaging time to yield the cancer risk for a specified age grouping. Cancer risk for each age group is summed as appropriate for the exposure duration.

If multiple substances are emitted, the substance-specific cancer risks for each exposure pathway is summed to give the (total) multipathway cancer risk at the receptor location. HARP2 displays the multipathway risk for each carcinogenic substance and a breakdown of the cancer risk from each exposure pathway.

This HRA evaluates mother's milk due to presence of lead in fugitive dust. The default assumption inherent in the intake rate is that the infant's only source of food is breast milk for the first year (e.g., is fully breastfed), which is one-half of the 0<2 year age group used in the Hot Spots program. Thus, the cancer risk by the

mother's milk pathway is calculated with a slightly modified equation using a different exposure duration. Once the cancer risk is determined for the mother's milk pathway then it is summed with the other risks to calculate the total cancer risk for the receptor.

For facilities with large emission footprints (e.g., refineries, ports, or rail yards, etc.), population-based health impacts provide a better illustration of the potential population-wide impacts of emissions since large numbers of people may be exposed to the emissions. The individual cancer risk approach discussed up to this point has some inherent limitations in terms of protecting public health. A small facility with a single stack can impact a few individuals with an individual cancer risk that is unacceptable, whereas a large facility may have an individual cancer risk that is less than the acceptable limit for individual risk but exposes many more people. Thus, the population-wide impacts are larger for the large facility. Population-wide risk is independent of individual risk, and assumes that a population (not necessarily the same individuals) will live in the impacted zone over a 70-year period.

To evaluate population risk, the cancer burden method accounts for the number of excess cancer cases that could occur in a population. The cancer burden is calculated by multiplying the cancer risk at a census block centroid by the number of people who live in the census block, and adding up the estimated number of potential cancer cases across the zone of impact. The result of this calculation is a single number that is intended to estimate of the number of potential cancer cases within the population that was exposed to the emissions.

Cancer burden is independent of how many people move in or out of the vicinity of an individual facility. For example, if 10,000 people are exposed to a carcinogen at a concentration with a 1×10^{-5} cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1×10^{-5} risk the cancer burden is 1.

OEHHA recommends that exposure from projects longer than 2 months but less than 6 months be assumed to last 6 months (e.g., a 2-month project would be evaluated as if it lasted 6 months). Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs. Thus, for example, if one is evaluating a proposed 10-year project, the cancer risks for the residents would be calculated based on exposures starting in the third trimester through the first ten years of life.

HRA performed for the Project follows the short project methodology described above for the Operation Phase which would last approximately fifteen years. Thus, the Project HRA assesses the emissions/risk for fifteen years starting in 2018. Emissions calculated for the Baseline (see Section 3.4.3) and Project (see Section 3.4.4 and 3.4.5) were determined for each time segment during the Project's life corresponding to cancer risk age bins third trimester to age two and age two through age fourteen. Cancer risk results for each time segment were then summed to determine the Project cancer risk impact at each receptor.

Non-Cancer Risk

Estimates of noncancer inhalation health impacts are determined by dividing an airborne concentration at the receptor by the appropriate REL. This is termed the Hazard Index (HI) Approach. A REL is used as an indicator

of potential noncancer health impacts and is defined as the concentration at which no adverse noncancer health effects are anticipated. When a health impact calculation is performed for a single substance, then it is called the hazard quotient (HQ). Each REL for a substance will have one or more target organ systems (e.g., respiratory system, nervous system, etc.) where the substance can have a noncancer health impact. Thus, all HQs have specified target organ systems associated with them. The sum of the Hazard HQs of all chemicals emitted that impact the same target organ is the HI. Inhalation RELs for noncancer health impacts have been developed for acute, 8-hour chronic, and continuous chronic exposures to a number of substances.

Acute RELs are designed to protect against the maximum 1-hour ground level concentration at a receptor. Chronic RELs protect against long-term exposure to the annual average air concentration spread over 24 hours/day, 7 days/week. 8-hour RELs are designed to protect people with daily 8-hour schedules, such as off-site workers, in an impacted zone. The 8-hour RELs are used for typical daily work shifts of 8 hours and represent concentrations at or below which health impacts would not be expected even for sensitive subpopulations in the general population with repeated chronic daily 8-hour exposures. The 8-hour RELs can be used to evaluate the potential for health impacts (including effects of repeated exposures) in off-site workers, and to children and teachers exposed during school hours.

Acute, 8-hour, and chronic RELs are needed because the dose metrics and even the health impact endpoints may be different with the different exposure durations of acute, daily 8-hour, and chronic exposures. Also, although chronic REL values are lower or set the same as 8-hour RELs, there are some cases such as special meteorological situations (e.g., significant diurnal-nocturnal meteorological differences) or intermittent exposures where the 8-hour REL may be more protective than the chronic REL.

As discussed above, in order to calculate the acute, 8-hour, or chronic HQ, the maximum ground-level concentration (in units of µg/m^3) during the appropriate period of time (i.e., 1-hour acute, 8-hour, and 1-year chronic) is divided by the corresponding REL (in µg/m^3) for the substance. If a receptor is exposed to multiple substances that target the same organ system, then the HQs for the individual substances are summed to obtain a Hazard Index (HI) for that target organ as shown in the following equations.

$$HI_{Organ1} = \frac{C_{air,1}}{REL_1} + \frac{C_{air,2}}{REL_2} + \cdots + \frac{C_{air,n,}}{REL_n}$$

or

$$HI_{Organ1} = HQ_1 + HQ_2 + \cdots + HQ_n$$

A HI of 1.0 or less indicates that adverse health effects are not expected to result from exposure to emissions of that substance. As the HI increases above one, the probability of human health effects increases by an undefined but relative amount. However, HI above one is not necessarily indicative of health impacts due to the application of uncertainty factors in deriving the RELs.

There are non-cancer multi-pathway pollutants that are assessed for inhalation, ingestion, and other non-inhalation pathways. Nickel and arsenic are two that are found in fugitive dust and so the non-inhalation exposures to these metals are assessed for the corresponding target organs. Specifically, nickel effects the

respiratory, hematologic, and alimentary systems while arsenic affects development, the skin, the nervous system, and the cardiovascular system.

3.5 Project-Level Impacts and Mitigation Measures

Project impact associated with each threshold of significance (Section 3.3) is evaluated in the following subsections. Mitigation measures are proposed for impacts where a threshold would potentially be exceeded. Mitigated impact is then assessed to evaluate the effect of the mitigation and determine if additional mitigation is warranted. Mitigated impacts that cannot feasibly be reduced to less than significant levels require a statement of overriding conditions before an EIR may be certified.

3.5.1 Conflict with or Obstruction to the Implementation of an Air Quality Plan

Impact Statement

Impact AQ-1: *Would the Project conflict with or obstruct implementation of the applicable air quality plan?* **(2019 CEQA Guidelines Checklist Appendix G Threshold Criteria (a))**

Impact Analysis

The SCAQMD AQMP is discussed in Section 3.1.4.1 which includes lists of control measures. In general, control measures to reduce emissions that are described in the applicable air quality plans would each be implemented as rules and undergo the associated public rulemaking process during which the feasibility of compliance with proposed requirements could be discussed and adjusted as needed. Thus, it is unlikely that such a process would result in a requirement that the Project could not comply with. In the end, the Project would be required to comply with regional air quality rules promulgated by the SCAQMD and participate in reducing air pollutant emissions. Aggregates production is proportional to population growth, which is a factor that is accounted for in air quality plans. Therefore, the Project would not obstruct implementation of an air quality plan for the simple reason that any growth in the emissions rate would be in an amount equal to the growth in the regional aggregates market and project sources would comply with rules developed from AQMD control measures.

As discussed in Section 3.1.4.1, AB 617 establishes a framework for development of Community Emissions Reduction Plans (CERP) in disadvantaged communities. A CERP for the SBM area that includes within the "emissions study area" both the exiting (Area L) and Project (Area Q) sites was prepared by the Community Steering Committee under the direction of the SCAQMD. The CERP lists actions prioritized by the Steering Committee that would reduce emissions and/or exposures within the Community.

Two actions in the Plan are intended for "rock/aggregate plants" and are described as follows:

- Outreach to operators on best practices and rule requirements.
- Focused air monitoring and inspections to identify potential emissions or violations.

Neither action contemplated in the CERP would impose new requirements. Thus, the Project is consistent with the CERP because it will use best practices for dust control as identified in Rules 403 and 1157. Focused air monitoring and inspection that could occur would be performed by others and enforce existing air quality and health risk standards.

At the state-level, AB 617 requires six (6) measures listed below and followed by detailed discussion of applicability to the Project and how the Project would comply with each:

1. Annual Reporting;
2. Best Available Retrofit Control Technology ("BARCT");
3. a Statewide Clearinghouse of BARCT;
4. Community Air Monitoring;
5. Community Emissions Reduction Programs; and
6. Increased Penalties.

Annual Reporting Requirements

AB 617 requires CARB and local air districts to establish an annual reporting system for certain classes of stationary sources. (Health and Safety Code, § 39607.1(b)(1)). Stationary sources subject to the annual reporting requirements include: (1) facilities required to report GHG emissions to CARB because they generate more than 25,000 $MTCO_2e$ annually; (2) facilities authorized to emit 250 tons or more of any nonattainment pollutant or its precursors; and (3) facilities that receive an elevated prioritization score based on cancer or noncancer health impacts. (*Id.* at § 39607.1(a)(2).)

The Project does not meet AB 617's definition of a stationary source. First, this Report concludes that Project operations will result in total emissions of 2,202 $MTCO_2e$ annually, which represents only 24 $MTCO_2e$ increase above existing baseline emissions and is well below the 25,000 $MTCO_2e$ threshold to qualify as a stationary source (see Section 4.5).

Second, the Project site sits in an air basin that is in nonattainment for $PM_{2.5}$ and ozone. NO_X is a precursor of ozone. As discussed in Section 3.5.2, this analysis concluded that operations in Area Q would also result in 28.5 pounds per day of $PM_{2.5}$ and 331 pounds per day of NO_X. Conservatively extrapolating those daily emissions to annual emissions results in annual emissions of 10,402.5 pounds of $PM_{2.5}$ and 121,581.5 pounds of NO_X. These emissions are well below the 250-ton threshold to qualify as a stationary source.

Finally, the existing operations (Area L) have not received an elevated prioritization score based on cancer or noncancer health impacts. Therefore, the Project is not a stationary source under AB 617 subject to the annual reporting requirements.

BARCT Requirements

AB 617 requires local air districts within nonattainment areas to develop an expedited BARCT schedule for all industrial sources subject to the state's cap-and-trade mechanism. (Health and Safety Code, § 40920.6(c). The Project is not subject to cap-and-trade; therefore, the Project is not subject to AB 617's BARCT requirements.

Community Air Monitoring

On September 27, 2018, CARB adopted the Community Air Protection Blueprint and selected the San Bernardino/Muscoy Area as for both community air monitoring and community emissions reduction.

AB 617 required the SCAQMD to deploy its community air monitoring system no later than July 1, 2019. (Health and Safety Code, § 42705.5(c).) The SCAQMD instituted its AB 617 Air Monitoring Plan for the San Bernardino/Muscoy Community ("CAMP") in April 2019. As part of the community air monitoring system, the SCAQMD may require certain classes of stationary sources to deploy fence-line or other real time emissions monitoring systems. Stationary sources subject realtime monitoring include: (1) facilities required to report GHG emissions to CARB because they generate more than 25,000 MTCO2e annually; (2) facilities authorized to emits 250 tons or more of any nonattainment pollutant or its precursors; and (3) facilities that receive an elevated prioritization score based on cancer or noncancer health impacts. (*Id.* at § 39607.1(a)(2).)

As previously discussed, the Project does not meet the definition of a stationary source because it will have less than 25,000 MTCO2e and 250-tons of criteria pollutant emissions annually.

Community Emissions Reduction Program

As discussed above, the Project would be consistent with applicable control measures in the CERP.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Less than significant.

3.5.2 Net Increase of any Criteria Pollutant

Impact Statement

Impact AQ-2: *Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?* **(2019 CEQA Guidelines Checklist Appendix G Threshold Criteria (b))**

Impact Analysis

CEQA defines cumulative impacts as two or more individual effects which, when considered together, are either significant or "cumulatively considerable", meaning they add considerably to a significant environmental impact. An adequate cumulative impact analysis considers a project over time and in conjunction with other past, present, and reasonably foreseeable future projects whose impacts might compound those of the project being assessed.

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development. Future attainment of State and Federal ambient air quality standards is a function of successful implementation of the SCAQMD's attainment plans. Consequently, the SCAQMD's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.

A Lead Agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (CCR §15064(h)(3)).

Thus, if Project emissions (i.e. change from Baseline) exceed thresholds for NOx, ROG, PM_{10} or $PM_{2.5}$, then the Project would result in a cumulatively considerable net increase of a criteria pollutant for which the SCAQMD is in non-attainment under applicable Federal or State ambient air quality standards. This means that if the project impact is less than those significance criteria, it cannot be cumulatively significant. The significance criteria are presented in Table 8 and includes two sets of Mass Daily Thresholds that are applied separately to construction and operation phases of the project in Table 25 and Table 26..

Table 25 Construction Phase Criteria Pollutant Impacts

	ROG (lb/day)	NO_X (lb/day)	CO (lb/day)	SOx (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Construction	5.09	59.5	35.1	0.062	5.81	3.8
Threshold	75	100	550	150	150	55
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Appendix F.

Note: Lead is present in fugitive dust at concentration of approximately 130 ppm (see Table 18). Thus, compliance with PM_{10} threshold of 150 lb/day also ensures that lead emissions do not exceed the three (3) lb/day threshold.

Table 26 Operation Phase Criteria Pollutant Emissions Impacts

	ROG (lb/day)	CO (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	SOx (lb/day)
Future Emissions with Project	17.5	108.8	333.1	76.5	28.5	0.2
Baseline Emissions	16.8	133.8	319.2	78.3	30	0.2
Project Emissions Net Change	0.7	-25	13.9	-1.8	-1.5	0
Significance Threshold	55	550	55	150	55	150
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Sources: Table 8, Table 12, and Table 16. County CEQA Significance Threshold criteria are equal to those published by SCAQMD.

Note: There would be no concurrent mining operations between Area L and the Project site (Area Q) because mining would not initiate until the mining in Area L is completed.
Emissions are based on an estimated maximum annual extraction rate of 3.1 million tons/year. Refer to Appendix G, dataset G.3 for calculations.

Negative values in Table 25 result from the fact that off-road engines were replaced or retrofit to comply with the In-Use, Non-Road Engine Air Toxic Control Measure during the baseline years. Compliance with the ATCM represents the Project's fair share emissions reductions to substantially lessen the cumulative air quality problems in the region. Additional replacement and retrofits will be made in the future at least until 2024 when the ATCM is fully phased-on for large fleets (i.e., Vulcan operates a large fleet with total horsepower greater than 5,000 hp).

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

3.5.3 Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Impact Statement

Impact AQ-3: *Would the Project expose sensitive receptors to substantial pollutant concentrations?* **(2019 CEQA Guidelines Checklist Appendix G Threshold Criteria (c))**

Impact Analysis

Determination of whether project emissions would expose sensitive receptors to substantial pollutant concentrations is a function of assessing potential health risks. Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors. When evaluating whether a project has the potential to result in localized impacts, the nature of the air pollutant emissions, the proximity between the emitting facility and sensitive receptors, the direction of prevailing winds, and local topography must be considered.

A Health Risk Assessment was performed as discussed in Section 3.4.6 to evaluate the effects of TACs including DPM from vehicles and various substances found in fugitive dust emissions (i.e., metals and crystalline silica). Health risks from operation of the Project are presented in Table 27 which shows impacts would be less than significant.

Table 27 Health Risk Impacts

Model Receptor # – Type	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
392 – Residence	5.46	0.0381	0.01
393 – Residence	5.33	0.0370	0.008

Model Receptor # – Type	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
387 – Residence	0.475	0.00267	0.0016
435 – Residence	-2.84	0.00128	0.0015
436 – School	-0.0120	0.00161	0.0011
445 – Rehabilitation Center	-2.36	< 0	< 0
438 – School	-2.65	< 0	< 0
317 – School	-0.774	< 0	< 0
532 – Worker	1.24	0.11	0.019
530 – Worker	1.23	0.11	0.024
Point of Maximum Impact (PMI)	n/d	n/d	0.024
Significance Threshold	**10**	**1.0**	**1.0**
Exceeds Threshold?	**No**	**No**	**No**

Source: Appendix G

Note: This table provides results for 8 of the 1073 receptors analyzed, however no off-site receptors in the model demonstrated significant Cancer, Chronic, or Acute risk. Results for all receptors can be found in Appendix G. PMI for acute health risk occurs at UTM Zone 11 coordinate (466921.99 m E, 3780804.6 m N).

In addition to analysis of individual receptors, a 70-year model was utilized to determine the geographical extents of the one in one million cancer risk isopleth (Figure 7). A circle with a radius of 3.8 km, centered at 467763 m East, 3782465 m North was chosen as a conservative representation of the one in one million isopleth. The HARP2 software census data demonstrates 33,213 individuals live within the bounds of the 3.8 km radius circle (Appendix I). The 70-year model highest cancer risk demonstrated at an individual receptor was determined to be 9.6 in one million (Appendix I). By multiplying 9.6 in one million by 33,213, the cancer burden was determined to be 0.31, which is below the 0.5 threshold of significance.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

3.5.4 Odors Affecting a Substantial Number of People

Impact Statement

Impact AQ-4: *Would the Project result in other emission (such as those leading to odors) adversely affecting a substantial number of people?* **(2019 CEQA Guidelines Checklist Appendix G Threshold Criteria (d))**

Impact Analysis

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact and the variety of odor sources, there are no quantitative or formulaic methodologies to determine the presence of a significant odor impact. SCAQMD CEQA Significance Thresholds state that a significant impact would occur if the Project would violate Rule 402 which states:

> *A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.*

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions. Diesel exhaust from mobile equipment/vehicles has a slight odor. Odor intensity would decrease rapidly with distance and is not expected to be frequently (or at all) detectable at locations outside of the Project site boundary. Given the large site upon which the diesel engines will traverse, and the fact that the existing mining operation produced up to the levels currently proposed without receiving odor complaints; the Project would result in a less than significant impact.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

4.0 GREENHOUSE GASES

This section of the AQCCIA assesses GHG impacts of the Project. The methodologies used and the information provided in this section are supported by calculations in Appendix G.

4.1 Regulatory Setting

4.1.1 Characteristics of Climate Pollutants

The accumulation of GHGs in the atmosphere contributes to the regulation of the earth's temperature. Some GHGs can remain in the atmosphere for long periods of time (i.e., long-lived). The GHGs discussed below are recognized under the Kyoto Protocol and have been found by the International Panel on Climate Change (IPCC) to have an effect on global climate change. In addition, California has identified "short-lived" climate pollutants.

Long-Lived Climate Pollutants

In general, there are six (6) compounds/classes of GHGs that are counted when emissions are inventoried. Each GHG exhibits a different global warming potential (GWP). The mass of emissions of each GHG is multiplied by its GWP to determine the carbon dioxide equivalent (CO_2e) potential for global warming. GWPs have changed over time by the Intergovernmental Panel on Climate Change (IPCC) which is considered an authority on GHGs and their effects. The CAP and CARB emissions inventories and plans use GWPs that are an iteration or two behind and the most recent IPCC publication. Characteristics of each long-lived GHG and the associated GWP is presented below.

Carbon Dioxide (CO_2) is an odorless, colorless natural GHG. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include burning coal, oil, natural gas, and wood. By definition, CO_2 has a GWP equal to one (1).

Methane (CH_4) is a flammable GHG. A natural source of CH_4 is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources include landfills, fermentation of manure, and ruminants such as cattle. CH_4 has a GWP equal to 25.

Nitrous Oxide (N_2O) is a colorless GHG. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O has a GWP equal to 298.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for chlorofluorocarbons (CFCs). Of all the GHGs, they are one of three groups with the highest global warming potential. HFCs are human made for applications such as air conditioners and refrigerants. HFCs have GWPs that range from 124 (HFC 125a) to 14,300 (HFC 23).

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. PFCs have GWPs that range from 7,390 (PFC 14) to 12,200 (PFC 116).

Sulfur Hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection. SF_6 has a GWP equal to 22,800.

Short-Lived Climate Pollutants

Short-lived climate pollutants are climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants, such as carbon dioxide (CO_2). Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. The impacts of short-lived climate pollutants are especially strong over the short term. Reducing these emissions can make an immediate beneficial impact on climate change.

Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Diesel particulate matter emissions are a major source of black carbon and are also toxic air contaminants that have been regulated and controlled in California for several decades in order to protect public health.

Fluorinated gases (F-gases) are the fastest growing source of greenhouse gas emissions in California and globally. They include ozone-depleting substances that are being phased out globally under the Montreal Protocol, and their primary substitute, hydrofluorocarbons (HFCs). Most F-gas emissions come from leaks of these gases in refrigeration and air-conditioning systems. Emissions also come from aerosol propellants, fire suppressants, and foam-relocation agents.

Methane (CH_4) is the principal component of natural gas. Its emissions contribute to background ozone in the lower atmosphere (troposphere), which itself is a powerful greenhouse gas and contributes to ground level air pollution. The atmospheric concentration of methane is growing as a result of human activities in the agricultural, waste treatment, and oil and gas sectors. Capturing methane from these sources can improve pipeline safety, and provide fuel for vehicles and industrial operations that displaces fossil natural gas use.

4.1.2 Federal

To date, there is no federal overarching law specifically related to climate change or the reduction of GHGs. The Environmental Protection Agency (EPA) authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA,* 549 US 497 (2007).The Supreme Court found that GHGs are air pollutants covered by the Clean Air Act, and the EPA Endangerment Findings concluded the elements CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 threatened public health for both current and future generations.

In 2009, the U.S. EPA published a rule for the mandatory reporting of GHG from sources that in general emit 25,000 metric tons or more of carbon dioxide equivalent per year in the United States. Implementation of 40 CFR Part 98 is referred to as the Greenhouse Gas Reporting Program (GHGRP). This collection of comprehensive, nationwide emissions data is intended to provide a better understanding of the sources of GHGs and to guide development of policies and programs to reduce emissions. (U.S. EPA, 2013) Additional federal actions have included the implementation of standards for vehicles, biofuel production, and power generation. Federal actions relating to GHG emissions are summarized in Appendix J, Table J.6.

4.1.3 State

The following tables were copied from the California government website for climate change (climatechange.ca.gov) and list the California legislation (Table 28), regulations, (Table 29), and executive orders (Table 30) through the end of 2015. More recent developments are discussed immediately following the tables.

Table 28 California Climate Change Legislation

Date	Legislation	Description
September 10, 2018	Senate Bill 100 (De León, Chapter 312, Statues of 2018)	California Renewables Portfolio Standard Program: emissions of greenhouse gases. This bill establishes the 100 Percent Clean Energy Act of 2017 which increases the Renewables Portfolio Standard (RPS) requirement from 50 percent by 2030 to 60 percent, and creates the policy of planning to meet all of the state's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045, for a total of 100 percent clean energy.
July 26, 2017	Assembly Bill 617 (Christina Garcia, Chapter 136, Statutes of 2017)	Companion to Cap-and-Trade Extension Establishes a groundbreaking program to measure and reduce air pollution from mobile and stationary sources at the neighborhood level in the communities most impacted by air pollutants. Requires the Air Resources Board to work closely with local air districts and communities to establish neighborhood air quality monitoring networks and to develop and implement plans to reduce emissions. The focus on community-based air monitoring and emission reductions will provide a national model for enhanced community protection.
July 25, 2017	Assembly Bill 398 (Eduardo Garcia, Chapter 135, Statutes of 2017)	Cap-and-Trade Extension Extends and improves the Cap and Trade Program, which will enable the state to meet its 2030 emission reduction goals in the most cost-effective manner. Furthermore, extending the Cap and Trade Program will provide billions of dollars in auction proceeds to invest in communities across California.
September 19, 2016	Senate Bill 1383 (Lara, Chapter 395, Statutes of 2016)	Short-lived Climate Pollutants Establishes statewide reduction targets for short-lived climate pollutants.

Date	Legislation	Description
September 8, 2016	Assembly Bill 197 (Eduardo Garcia, Chapter 250, Statutes of 2016)	Greenhouse gas regulations Prioritizes direct emission reductions from large stationary sources and mobile sources.
September 8, 2016	Senate Bill 32 (Pavley, Chapter 249, Statutes of 2016)	Greenhouse Gas emission reduction target for 2030 Establishes a statewide greenhouse gas (GHG) emission reduction target of 40 percent below 1990 levels by 2030.
October 7, 2015	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)	Clean Energy and Pollution Reduction Act of 2015 Establishes targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030.
September 21, 2014	Senate Bill 605 (Lara, Chapter 523, Statutes of 2014)	Short-lived climate pollutants Requires the State Air Resources Board to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants by January 1, 2016.
September 21, 2014	Senate Bill 1275, (De León, Chapter 530, Statutes of 2014)	Charge Ahead California Initiative Establishes a State goal of 1 million zero-emission and near-zero-emission vehicles in service by 2020. Amends the enhanced fleet modernization program to provide a mobility option. Establishes the Charge Ahead California Initiative requiring planning and reporting on vehicle incentive programs, and increasing access to and benefits from zero-emission vehicles for disadvantaged, low-income, and moderate-income communities and consumers.
September 21, 2014	Senate Bill1204 (Lara, Chapter 524, Statutes of 2014)	California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program Creates the California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program funded by the Greenhouse Gas Reduction Fund for development, demonstration, precommercial pilot, and early commercial deployment of zero- and near-zero emission truck, bus, and off-road vehicle and equipment technologies, with priority given to projects benefiting disadvantaged communities.
September 28, 2013	Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013)	Alternative fuel and vehicle technologies: funding programs Extends until January 1, 2024, extra fees on vehicle registrations, boat registrations, and tire sales in order to fund the AB 118, Carl Moyer, and AB 923 programs that support the production, distribution, and sale of alternative fuels and vehicle technologies and air emissions reduction efforts. The bill suspends until 2024 ARB's regulation requiring gasoline refiners to provide hydrogen fueling stations and appropriates up to $220 million, of AB 118 money to create a hydrogen fueling infrastructure in the State.
September 28, 2013	Assembly Bill 1092 (Levine, Chapter 410, Statutes of 2013)	Building standards: electric vehicle charging infrastructure Requires the Building Standards Commission to adopt mandatory building standards for the installation of future electric vehicle charging infrastructure for parking spaces in multifamily dwellings and nonresidential development.

Date	Legislation	Description
September 30, 2012	Senate Bill 535 (De León, Chapter 830, Statutes of 2012)	Greenhouse Gas Reduction Fund and Disadvantaged Communities Requires the California Environmental Protection Agency to identify disadvantaged communities; requires that 25% of all funds allocated pursuant to an investment plan for the use of moneys collected through a cap-and-trade program be allocated to projects that benefit disadvantaged communities and 10 those 25% be use within disadvantaged communities; and requires the Department of Finance to include a description of how these requirements are fulfilled in an annual report.
September 30, 2012	Assembly Bill 1532 (J. Perez, Chapter 807, Statutes of 2012)	Greenhouse Gas Reduction Fund in the Budget Requires the Department of Finance to develop and submit to the Legislature an investment plan every three years for the use of the Greenhouse Gas Reduction Fund; requires revenue collected pursuant to a market-based compliance mechanism to be appropriated in the Annual Budget Act; requires the department to report annually to the Legislature on the status of projects funded; and specifies that findings issued by the Governor related to "linkage" as part of a market-base compliance mechanism are not subject to judicial review.
April 12, 2011	Senate Bill X1-2 (Simitian, Chapter 1, Statutes of 2011)	Governor Edmund G. Brown, Jr. signed Senate Bill X1-2 into law to codify the ambitious 33 percent by 2020 goal. SBX1-2 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of electricity generated from eligible renewable energy resources per year to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2013, 25% by December 31, 2016 and 33% by December 31, 2020. The new RPS goals applies to all electricity retailers in the State including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. This new RPS preempts the California Air Resources Boards' 33 percent Renewable Electricity Standard.
September 29, 2011	Assembly Bill 1504 (Skinner, Chapter 534, Statutes of 2010)	Forest resources and carbon sequestration. Bill requires Department of Forestry and Fire Protection and Air Resources Board to assess the capacity of its forest and rangeland regulations to meet or exceed the State's greenhouse goals, pursuant to AB 32.
September 30, 2008	Senate Bill 375 (Steinberg, Chapter 728, Statutes of 2008)	Sustainable Communities & Climate Protection Act of 2008 requires Air Resources Board to develop regional greenhouse gas emission reduction targets for passenger vehicles. ARB is to establish targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations. For more information on SB 375, see the ARB Sustainable Communities page.
October 14, 2007	Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007)	Alternative Fuels and Vehicles Technologies The bill would create the Alternative and Renewable Fuel and Vehicle Technology Program, to be administered by the Energy Commission, to provide funding to public projects to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the State's climate change policies.
August 24, 2007	Senate Bill 97 (Dutton, Chapter 187, Statutes of 2007)	Directs Governor's Office of Planning and Research to develop CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." For more information see the OPR CEQA and Climate Change page.

Date	Legislation	Description
July 18. 2006	Assembly Bill 1803 (Committee on Budget, Chapter 77, Statutes of 2006)	Greenhouse gas inventory transferred to Air Resources Board from the Energy Commission.
August 21, 2006	Senate Bill 1 (Murray, Chapter 132, Statutes of 2006)	California's Million Solar Roofs plan is enhanced by PUC and CEC's adoption of the California Solar Initiative. SB1 directs PUC and CEC to expand this program to more customers, and requiring the State's municipal utilities to create their own solar rebate programs. This bill would require beginning January 1, 2011, a seller of new homes to offer the option of a solar energy system to all customers negotiating to purchase a new home constructed on land meeting certain criteria and to disclose certain information.
September 26, 2006	Senate Bill 107 (Simitian, Chapter 464, Statutes of 2006)	SB 107 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of renewable electricity (Renewable Portfolio Standard) generated per year, from 17% to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2010.
September 27, 2006	Assembly Bill 32 (Núñez, Chapter 488, Statutes of 2006)	California Global Warming Solutions Act of 2006. This bill would require Air Resources Board (ARB) to adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020. ARB shall adopt regulations to require the reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with this program. AB 32 directs Climate Action Team established by the Governor to coordinate the efforts set forth under Executive Order S-3-05 to continue its role in coordinating overall climate policy. See more information on AB 32 at ARB.
September 12, 2002	Senate Bill 1078 (Sher, Chapter 516, Statutes of 2002)	This bill establishes the California Renewables Portfolio Standard Program, which requires electric utilities and other entities under the jurisdiction of the California Public Utilities Commission to meet 20% of their renewable power by December 31, 2017 for the purposes of increasing the diversity, reliability, public health and environmental benefits of the energy mix.
September 7, 2002	Senate Bill 812 (Sher, Chapter 423, Statutes of 2002)	This bill added forest management practices to the California Climate Action Registry members' reportable emissions actions and directed the Registry to adopt forestry procedures and protocols to monitor, estimate, calculate, report and certify carbon stores and carbon dioxide emissions that resulted from the conservation-based management of forests in California.
July 22, 2002	Assembly Bill 1493 (Pavley, Chapter 200, Statutes of 2002)	The "Pavley" bill requires the registry, in consultation with ARB, to adopt procedures and protocols for the reporting and certification of reductions in greenhouse gas emissions from mobile sources for use by the ARB in granting the emission reduction credits. This bill requires the ARB to develop and adopt, by January 1, 2005, regulations that achieve the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks. For more information on AB 1493 Pavley I, see the ARB Clean Car Standards page.

Date	Legislation	Description
October 11, 2001	Senate Bill 527 (Sher, Chapter 769, Statutes of 2001)	This bill revises the functions and duties of the California Climate Action Registry and requires the Registry, in coordination with CEC to adopt third-party verification metrics, developing GHG emissions protocols and qualifying third-party organizations to provide technical assistance and certification of emissions baselines and inventories. SB 527 amended SB 1771 to emphasize third-party verification.
September 30, 2000	Senate Bill 1771 (Sher, Chapter 1018, Statutes of 2000)	SB 1771 establishes the creation of the non-profit organization, the California Climate Action Registry and specifies functions and responsibilities to develop a process to identify and qualify third-party organizations approved to provide technical assistance and advice in monitoring greenhouse gas emissions, and setting greenhouse gas (GHG) emissions baselines in coordination with CEC. Also, the bill directs the Registry to enable participating entities to voluntarily record their annual GHG emissions inventories. Also, SB 1771 directs CEC to update the State's greenhouse gas inventory from an existing 1998 report and continuing to update it every five years.
September 28, 1988	Assembly Bill 4420 (Sher, Chapter 1506, Statutes of 1988)	The California Energy Commission (CEC) was statutorily directed to prepare and maintain the inventory of greenhouse gas emissions (GHG) and to study the effects of GHGs and the climate change impacts on the State's energy supply and demand, economy, environment, agriculture, and water supplies. The study also required recommendations for avoiding, reducing, and addressing related impacts - and required the CEC to coordinate the study and any research with federal, state, academic, and industry research projects.

Source: (climatechange.ca.gov, 2017)

Table 29 California Climate Change Regulations

Regulations	Description
Cap & Trade Amendments	The September 2016 amendments to the cap-and-trade regulation included: • Emission caps for the post-2020 program • Post-2020 continuation of the allowance price containment reserve • Linking with Ontario's cap-and-trade program • Compliance with the federal Clean Power Plan Modifications to allowance allocation
Low Carbon Fuel Standard	In September 2015, the Air Resources Board re-adopted the Low Carbon Fuel Standard, to settle issues arising from lawsuits. The requirement is still a 10 percent reduction in the carbon intensity of transportation fuels.
Cap & Trade Offset Protocols	The Air Resources Board has adopted five protocols for offset compliance projects. In addition to the original four protocols adopted in 2011, ARB has adopted: Mine Methane Capture (MMC) Projects Compliance Offset Protocol, adopted April 2014
Cap & Trade Link with Quebec	California linked its cap-and-trade program with Quebec's program in January 2014. Linkage allows for the use of compliance instruments from Quebec's greenhouse gas emission trading system to meet compliance obligations pursuant to the California Cap-and-Trade Regulation, and the reciprocal approval of compliance instruments issued by California to meet compliance obligations in the external trading program.

Regulations	Description
Building Energy Efficiency Standards	The Energy Commission's 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The Standards, which took effect on January 1, 2014, offer builders better windows, insulation, lighting, ventilation systems and other features that reduce energy consumption in homes and businesses.
Advanced Clean Cars Standard	The Advanced Clean Cars Program, approved in January 2012, will achieve additional GHG reductions from passenger vehicles for model years 2017-2025. This Program represents a new approach to passenger vehicles – cars and light trucks -- by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards known as Low Emission Vehicles (LEV) III. The new approach also includes efforts under the Zero-Emission Vehicle Program to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California.
Water Appliance Standards	The Energy Commission's 2015 Water Appliance Standards are projected to save 10 billion gallons in the first year, increasing over time to 100 billion gallons of water per year. The energy efficiency and water standards require water appliances to consume less water thereby using less energy while performing the same function. The standards apply to: toilets and urinals; residential lavatory faucets; kitchen faucets; public lavatory faucets.
Cap & Trade Rulemaking Activities	A proposed California cap on greenhouse gas emissions and a market-based compliance mechanisms, including compliance offset protocols. OAL approved the rulemaking and filed it with the Secretary of State on December 13, 2011. The regulation will become effective on the January 1, 2012.
Low Carbon Fuel Standards (LCFS)	The regulations are designed to reduce the carbon intensity (CI) of transportation fuels used in California by at least 10 percent by the year 2020. The Air Resources Board approved the LCFS regulation for adoption on April 23, 2009. The regulation entered into full effect on April 15, 2010. Based upon feedback from stakeholders, amendments to the regulations were proposed by the Board in December 2011.
33% Renewable Portfolio Standard	On May 5, 2011, the Commission adopted the Order Instituting Rulemaking (R.) 11-05-005 to open a new proceeding for the implementation and administration of the 33% RPS Program. The primary focus of the R.11-05-005 proceeding was the implementation of the new 33% RPS law, Senate Bill (SB) 2 (1X) (Simitian), stats. 2011.
Mandatory Commercial Recycling	This regulation addresses recycling requirements for businesses that generate 4 or more cubic yards of commercial solid waste per week and multifamily residential dwellings with 5 or more units, regardless of the amount of waste generated; local jurisdiction requirements for education, outreach, monitoring and reporting; and CalAsphalt and concrete recycling review. The regulations were approved on May 7, 2012.

Source: (climatechange.ca.gov, 2017).

Table 30 California Climate Change Executive Orders

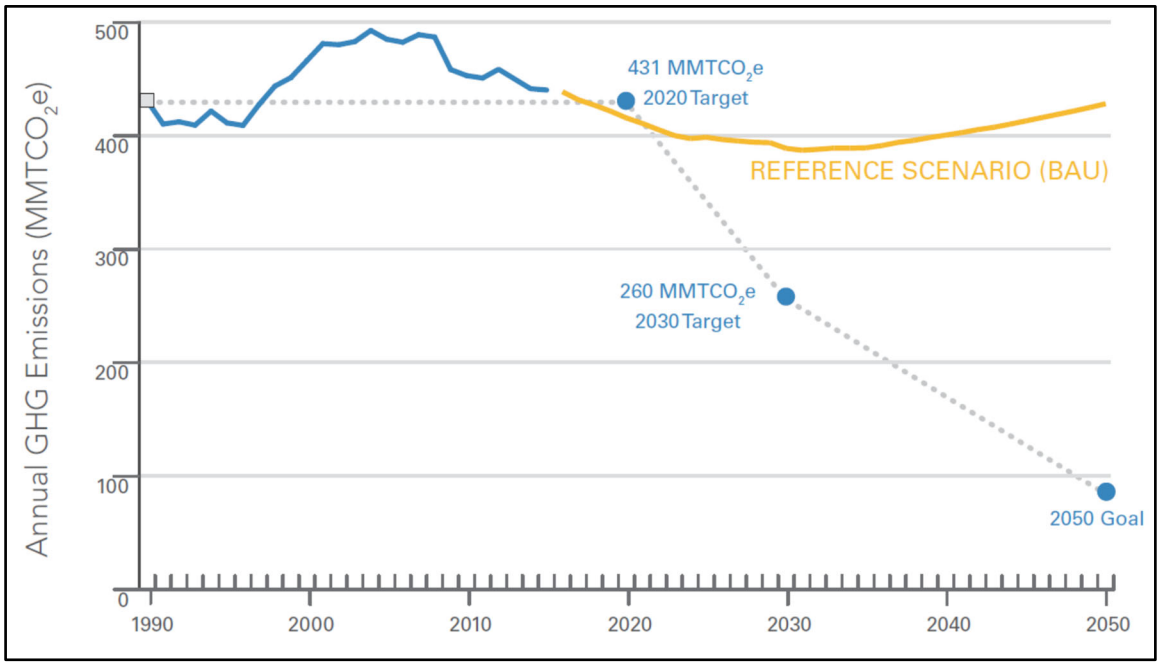
Date	Executive Order	Description
September 10, 2018	B-55-18	EO-B-55-18 establishes a new statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter.
April 29, 2015	B-30-15	EO-B-30-15 sets a greenhouse gas (GHG) emissions target for 2030 at 40 percent below 1990 levels.
April 25, 2012	B-18-12	EO-B-18-12 calls for significant reductions in State agencies' energy purchases and GHG emissions. The Executive Order included a Green Building Action Plan, which provided additional details and specific requirements for the implementation of the Executive Order
March 23, 2012	B-16-12	EO-B-16-12 orders State agencies to facilitate the rapid commercialization of zero-emission vehicles (ZEVs). The Executive Order sets a target for the number of 1.5 million ZEVs in California by 2025. Also the Executive Order sets as a target for 2050 a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels.
November 14, 2008	S-13-08	EO-S-13-08 directs State agencies to plan for sea level rise and climate impacts through coordination of the State Climate Adaptation Strategy.
January 18, 2007	S-01-07	EO-S-01-07 establishes the 2020 target and Low Carbon Fuel Standard. The EO directs the Secretary of Cal/EPA as coordinator of 2020 target activities and requires the Secretary to report back to the Governor and Legislature biannually on progress toward meeting the 2020 target.
October 18, 2006	S-20-06	EO-S-20-06 establishes responsibilities and roles of the Secretary of Cal/EPA and State agencies in climate change.
April 25, 2006	S-06-06	EO-S-06-06 directs Secretary of Cal/EPA to participate in the Bio-Energy Interagency Working Group and addresses biofuels and bioenergy from renewable resources.
June 1, 2005	S-03-05	EO-S-3-05 establishes greenhouse gas emission reduction targets, creates the Climate Action Team and directs the Secretary of Cal/EPA to coordinate efforts with meeting the targets with the heads of other State agencies. The EO requires the Secretary to report back to the Governor and Legislature biannually on progress toward meeting the GHG targets, GHG impacts to California, Mitigation and Adaptation Plans.
December 14, 2004	S-20-04	EO-S-20-04 (Green Buildings) directs State agencies to reduce energy use in State owned buildings by 20% by 2015 and increase energy efficiency.

Source: (climatechange.ca.gov, 2017)

On December 14, 2017, CARB approved the 2017 Climate Change Scoping Plan Update (Scoping Plan) which aims to reduce GHG emissions according to Chart 2. The Scoping Plan "is a package of economically viable and technologically feasible actions to not just keep California on track to achieve its 2030 target, but stay on track for a low- to zero-carbon economy by involving every part of the state. Every sector, every local government, every region, every resident is part of the solution. The Plan underscores that there is no single solution but rather a balanced mix of strategies to achieve the GHG target. This Plan highlights the fact that a balanced mix of strategies provides California with the greatest level of certainty in meeting the target at a low cost while also improving public health, investing in disadvantaged and low-income communities, protecting consumers, and supporting economic growth, jobs and energy diversity. Successful implementation of this Plan relies, in

part, on long-term funding plans to inform future appropriations necessary to achieve California's long-term targets." (2017 Scoping Plan, p. ES4).

Chart 2 2030 Target Scoping Plan Reference Scenario



Source: Figure 6 (2017 Scoping Plan, p. 24)

> *The development of the Scoping Plan began by first modeling a Reference Scenario (BAU). The Reference Scenario is the forecasted statewide GHG emissions through 2030 with existing policies and programs, but without any further action to reduce GHGs. [2017 Scoping Plan] Figure 6 [above] provides the modeling results for a Reference Scenario for this Scoping Plan. The graph shows the State is expected to reduce emissions below the 2020 statewide GHG target, but additional effort will be needed to maintain and continue GHG reductions to meet the mid- (2030) and long-term (2050) targets. Figure 6 depicts a linear, straight-line path to the 2030 target. It should be noted that in any year, GHG emissions may be higher or lower than the straight line. That is to be expected as periods of economic recession or increased economic activity, annual variations in hydropower, and many other factors may influence a single or several years of GHG emissions in the State. CARB's annual GHG reporting and inventory will provide data on progress towards achieving the 2030 target.*
> (2017 Scoping Plan, p. 23).

The Scoping Plan states that the California Legislature has shaped the State's climate change program, setting out clear policy objectives over the next decade including:

- *40% reduction in GHG emissions by 2030;*
- *50% renewable electricity;*
- *Double energy efficiency savings;*

- *Support for clean cars;*
- *Integrate land use, transit, and affordable housing to curb auto trips;*
- *Prioritize direct reductions;*
- *Identify air pollution, health, and social benefits of climate policies;*
- *Slash "super pollutants" (i.e., hydrofluorocarbons or HFCs);*
- *Protect and manage natural and working lands;*
- *Invest in disadvantaged communities; and*
- *Strong support for Cap-and-Trade.*

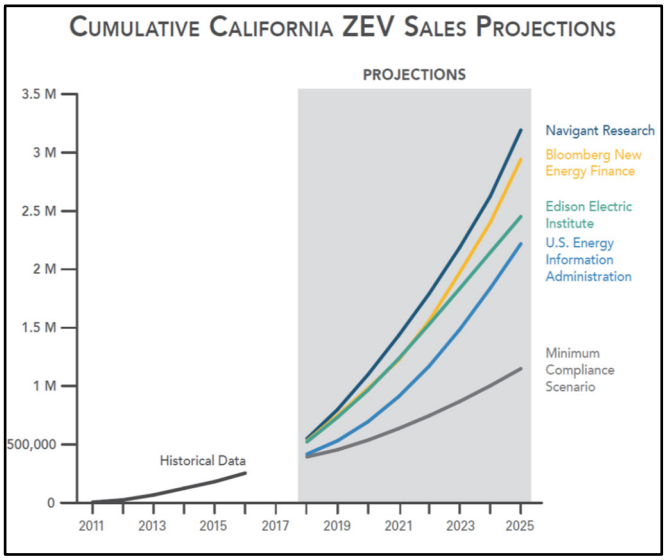
(2017 Scoping Plan, p. ES6).

The graphics shown in Chart 3 from the Scoping Plan that pertain to future emissions from the sectors representing the greatest GHG emissions, transportation and electricity use, are reproduced below.

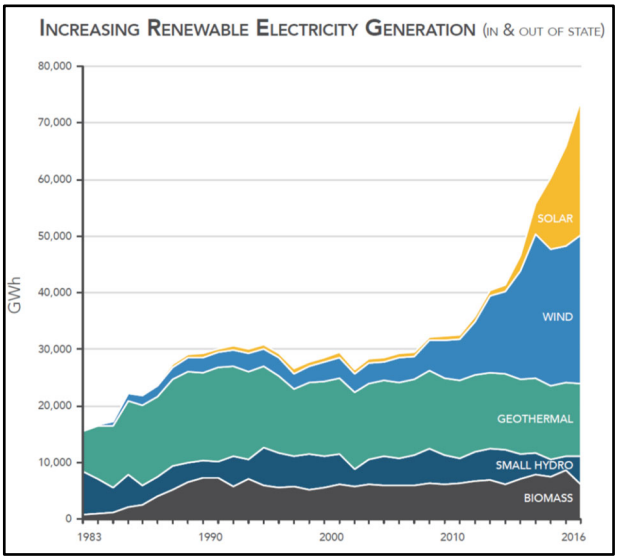
In addition to technology forcing and incentivizing regulations, the Cap-and-Trade Program is critical to meeting the Scoping Plan objectives. CARB states:

> *The Cap-and-Trade Program is fundamental to meeting California's long-range climate targets at low cost. The Cap-and-Trade Program includes GHG emissions from transportation, electricity, industrial, agricultural, waste, residential and commercial sources, and caps them while complementing the other measures needed to meet the 2030 GHG target. Altogether, the emissions covered by the Cap-and-Trade program total 80 percent of all GHG emissions in California. California's response to climate change has led to many innovative programs designed to reduce GHG emissions, including the Renewable Portfolio and Low Carbon Transportation Standards, but the Cap-and-Trade Program guarantees GHG emissions reductions through a strict overall emissions limit that decreases each year, while trading provides businesses with flexibility in their approach to reducing emissions. The Cap-and-Trade Program also generates revenue when the allowances to emit pollution are auctioned. Some of the revenue is returned directly to electricity ratepayers, and the rest is dedicated to reducing GHG emissions by making Legislatively directed investments in California with an emphasis on programs or projects that benefit disadvantaged and low-income communities.*

Chart 3 2017 Scoping Plan GHG Exhibits



Source: **(2017 Scoping Plan, p. ES5)**

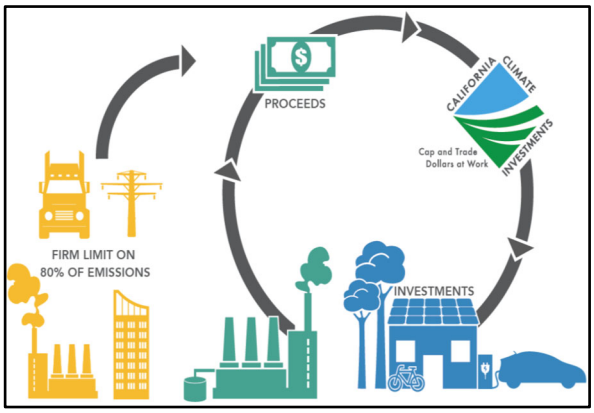


Source: (2017 Scoping Plan, p. ES9)

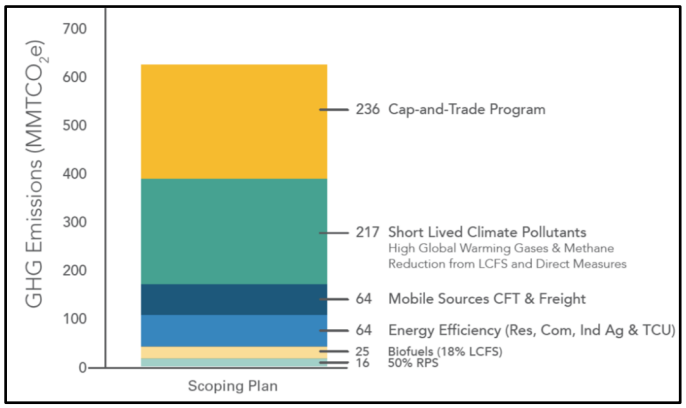
Chart 4 presents how CARB believes money will flow from the Cap-and-Trade program to enable state-funded investments and the amount of GHG emissions reduction that will be achieved overall and from Cap-and-Trade which is required to cover the gap between reductions from other measures in the Scoping Plan and the 2030 Target.

Reference Scenario 2030 emissions estimate of 389 MMTCO2e to the 2030 target of 260 MMTCO2e and the level of 2030 emissions with the known commitments, estimated to be 320 MMTCO2e. The known commitments are expected to result in emissions that are 60 MMTCO2e above the target in 2030, and have a cumulative emissions reduction gap of about 236 MMTCO2e. This means the known commitments do not decline fast enough to achieve the 2030 target. The remaining 236 MMTCO2e of estimated GHG emissions reductions would not be achieved unless further action is taken to reduce GHGs. Consequently, for the Scoping Plan Scenario, the Post-2020 Cap-and-Trade Program would need to deliver 236 MMTCO2e cumulative GHG emissions reductions from 2021 through 2030. If the estimated GHG reductions from the known commitments are not realized due to delays in implementation or technology deployment, the post-2020 Cap-and-Trade Program would deliver the additional GHG reductions in the sectors it covers to ensure the 2030 target is achieved. Climate change policies and measures are outlined in Table 31.

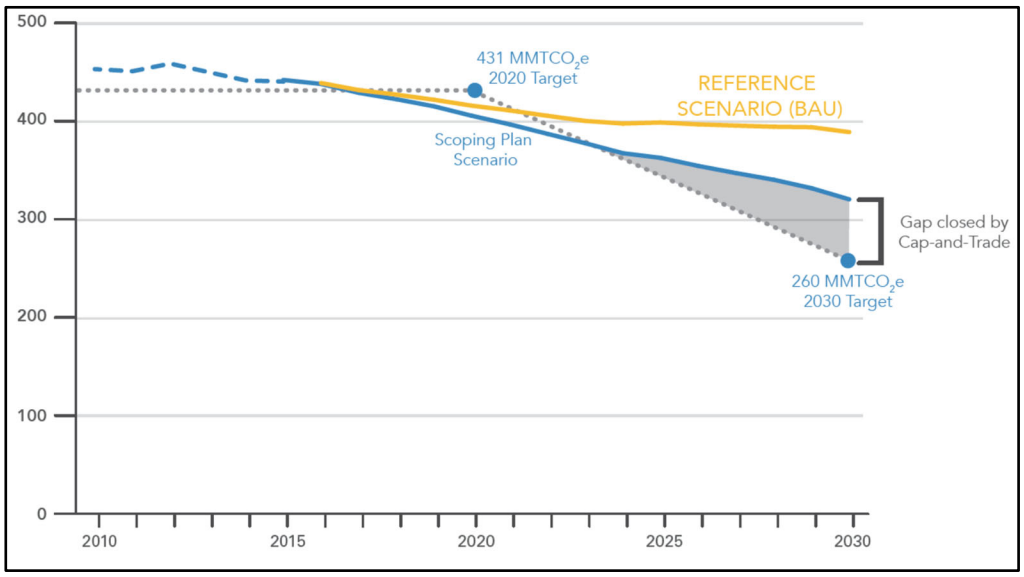
Chart 4 2017 Scoping Plan Cap-and-Trade Exhibits



Source: California's Carbon Pricing and Investment Overview (2017 Scoping Plan, p. ES16).



Source: Scoping Plan Scenario – Estimated Cumulative GHG Reductions by Measure (2021 – 2030) (2017 Scoping Plan, p. 28).



Source: 2017 Scoping Plan Reference Scenario (2017 Scoping Plan, p. 24).

Table 32 shows the amount of change in GHG emissions by Scoping Plan sector. Note that Project sources mainly fall into the electric power and transportation sectors with exception of the portable generator which would be in the industrial sector but is likely to be owned and operated by a contractor.

Table 31 Climate Change Policies and Measures

Recommended Action	Applies to Project?
Implement SB 350 by 2030: • Increase the Renewables Portfolio Standard to 50 percent of retail sales by 2030 and ensure grid reliability. • Establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030. • Reduce GHG emissions in the electricity sector through the implementation of the above measures and other actions as modeled in IRPs to meet GHG emissions reductions planning targets in the IRP process. Load-serving entities and publicly- owned utilities meet GHG emissions reductions planning targets through a combination of measures as described in IRPs.	No, Project will purchase grid electricity.
Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).	No, Project does not affect SB 375 targets.
By 2019, adjust performance measures used to select and design transportation facilities. Harmonize project performance with emissions reductions, and increase competitiveness of transit and active transportation modes (e.g. via guideline documents, funding programs, project selection, etc.).	No, Project does not affect viability of transit or active modes.
By 2019, develop pricing policies to support low-GHG transportation (e.g. low-emission vehicle zones for heavy duty, road user, parking pricing, transit discounts).	No, Project does not affect government pricing policies.
Implement Mobile Source Strategy (Cleaner Technology and Fuels): • At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025. • At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030. • Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean Cars regulations. • Medium- and heavy-duty GHG Phase 2. • Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low-NO_X standard. • Last Mile Delivery: New regulation that would result in the use of low NO_X or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for class 3-7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030. • Further reduce VMT through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."	No, Project vehicles are heavy-heavy duty and were not subject to heavy-duty GHG Phase 1 regulations.

Recommended Action	Applies to Project?
Implement California Sustainable Freight Action Plan: • Improve freight system efficiency. • Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.	No, Project does not affect whether Freight Action Plan can be implemented.
Adopt a Low Carbon Fuel Standard with a CI reduction of 18 percent.	No, Project does not affect CARB's ability to adopt standards.
Implement the Short-Lived Climate Pollutant Strategy by 2030: • 40 percent reduction in methane and hydrofluorocarbon emissions below 2013 levels. • 50 percent reduction in black carbon emissions below 2013 levels.	No, Project does not affect whether SLCP strategy can be implemented.
By 2019, develop regulations and programs to support organic waste landfill reduction goals in the SLCP and SB 1383.	No, Project does not affect CARB's ability to adopt regulations.
Implement the post-2020 Cap-and-Trade Program with declining annual caps.	No, Project does not affect CARB's ability to implement Cap-and-Trade.
By 2018, develop Integrated Natural and Working Lands Implementation Plan to secure California's land base as a net carbon sink: • Protect land from conversion through conservation easements and other incentives. • Increase the long-term resilience of carbon storage in the land base and enhance sequestration capacity • Utilize wood and agricultural products to increase the amount of carbon stored in the natural and built environments • Establish scenario projections to serve as the foundation for the Implementation Plan	No, Project does not affect ability to develop such a plan.
Establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018.	No, Project does not affect ability to establish such a framework.
Implement Forest Carbon Plan	No, Project does not affect ability to implement such a plan.
Identify and expand funding and financing mechanisms to support GHG reductions across all sectors.	No, Project does not affect whether CARB can identify and expand funding.

Source: (CARB, 2017, pp. 103-104).

Table 32 Estimated Change in GHG Emissions by Sector

Scoping Plan Category	1990 ($MMTCO_2e$)	2030 Scoping Plan Ranges ($MMTCO_2e$)	Percent Change from 1990
Agriculture	26	24–25	-8 to -4
Residential and Commercial	44	38–40	-14 to -9
Electric Power	108	30–53	-72 to -51
High GWP	3	8–11	267 to 367
Industrial	98	83–90	-15 to -8
Recycling and Waste	7	8–9	14 to 29**
Transportation (Including TCU)	152	103–111	-32 to -27
Natural Working Lands Net Sink*	-7***	TBD	TBD
Sub Total	431	294–339	-32 to -21
Cap-and-Trade Program	n/a	34–79	n/a
Total	**431**	**260**	**-40**

Source: (2017 Scoping Plan, p. 31).

* Work is underway through 2017 to estimate the range of potential sequestration benefits from the natural and working lands sector.

** The SLCP will reduce emissions in this sector by 40 percent from 2013 levels. However, the 2030 levels are still higher than the 1990 levels as emissions in this sector have grown between 1990 and 2013.

*** This number reflects net results and is different than the intervention targets discussed in Chapter 4.

4.1.4 South Coast Air Quality Management District

SCAQMD Regulation XXVII contains requirements applicable to GHGs including the SoCal Climate Solutions Exchange (Rule 2701) which is a voluntary program to quantify and certify GHG emissions reduction credits and the Greenhouse Gas Reduction Program (Rule 2702) which creates a funding mechanism for SCAQMD to undertake projects that reduce GHG emissions. SCAQMD has also established a multi-tiered CEQA significance threshold for GHG emissions which is discussed further in Section 4.3.2.

4.1.5 County of San Bernardino

The County of San Bernardino GHG reduction plan complete Development Review Process states the following performance standards:

> *With the application of the GHG performance standards, projects that are exempt from CEQA and small projects that do not exceed 3,000 $MTCO_2e$ per year will be considered to be consistent with the Plan and determined to have a less than significant individual and cumulative impact for GHG emissions.* (County of San Bernardino, 2011)

A more recent 2015 San Bernardino County Greenhouse Gas Emissions Development Review Process re-affirms the 2011 performance standards. (County of San Bernardino, 2015)

4.2 Environmental Setting

Climate change refers to global changes in the average weather of the Earth measured by changes in wind patterns, storms, precipitation, and temperature. While climate change is global in scale, California-specific impacts to the climate may result in a loss of snow-pack, increased risk of large wildfires, and a potential reduction in the quality and quantity of certain agricultural products.

Gases that trap heat in the atmosphere are GHGs, analogous to the way a greenhouse retains heat. Consequently, these GHG emissions are believed to directly affect the global climate.

4.2.1 Effects Attributed to GHG Emissions

The most recent GHG policy document issued by CARB is the next Scoping Plan update published in draft in November 2017 (2017 Scoping Plan). This document Reports updates findings in the field of climate science since the last Scoping Plan update and is the source of the quoted text below (footnotes omitted, see https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf for a complete copy).

> *"Climate scientists agree that global warming and other shifts in the climate system observed over the past century are caused by human activities. These recorded changes are occurring at an unprecedented rate.11 According to new research, unabated GHG emissions could allow sea levels to rise up to ten feet by the end of this century–an outcome that could devastate coastal communities in California and around the world.*
>
> *California is already feeling the effects of climate change, and projections show that these effects will continue and worsen over the coming centuries. The impacts of climate change have been documented by the Office of Environmental Health Hazard Assessment (OEHHA) in the Indicators of Climate Change Report, which details the following changes that are occurring already:*
>
> - *A recorded increase in annual average temperatures, as well as increases in daily minimum and maximum temperatures.*
> - *An increase in the occurrence of extreme events, including wildfire and heat waves.*
> - *A reduction in spring runoff volumes, as a result of declining snowpack.*
> - *A decrease in winter chill hours, necessary for the production of high-value fruit and nut crops.*
> - *Changes in the timing and location of species sightings, including migration upslope of flora and fauna, and earlier appearance of Central Valley butterflies.*
>
> *In addition to these trends, the State's current conditions point to a changing climate. California's recent historic drought incited land subsidence, pest invasions that killed over 100 million trees, and water shortages throughout the State. Recent scientific studies show that such extreme drought conditions are more likely to occur under a changing climate. The total statewide economic cost of the 2013–2014 drought was estimated at $2.2 billion, with a total loss of 17,100 jobs. In the Central Valley, the drought cost California agriculture about $2.7 billion and more than 20,000 jobs in 2015, which highlights the critical need for developing drought resilience. Drought affects other sectors as well. An analysis of the amount of water consumed in meeting California's energy needs between 1990 and 2012 shows that while California's energy policies have supported climate mitigation efforts, the performance of these policies have increased vulnerability to climate impacts, especially greater hydrologic uncertainty.*

Several publications carefully examined the potential role of climate change in the recent California drought. One study examined both precipitation and runoff in the Sacramento and San Joaquin River basins, and found that 10 of the past 14 years between 2000 and 2014 have been below normal, and recent years have been the driest and hottest in the full instrumental record from 1895 through November 2014. In another study, the authors show that the increasing co-occurrence of dry years with warm years raises the risk of drought, highlighting the critical role of elevated temperatures in altering water availability and increasing overall drought intensity and impact. Generally, there is growing risk of unprecedented drought in the western United States driven primarily by rising temperatures, regardless of whether or not there is a clear precipitation trend.

According to the U.S. Forest Service Report, National Insect and Disease Forest Risk Assessment, 2013– 2027, California is at risk of losing 12 percent of the total area of forests and woodlands in the State due to insects and disease, or over 5.7 million acres. Some species are expected to lose significant amounts of their total basal area (e.g., whitebark pine is projected to lose 60 percent of its basal area; and lodgepole pine is projected to lose 40 percent). While future climate change is not modeled within the risk assessment, and current drought conditions are not accounted for in these estimates, the projected climate changes over a 15 year period (2013-2027) are expected to significantly increase the number of acres at risk, and will increase the risk from already highly destructive pests such as the mountain pine beetle. Extensive tree mortality is already prevalent in California. The western pine beetle and other bark beetles have killed a majority of the ponderosa pine in the foothills of the central and southern Sierra Nevada Mountains. A recent aerial survey by the U.S. Forest Service identified more than 100 million dead trees in California. As there is usually a lag time between drought years and tree mortality, we are now beginning to see a sharp rise in mortality from the past four years of drought. In response to the very high levels of tree mortality, Governor Brown issued an Emergency Proclamation on October 30, 2015, that directed state agencies to identify and take action to reduce wildfire risk through the removal and use of the dead trees.

A warming climate also causes sea level to rise; first, by warming the oceans which causes the water to expand, and second, by melting land ice which transfers water to the ocean. Even if storms do not become more intense or frequent, sea level rise itself will magnify the adverse impact of any storm surge and high waves on the California coast. Some observational studies Report that the largest waves are already getting higher and winds are getting stronger. Further, as temperatures warm and GHG concentrations increase more carbon dioxide dissolves in the ocean, making it more acidic. More acidic ocean water affects a wide variety of marine species, including species that people rely on for food. Recent projections indicate that if no significant GHG mitigation efforts are taken, the San Francisco Bay Area may experience sea level rise between 1.6 to 3.4 feet, and in an extreme scenario involving the rapid loss of the Antarctic ice sheet, sea levels along California's coastline could rise up to 10 feet by 2100. This change is likely to have substantial ecological and economic consequences in California and worldwide.

While more intense dry periods are anticipated under warmer conditions, extremes on the wet end of the spectrum are also expected to increase due to more frequent warm, wet atmospheric river events and a higher proportion of precipitation falling as rain instead of snow. In recent years, atmospheric rivers have also been recognized as the cause of the large majority of major floods in rivers all along the U.S. West Coast and as the source of 30-50 percent of all precipitation in the same region. These extreme precipitation events, together with the rising snowline, often cause devastating floods in major river basins (e.g., California's Russian River). It was estimated that the top 50 observed floods in the U.S. Pacific Northwest were due to atmospheric rivers. Looking ahead, the frequency and severity of atmospheric rivers on the U.S. West Coast will increase due to higher atmospheric water vapor that occurs with rising temperature, leading to more frequent flooding.

Climate change can drive extreme weather events such as coastal storm surges, drought, wildfires, floods, and heat waves, and disrupt environmental systems including our forests and oceans. As GHG emissions continue to accumulate and climate disruption grows, such destructive events will become more frequent. Several recent studies project increased precipitation within hurricanes over ocean regions. The primary physical mechanism for this increase is higher water vapor in the warmer atmosphere, which enhances moisture convergence in a storm for a given circulation strength. Since hurricanes are responsible for many of the most extreme precipitation events, such events are likely to become more extreme. Anthropogenic warming by the end of the 21st century will likely cause tropical cyclones globally to become more intense on average. This change implies an even larger percentage increase in the destructive potential per storm, assuming no changes in storm size. Thus, the historical record, which once set our expectations for the traditional range of weather and other natural events, is becoming an increasingly unreliable predictor of the conditions we will face in the future. Consequently, the best available science must drive effective climate policy.

California is committed to further supporting new research on ways to mitigate climate change and how to understand its ongoing and projected impacts. California's Fourth Climate Change Assessment and Indicators of Change Report will further update our understanding of the many impacts from climate change in a way that directly informs State agencies' efforts to safeguard the State's people, economy, and environment.

Together, historical data, current conditions, and future projections provide a picture of California's changing climate, with two important messages:

- *Change is already being experienced and documented across California, and some of these changes have been directly linked to changing climatic conditions.*
- *Even with the uncertainty in future climate conditions, every scenario estimates further change in future conditions.*

It is critical that California continue to take steps to reduce GHG emissions in order to avoid the worst of the projected impacts of climate change. At the same time, the State is taking steps to make the State more resilient to ongoing and projected climate impacts as laid out

by the Safeguarding California Plan.37 The Safeguarding California Plan is being updated in 2017 to present new policy recommendations and provide a roadmap of all the actions and next steps that state government is taking to adapt to the ongoing and inevitable effects of climate change. The Draft Safeguarding California Plan38 is available and will be finalized after workshops and public comments. California's continuing efforts are vital steps toward minimizing the impact of GHG emissions and a three-pronged approach of reducing emissions, preparing for impacts, and conducting cutting-edge research can serve as a model for action." (CARB, 2017).

4.2.2 Emissions Inventories

CARB has emissions inventories of GHG by activity/sector for the State. Each is discussed below followed by Table 33 which presents a side-by-side summary of emissions by source category for both inventories.

CARB's most recent GHG emission inventory, the 2018 Edition, tracks the emissions of seven GHGs identified in the California Health and Safety Code for years 2000 to 2016. In 2016, total GHG emissions were 429 million metric tons of $C0_2$ equivalent ($MMTCO_2e$), a decrease of 12 $MMTCO_2e$ compared to 2015. This level is slightly less than the 2020 target of 431 $MMTCO_2e$. During the 2000 to 2016 period, per capita GHG emissions in California dropped from a peak in 2001 of 14.0 tonnes per person to 10.8 tonnes per person in 2016; a 23% decrease. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product (GDP)) is declining, representing a 38% decline since the 2001 peak, while the State's GDP has grown 41% during this period (Trend Report, 2018, p. 1).

The transportation sector remains the largest source of GHG emissions in the State, accounting for 39% of the inventory, and shows an increase in emissions in 2016. Emissions from the electricity sector account for 16% of the inventory and show a significant drop in 2016 with a large increase in renewable energy driven by the Renewable Portfolio Standard requiring the state to provide 50% of its electricity from renewable sources by 2030. The industrial sector has seen a slight decrease in emissions in the past two years, but remains at 21% of the inventory in both 2015 and 2016. Emissions from the remaining sectors are relatively constant in recent years, although emissions from high Global Warming Potential (GWP) gases have continued to increase as they replace ODS banned under the 1987 Montreal Protocol. (Trend Report, 2018, p. 2).

Table 33 presents the most recent GHG emissions inventories and BAU projections published by CARB.

Table 33 State and County GHG Inventories

Sector/Activity	2016 Statewide ($MMTCO_2e$ / yr)	2020 Statewide BAU ($MMTCO_2e$ / yr)	2030 Statewide Proposed BAU Ranges ($MMTCO_2e$ / yr)
Electricity	68.58	57.3	42 – 62
Transportation	169.38	185.3	103 – 111
Industrial (fuel, water)	89.61	93.7	77 – 87
Commercial (fuel)	12.92	17.9	38 – 40
Residential (fuel)	24.20	31.7	

Sector/Activity	2016 Statewide ($MMTCO_2e$ / yr)	2020 Statewide BAU ($MMTCO_2e$ / yr)	2030 Statewide Proposed BAU Ranges ($MMTCO_2e$ / yr)
Agriculture & Forestry	33.84	36.2	24 – 25
High GWP	19.78	31.5	8 – 11
Recycling and Waste	8.81	9.4	8 – 9
Total	429.35	509.4	300 – 345
Cap-and-Trade	n/d	n/d	40 – 85
Goal	n/d	431	260

Sources: (CARB, 2018),

Notes: n/d = not determined.

[a] Electricity and natural gas related GHG emissions for industrial, commercial and residential are summed in the County inventory and presented for each type of land use accordingly.

[b] Water and wastewater related emissions are attributed to the industrial sector for comparison to the statewide inventory.

4.3 Significance Thresholds

Determination of whether an impact is significant usually involves the comparison of Project impact levels to threshold criteria set by the lead agency. For GHG impacts, lead agencies often rely on guidance from a responsible agency (e.g., in this case, SCAQMD as discussed in Section 4.3.2).

4.3.1 CEQA Guidelines Appendix G

Appendix G of the CEQA Guidelines presents questions about projects that, if true for a particular project, would be considered a significant impact. This document considers the following Appendix G checklist questions to be the Significance Thresholds for GHG emissions from this Project.

Would the project:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

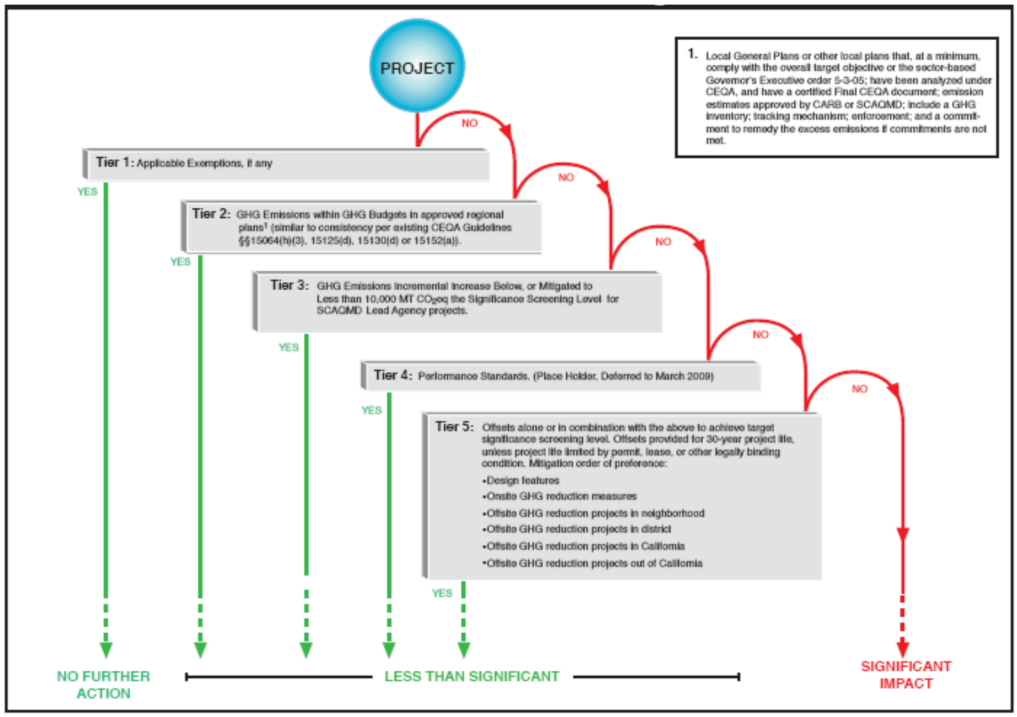
4.3.2 Additional Threshold Criteria

South Coast AQMD

The GHG screening threshold of 10,000 $MTCO_2e$/yr is for industrial projects only. Industrial projects that emit greater than this amount could still have a less than significant impact provided that they meet performance standards or provide offsets. SCAQMD has not formally approved performance measures but staff has considered measures such as a Percent Emissions Reduction Target which could be set at the overall level of reduction required by the AB32 Scoping Plan or the level of reduction required from the industrial sector/source category by the AB32 Scoping Plan. Consistency with emissions reductions described in the AB 32 Scoping Plan is used to determine the significance of GHG emissions from this Project.

As shown in Chart 5, the 10,000 MTCO2e/yr criteria is but one of several tiers of analysis that can lead to the determination that a project's impact will be less than significant.

Chart 5 Flow Chart of AQMD Staff's Recommended Interim GHG Significance Threshold



4.4 Methodology

4.4.1 CEQA Baseline

Baseline emissions were estimated using historical fuel use data from off-road vehicles, aggregates production records, and other specifications (e.g. engine information) provided by Vulcan.

Based on the existing production data provided by Vulcan for the years of 2006 and 2017, Table 34 presents the estimated baseline GHG emissions associated with Vulcan's existing operations. Also see Appendix G for more details.

Table 34 Baseline GHG Emissions

Source	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO2e (MT/yr)
Off-road Engines	2164.8	0.32	0.021	2178.5
Total	2164.8	0.32	0.021	2178.5

Source: Appendix G

4.4.2 Construction Phase

As shown in the CalEEMod results (Appendix F), project construction may emit up to 9,516 lbs CO_2e/day and 2,160 MTCO_2e total. The total emissions are amortized over 30-years and added to operation phase GHG emissions in the impact section pursuant to SCAQMD methodology.

4.4.3 Operation Phase

Equipment and activity levels for excavation in the Baseline and for the Project are presented in Section 3.4 above and the associated GHG emissions are summarized in Table 35 below.

Conveyor Electricity

Additional emissions from potential increased utilization of conveyor systems are calculated below. It was assumed that a 25 horse power motor was used 12 hours per day using grid electricity, which was assumed to emit 427 grams of CO_2 per kWh based on CARB's GHG inventory documentation (California Air Resources Board, 2016).

$$25hp * 12\frac{hr}{day} * 260\frac{days}{yr} * 0.745\frac{kW}{hp} * 0.000427\frac{MT\ CO2E}{kWhr} = 24.81\frac{MT\ CO2E}{yr}$$

Table 35 Operation Phase GHG Emissions

Source	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO2e (MT/yr)
Off-road Engines	2113.8	0.3124	0.02083	2127.124
Conveyor Extension	N/A	N/A	N/A	24.81
Total	2113.8	0.3124	0.02083	2151.93

Sources: Appendix G

4.5 Project-Level Impacts and Mitigation Measures

4.5.1 Generate GHG Emissions That May Have a Significant Impact on the Environment

Impact Statement

Impact GHG-1: *Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?* **(2019 CEQA Guidelines Checklist Appendix G Threshold Criteria (a)).**

Impact Analysis

The analysis of GHG emissions is a different analysis than for criteria pollutants for the following reasons. For criteria pollutant, significance thresholds are based on daily emissions because attainment or non-attainment is primarily based on daily exceedances of applicable AAQS. Further, several AAQS are based on relatively short-term exposure effects to human health (one-hour and eight-hour standards), whereas the half-life of CO_2 is approximately 100 years, and as such the effects of GHGs occur over a longer timeframe than a single day. GHG emissions are typically considered to be cumulative impacts because they contribute to global climate change (versus local impacts).

SCAQMD has adopted an interim CEQA GHG Significance Threshold of 10,000 metric tons of CO_2 equivalent emissions ($MTCO_2eq$) per year for industrial projects. Projects with incremental increases less than this threshold screen out of further analysis and are not cumulatively considerable. Other tiers of analysis by which GHG impact may be determined to be less than significant are available as discussed in Section 4.3.2.

GHG emissions impact from implementing the Project were calculated at the Project-specific level for operation as explained in the previous paragraphs. Impact analysis for the Project follows the approach certified by SCAQMD in the Final Negative Declaration for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project on December 12, 2014 (SCAQMD, 2014). In summary, this approach takes into account the cumulative nature of the energy industry, and recognizes that consumers of electricity and diesel fuel are in effect regulated by higher level emissions restrictions on the producers of these energy sources.

Table 36 Greenhouse Gas Emissions

Source	CO2e (MT/yr)
Construction Phase Emissions (amortized over 30-year period)	72
Operation Phase Emissions	2152
Baseline Emissions	2179
Project Emissions	45
San Bernardino Green House Gas Reduction Plan Screening Threshold[1]	3,000
SCAQMD Screening Threshold[2]	10,000
Exceeds Screening Threshold(s)?	No

[1]See Section 4.1.5

[2]See Section 4.3.2

*Values above may differ slightly from previously stated values due to rounding.

Level of Significance Before Mitigation

No significant impact

Mitigation Measures

None required

Level of Significance After Mitigation

Not applicable

4.5.2 Conflict with an Applicable Plan, Policy or Regulation that Reduces GHGs

Impact Statement

Impact GHG-1: *Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?* **(2019 CEQA Guidelines Checklist Appendix G Threshold Criteria (b)).**

Impact Analysis

As discussed in Section 4.5.1, the Project would increase GHG emissions in an amount determined to be less than significant. However, there may be plans established that require Project sources go beyond little to no increase in GHG emissions. In fact, there are many such requirements for sources to reduce GHG emissions

and most originate from the AB 32 Scoping Plan and associated programs administrated by CARB. The Scoping Plan is the State's blueprint for how GHG reductions will be achieved. Local jurisdictions may have requirements as well, but the overall effort is centralized with CARB. Therefore, this impact evaluates whether the Project may conflict with the Scoping Plan (see Section 4.5.2). The SCAQMD Interim GHG Significance Threshold takes a tiered approach whereby Projects can screen-out by one of the following five methods: exemption from CEQA, GHG emissions already analyzed in GHG budgets from in approved regional plans, having emissions less than the 10,000 $MTCO_2e$/yr screening level, meeting best performance standards, or purchase GHG emissions offsets by funding projects or buying them outright.

In the decade after SCAQMD adopted the Interim GHG Significance Threshold, several new laws and executive orders were adopted that require additional reductions in years after 2020. For instance, Senate Bill 32 (Lara, 2016) requires that GHG emissions be 40% less than 1990 levels by 2030. More drastic still, Senate Bill 100 (de Leon, 2018) which was signed by the Governor recently requires 100% zero-carbon electricity by 2045. On the day SB 100 was signed into law, the Governor also signed Executive Order B-55-18 which commits California to total, economy-wide carbon neutrality by 2045. Clearly, the 2008 Guidance is may be somewhat inadequate in producing a meaningful comparison by today's standards which propose a grand vision that, if achieved, would fundamentally change how business is conducted and citizens live in the State. Thus, as discussed in the most recent updates to the Scoping Plan, objectives of the Scoping Plan affect entire sectors of the economy and it no longer makes sense to evaluate GHG emissions on a project-level.

As stated previously, Project GHG emissions levels presented in Table ES-4 are primarily for disclosure purposes because impact analysis for the Project follows the approach certified by SCAQMD in the Final Negative Declaration for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project on December 12, 2014 (SCAQMD, 2014). The approach used by SCAQMD to assess GHG impacts from that project recognizes that consumers of electricity and transportation fuels are, in effect, regulated by requiring providers and importers of electricity and fuel to participate in the GHG Cap-and-Trade Program and other Programs (e.g., low carbon fuel standard, renewable portfolio standard, etc.). Each such sector-wide program exists within the framework of AB 32 and its descendant laws the purpose of which is to achieve GHG emissions reductions consistent with the AB 32 Scoping Plan.

In summary, the Project would generate GHGs from electricity use and combustion of transportation fuels, each of which is regulated near the top of the supply-chain. As such, each citizen of California (including the operator of the Project) will have no choice but to purchase electricity and fuels produced in a way that is acceptable to the California market. Thus, Project GHG emissions will be consistent with the relevant plan (i.e. AB 32 Scoping Plan). The Project would meet its fair share of the cost to mitigate the cumulative impact of global climate change because Vulcan is purchasing energy from the California market. Thus, the Project would have a less than significant impact on applicable GHG reduction plans.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

5.0 ACRONYMS

AADT	average annual daily trips
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ADJ_U*	adjusted friction velocity
ADL	annual dermal load
AERMET	AERMOD Meteorological Processor
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
APCO	Air Pollution Control Officer
AQCCIA	Air Quality and Climate Change Impact Assessment
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ASF	age sensitivity factors
ATCM	airborne toxic control measure
ATCP	Air Toxics Control Plan
ATS	American Thoracic Society
BACM	best available control measure
BACT	best available control technology
BARCT	best available retrofit control technology
BAU	business-as-usual
BPS	best performance standard
BR	breathing rate
BW	body weight
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California ambient air quality standards
CAFE	corporate average fuel economy
CalEEMod	California Emissions Estimator Model®
CalEPA	California Environmental Protection Agency
CAMP	AB 617 Air Monitoring Plan for the San Bernardino/Muscoy Community
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CBE	Communities for a Better Environment
CCAA	California Clean Air Act
CCP	Clean Communities Plan
CCR	California Code of Regulations
CDC	Center for Disease Control
CEC	California Energy Commission
CEIDARS	California Emission Inventory Development and Reporting System
CEQA	California Environmental Quality Act
CERP	Community Emissions Reduction Plan
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CH_4	methane

CI	carbon intensity
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPF	cancer potency factor
CPUC	California Public Utility Commission
CUP	Conditional Use Permit
CUPA	Certified Unified Permitting Agency
$DOSE_{air}$	daily inhalation dose
DPM	Diesel particulate matter
dscf	dry standard cubic feet
DWR	Department of Water Resources
EF	Emissions Factor
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
erc	emission reduction credits
FAH	fraction of time at home
FED	functionally equivalent document
FPMP	fugitive PM_{10} management plan
g/dscm	grams per dry standard cubic meter
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts
GDP	gross domestic product
GHG	Greenhouse Gasses
GHGRP	Greenhouse Gas Reporting Program
GLC	ground level concentration
GM	geometric mean
GRAF	gastrointestinal relative absorption fraction
gr/dscf	grains per dry standard cubic feet
GWP	global warming potential
HAPs	Federal Hazardous Air Pollutants
HARP2	Hot Spots Analysis and Reporting Program
HFC	hydrofluorocarbon
HI	hazard index
hp	horsepower
HQ	hazard quotient
HRA	Health Risk Assessment
IPCC	International Panel on Climate Change
LEV	Low Emission Vehicles
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LOAEL	lowest observed adverse effects level
MACT	maximum achievable control technology
MEIR	maximum exposed individual receptor
MEIW	maximum exposed individual worker
MICR	maximum individual cancer risk
MMC	Mine Methane Capture
$MMTCO_2e$	million metric tons of $C0_2$ equivalent

MPO	metropolitan planning organizations
MT	metric tonnes
NAAQS	National Ambient Air Quality Standards
NC	non-cancer
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NMHC	non-methane hydrocarbons
N_2O	nitrous oxide
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NOA	naturally-occurring asbestos
NOAEL	no observed adverse effects level
NSPS	New Source Performance Standards
NSR	New Source Review
NHTSA	National Highway Traffic Safety Administration
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Governor's Office of Planning and Research
Pb	Lead
PCC	Portland cement concrete
PERP	Portable Equipment Registration Program
PFC	perfluorocarbon
PM	Particulate matter
PM_{10}	PM with aerodynamic diameter less than 10 microns
$PM_{2.5}$	PM with aerodynamic diameter less than 2.5 microns
PMI	point of maximum impact
POUs	publicly owned utilities
ppm	Parts per million
RACM	reasonably available control measure
RCS	respirable crystalline silica
REL	reference exposure level
RICE	reciprocating internal combustion engine
ROG	reactive organic gas
RPS	Renewables Portfolio Standard
SB	Senate Bill
SBM	San Bernardino-Muscoy
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SIP	state implementation plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
SOON	Surplus Off-Road Opt-In for NO_x
TAC	toxic air contaminant
tpy	tons per year
TVP	true vapor pressure
U.S.	United States

USGS	United States Geological Survey
US EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VDE	visible dust emissions
VMT	vehicle miles traveled
VOC	volatile organic compounds
WAF	worker adjustment factor
WRCC	Western Regional Climate Center
ZEVs	zero-emissions vehicles

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APPENDEIX A FIGURES

Figure 1. Site Location (regional)
Figure 2. Site Location (local)
Figure 3. Wind Rose
Figure 4. Sensitive Receptors Vicinity Map
Figure 5. Modeled Receptors
Figure 6. Model Objects

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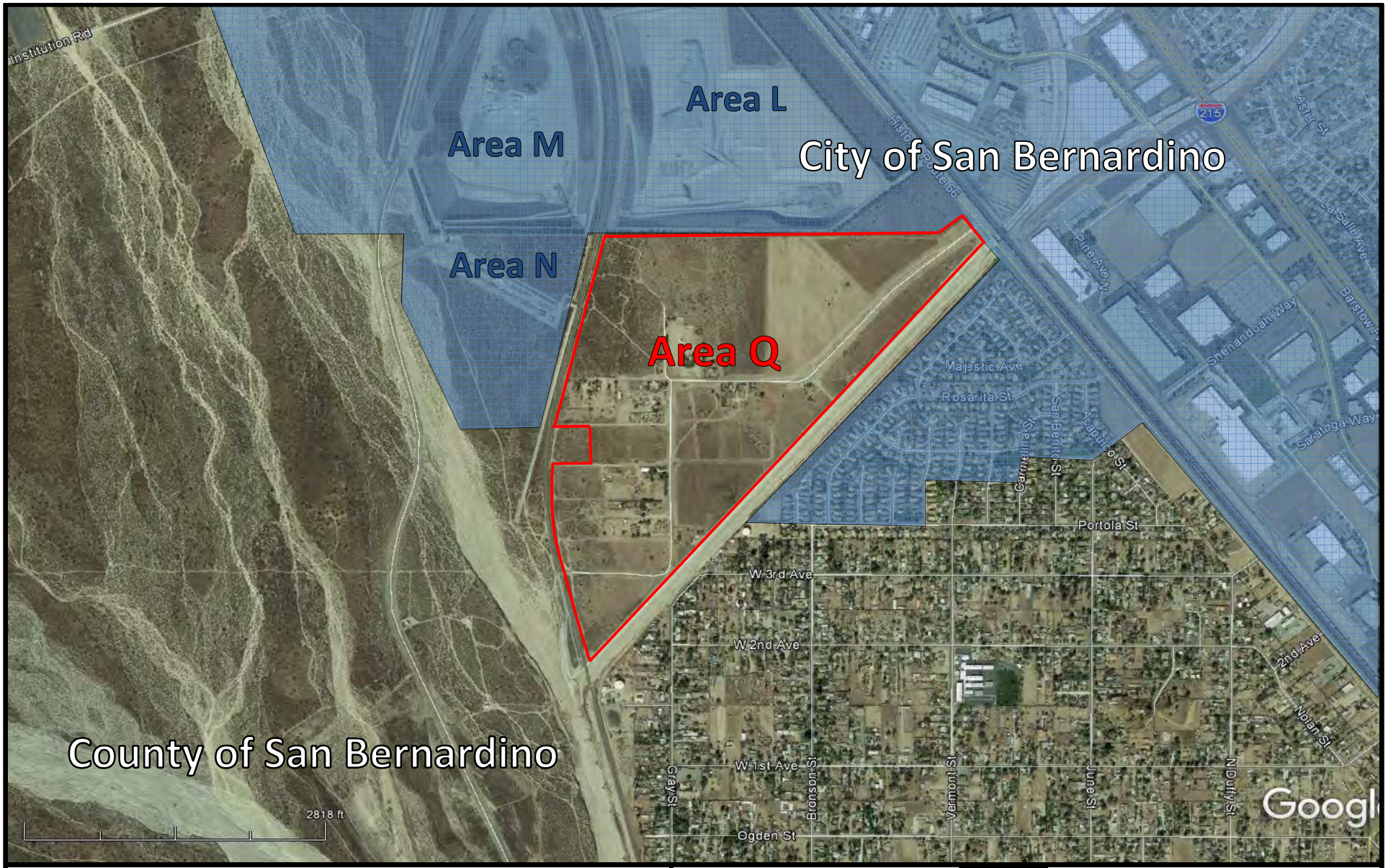
Source: Google Earth 2018

SESPE CONSULTING, INC.

FIGURE	Site Location (regional)		
1	Area Q Mine Expansion Vulcan Materials Company San Bernardino County, California		
PROJECT #:	VU01.17.79	DATE:	2/26/18
SCALE:	SHOWN	DRAWN BY:	ADA



Source: Google Earth 2018

Approximate Area Q Property Boundaries

Approximate City of San Bernardino Jurisdiction

N

SESPE CONSULTING, INC.

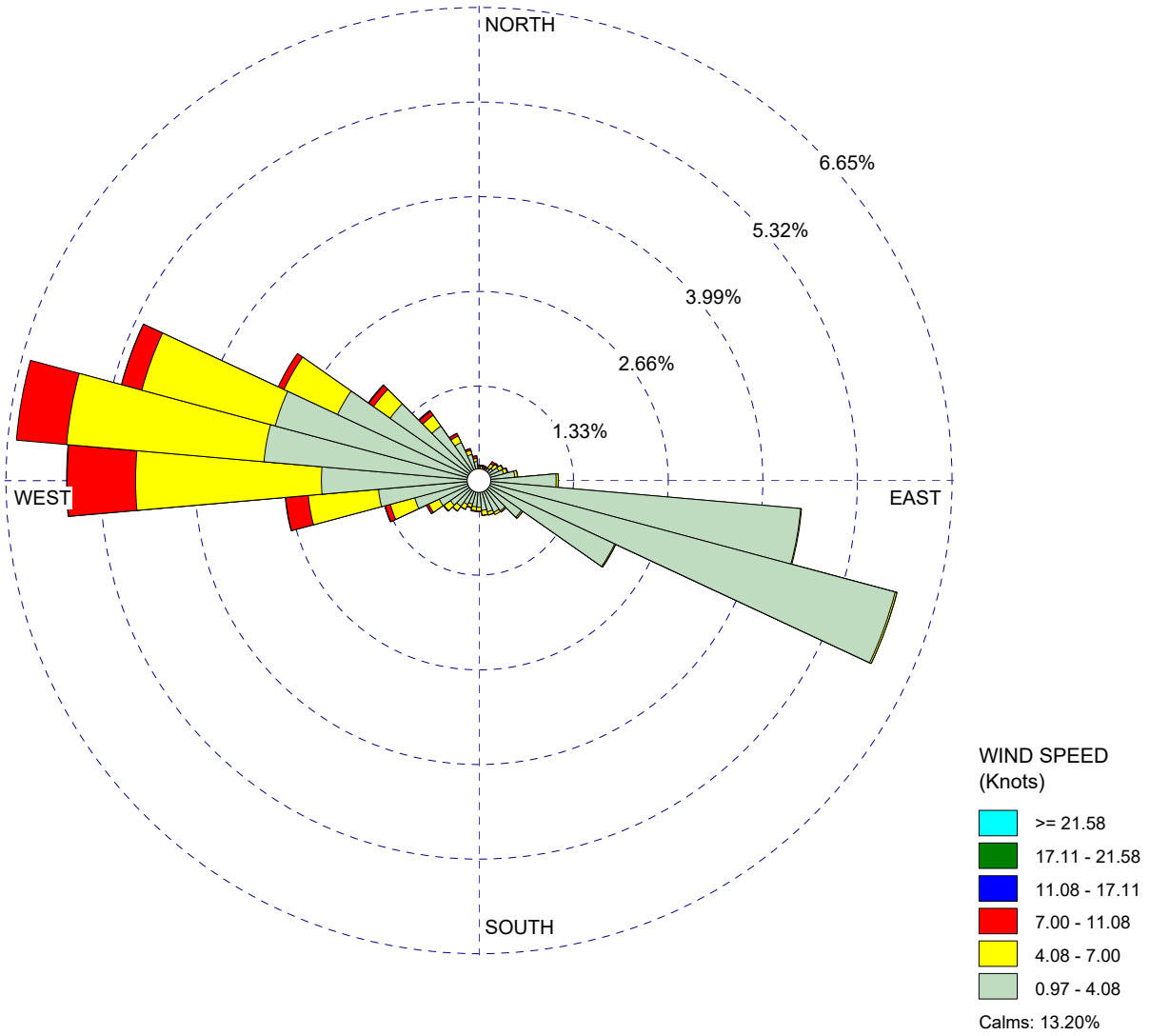
FIGURE 2	Site Location (local) Area Q Quarry Project Vulcan Materials Company San Bernardino County, California		
PROJECT #:	VU01.17.79	DATE:	2/14/19
SCALE:	See Above	DRAWN BY:	GPS

WIND ROSE PLOT:

Vulcan Area Q Expansion Project

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Meteorological data avaliable from the South Coast Air Quality Managment District. http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/aermod-table-1	**Start Date: 1/1/2012 - 00:00** **End Date: 12/31/2016 - 23:59**	**Sespe Consulting**	
		MODELER: **ADA**	SESPE CONSULTING, INC.
	CALM WINDS: **13.20%**	TOTAL COUNT: **85370 hrs.**	
	AVG. WIND SPEED: **2.57 Knots**	DATE: **2/27/2018**	PROJECT NO.: **VU01.17.79**

WRPLOT View - Lakes Environmental Software

Source: Google Earth 2018

SESPE CONSULTING, INC.

FIGURE 4	Sensitive Receptor Locations Area Q Mine Expansion Vulcan Materials Company San Bernardino County, California		
PROJECT #:	VU01.17.79	DATE:	2/26/18
SCALE:	SHOWN	DRAWN BY:	ADA

Source: Google Earth 2018

Modeled Receptors

SESPE CONSULTING, INC.

FIGURE 5	Model Receptor Locations Area Q Mine Expansion Vulcan Materials Company San Bernardino County, California		
PROJECT #:	VU01.17.79	DATE:	2/26/18
SCALE:	SHOWN	DRAWN BY:	ADA

Source: Lakes Aermod View 9.4.0

SESPE CONSULTING, INC.

FIGURE	Model Emissions Objects Area Q Mine Expansion Vulcan Materials Company San Bernardino County, California		
6			
PROJECT #:	VU01.17.79	DATE:	2/26/18
SCALE:	SHOWN	DRAWN BY:	ADA

APPENDEIX B ECONOMICS OF CONSTRUCTION AGGREGATES

A Note on the Environmental Costs of Aggregates
Map Sheet 52 Report
Open File Report 99-09 (Partial)
Caltrans Aggregate Availability Memo

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DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND POLICY
DIVISION OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA AT BERKELEY

WORKING PAPER NO. 994

A NOTE ON THE ENVIRONMENTAL COSTS OF AGGREGATES

by

Peter Berck

California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
January 2005

A Note on the Environmental Costs of Aggregates

by Peter Berck*
January 10, 2005

Abstract:
The opening of a new site for the production of aggregates has both direct and indirect impacts on the environment. The indirect impacts include changes in the environmental costs of hauling aggregates and possible changes in the level of construction activity. In this note, we show that the most likely effect of a new aggregate site is to reduce the truck miles used for aggregate hauling, which is an environmental benefit. We also show that the change in construction activity induced by a new site is likely to be extremely small.

* Peter Berck is Professor of Agricultural and Resource Economics. I would like to thank Atanu Dey for able research assistance. The remaining errors are mine.

A Note on the Environmental Costs of Aggregates

The opening of a new quarry for aggregates will change the pattern of transportation of aggregates in the area served by the quarry. In this note, we will show that, so long as aggregate producers are cost minimizing, the new pattern of transportation requires less truck transport than the pattern of transportation that existed before the opening of the new quarry. Since the costs of providing aggregates falls, it is reasonable to assume that the price of delivered aggregates also will fall. This note also shows that the demand expansion effect is of very small magnitude. Since the demand increase from a new quarry is quite small, the dominant effect is that the quarries are on average closer to the users of aggregates and, as a result, the truck mileage for aggregate hauling decreases. To summarize the effects of a new quarry project:

a) The project in itself will not significantly increase the demand for construction materials in the region through market forces, which include the downward pressure on pricing.

b) Truck traffic (i.e. vehicle miles traveled) in the region will not increase and may decrease as a result of the project.

As a result, the effect of a new quarry project will be to reduce the air emissions from aggregate trucking. The reduction in emissions should be included as a positive impact of a quarry project in any analysis of the environmental consequences of a new quarry.

The remainder of this note provides a brief description of the economics of construction materials and explains why these points must be true.

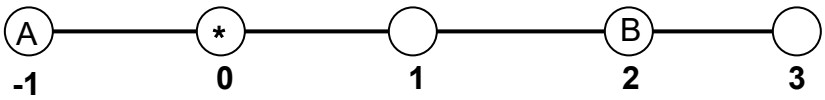
Based upon the available evidence, a project would decrease haul distances for aggregates and would therefore decrease emissions from trucks, rather than increase them.

There are two economic facts that are important to understand in evaluating the likely addition or subtraction to truck traffic from a new quarry. One is the economics of location. The second is the demand for aggregates, which is the quantity of aggregates used as a function of price.

That a new site leads to smaller haul distance is a matter of geometry and economics. Transportation is a major element in the cost of delivered aggregate, so new sites are chosen, within the limits placed by the natural availability of aggregates, to minimize transport costs.

An example should make this fact clear. Consider diagram 1. Circles represent aggregate-using projects of equal size. The five projects shown are located at miles marked –1, 0, 1, 2, and 3. Two of the project sites are marked with the letters A and B, and they are potential locations for aggregate production. The location at mile 0 is an existing aggregate production site and it is marked by an asterisk (*). The scale is in miles. For simplicity, each project uses one unit of aggregate.

Diagram 1



With only one aggregate production site at mile 0, the miles traveled to supply the five projects is seven: zero miles for project at mile 0, one mile for each for the projects at mile –1 and 1, two miles for the project at 2 and three miles for the project at 3 for a total of 7 miles. If an additional aggregate production site is started at A, the miles traveled decreases to six, because there is no transportation required for the aggregate-using project at A and all other projects are served by the original site. However, if the new site is placed at B instead of being placed at A, transport distance falls to three miles because then two projects have aggregate production at their location and thus have zero

transportation requirements, and the three remaining sites each require a one-mile transport. Each aggregate production site supplies 2.5 units of aggregates, that is, half the total required by the five projects. Since cost depends on distance and, markets minimize costs, the free market system always will choose a point like B, the one with the lowest cost. In this case it is also the lowest transport distance.

Other forms of industrial organization lead to higher prices being charged for aggregates, but the effect of additional suppliers is to lower prices and haul distances. Appendix A elucidates the case where the price depends upon the delivered costs of the second most efficient producer.

The second issue for the siting of aggregate production is the possibility that lower delivered costs lead to more projects or more use of aggregates in existing projects. The degree to which decrease in the price of a good, in this case construction material, leads to an increase in the quantity of that material used is described by the elasticity of demand. The elasticity of demand is the percent increase in use caused by a one percent decrease in price.

A search of the economic literature found no articles estimating a positive elasticity of demand for aggregates. A review by the Susan Kohler[†] finds that only population and not price is correlated with aggregate usage. In other words, a reduction in the price of aggregate does not lead to an increase in demand for it.

While it is a theoretical possibility that the quantity of aggregates demanded (that is, the quantity used in projects) is responsive to price, two facts about construction make this unlikely. First, the cost of aggregates is usually a tenth or less of the cost of a project. Second, the building of projects -- housing, roads, and commercial construction -- is not very sensitive to the costs of producing them.

[†] *Map Sheet 52. Aggregate Availability in California.* by Susan L. Kohler. California Department of Conservation. California Geological Survey. Sacramento. 2002.

Although we have not found literature on the elasticity of demand for either public projects or contract construction, there is an empirical literature on the elasticity of demand for housing[‡]. In these studies, a one percent change in the price leads to about a half percent change in the quantity of housing consumed. Public projects, like roads, are budgeted, often from specials funds, like road taxes. In that case, a one percent decrease in the costs of *all* projects in a taxing jurisdiction would lead to a one percent increase in the quantity of roads built. Since aggregates are very expensive to ship, the quarry being considered likely would only change the costs of nearby road construction, perhaps for just one county.

For example, Monterey County has a population of 400,000 while the state population is 33.9 million people.[§] Assuming that road construction is roughly proportional to population, about 1.2 percent of road construction would be in Monterey. So, if a new quarry in Monterrey decreased the price of aggregates in Monterrey by 1 percent and left the price the same in the rest of the state, then the average price in the whole state would fall by about 0.01 percent, which is negligible. A project that affects only a small part of a taxing jurisdiction has only a small effect on that jurisdiction's costs and can have no major affect on the quantity of services supplied by that jurisdiction.

We know of no evidence of elasticities for construction work as high as one. We estimate the elasticity of demand for projects using aggregates to be much less than one, likely under a half in the private sector and near zero in the public sector.

Given that projects will be built, there is some possibility of substituting of other structural materials for aggregates in buildings. However these substitute materials too would be trucked. The realistic possibility for roads is that there are no materials to substitute for aggregates. I do not believe this pathway to greater use of aggregates in building would be triggered by the transport savings from a new aggregate source or that it would result in an increase in net truck miles.

[‡] Hanushek, Eric A., John Quigley. "What is the price elasticity of housing demand?" *Review of Economics and Statistics.* August, 1980.
[§] Population figures are for the year 2000.

Since a change in price of aggregates does not lead to either a substantial substitution of other materials for aggregates or a substantial increase in the quantity of projects, the demand for aggregates is very inelastic. This inelasticity of demand is exactly the reason that the State of California can use a fixed per-capita consumption rate for forecasting the need for construction materials.

An example will make clear how the transport advantage and elasticity of demand arguments fit together. Let us consider a new quarry that, through its transportation advantage over existing quarries, would save 12.5 miles of trucking on each and every project in the study area. We shall assume that the average truck haul pre-project was 25 miles.

According to the *Map Sheet 52: Aggregate Availability in California,* the cost of construction aggregate doubles every 25-35 miles from the point of production. The following calculations are carried out assuming that a 25 mile haul doubles the cost. Assuming that a unit of aggregate costs $1 at the production site, then its delivered cost at a project site 25 miles away is $2. If the haul distance were to be reduced to 12.5 miles due to a new quarry, then half of the transportation costs – or $0.50 – would be saved. This represents a cost savings of 25 percent in the delivered cost of aggregate and is entirely due to a 50 percent decrease in miles traveled.

The only way for a new quarry to influence the quantity of construction is through the price of aggregates. This example presents the competitive case, where the delivered price decreases by the full amount of the transport cost savings. In the competitive case, the effect on the quantity of construction will be extremely moderate, as demonstrated below. (Appendix A presents a less than perfectly competitive example.)

In keeping with the fact that the cost of aggregate accounts for less than 10 percent of the total cost of a construction project, a price reduction of 25 percent on aggregate is a cost saving of 2.5 percent or less on the project. Let us assume a very liberal price elasticity of

demand for construction of 0.5. In other words, 2.5 percent reduction in the cost of construction would lead to 1.25 percent increase in the quantity of construction demanded. This increased quantity of delivered aggregate leads to additional truck haul miles. The number of increased miles from the increased aggregate sales is 1.25 percent of the original quantity times the new haul distance which is 50% of the original distance. Therefore, the percentage increase in truck haul miles occasioned by a decrease in aggregate price will be 0.625 percent because the new aggregate location is only half as far away.

In this example, the new quarry saves 50 percent of truck trip miles through location and contributes 0.625 percent of new truck trip miles from demand increase. This leads to a net decrease of 49.375 percent in truck miles. The following Table 1 summarizes the net reduction of truck haul miles for three different scenarios – the new aggregate project site located at 12.5, 6.25, and 2.5 miles from a construction site.

Table 1

Distance to New Quarry (miles)	**Decrease in haul miles (%)**[**]	**Decrease in delivered aggregate cost (%)**	**Decrease in construction cost (%)**	**Increase in construction quantity (%)**	**Increase in haul miles from additional construction(%)**[††]	**Net decrease in miles hauled (%)**
12.5	50	25	2.5	1.25	0.62	**49.4**
6.25	25	37.5	3.75	1.85	0.46	**74.5**
2.5 miles	90	45	4.5	2.25	0.22	**89.8**

There is a general rule to be deduced from the example: The percent decrease in cost for the delivery of aggregates equals the percent decrease in miles driven, while the increase in the use of aggregates equals the elasticity of demand for a final product (such as roads) times the cost share of aggregates in making the product times the decrease in cost. Since the elasticity of demand for a final product is much less than one, and the cost

[**] This decrease is with respect to the pre-project haul miles.
[††] This increase is with respect to the pre-project haul miles.

share of aggregates in making the product is about 8 percent, a new quarry must decrease truck miles and decrease NOX and other emissions from trucks.

Appendix A

Spatial Models with Imperfect Competition

When a producer has a price advantage over other producers because of lower transport costs, the producer can exploit that advantage by charging consumers a price greater than its marginal cost. Marginal cost is the cost of producing one incremental unit.
In this appendix, I will briefly investigate one model of spatial competition that is derived from a classical model of Hotelling [‡‡]

In Hotelling's model, two stores (which are analogous to production sites) can relocate at no cost and then compete based on price. Since consumers are some distance from the store, they see the price of a product as the amount they pay for the product plus the cost of travel. They go to the store with the least total cost (cost of product plus cost of travel). The stores seek to make the most money they can make. The price the consumer will pay is the largest price that the store the consumer goes to can charge without losing the customer to the other store.[§§] In Hotelling's model, the two stores will locate next to each other, split the market in half, and charge the competitive price. While the pricing rule of the Hotelling model may well apply to aggregates, the assumption of complete location flexibility is not applicable.

Returning to the model of diagram 1, shown above., I now consider the effects on pricing of adding one aggregate production site with competition in prices. Consider the case where both aggregate production sites and aggregate-using projects exist at location A and *. The production site at * would be willing to supply the project at location A at its marginal cost of production (mc) plus the cost of transport for one mile, for a total of mc + 1 c. This is higher than the marginal plus transport costs that production site A has for

[5] Hotelling, Harold. 1929. "Stability in Competition." Economic Journal 39:41-57
[6] Salop, Steven C. 1979. "Monopolistic Competition with Outside Goods." *The Bell Journal of Economics.* Salop models the competition between stores in terms of quantity, so that the price for consumers near a store is determined as a monopolist would determine price. With a very low elasticity of demand as is true for aggregates, the price competition model of Hotelling seems more appropriate.

supplying the project at A. However, the site at A can charge up to mc+c without losing the customer. The site charges mc+c while its costs are mc and makes c units of pure profit. The site at * prices in the same way—a price just high enough to avoid the site at A from taking the customer. For the sites to the right of *, the prices are mc+2, mc+3, and mc+ 4. In each case, this is the highest price site * can charge without losing the customer to site A.

In this model, one of the best places for a new site would be at B. The new site would sell ½ unit to the project between it and * at a price of mc + c, a whole unit to the project located at B at a price of mc + 2c (the price at which the site at * would be willing to supply aggregate), and a whole unit to the project located to its right at a price of mc + 3c. The result of adding the new site would be that the price for each project to the right of the project at * fell by c.

With competitive (marginal cost) pricing as described in the body of the note, the addition of the new site at B would result in the prices paid by projects decreasing by four, while with imperfect competition as described in this appendix, the new site would result in the prices paid by projects decreasing only by three. Compared to the competitive case cited above, the imperfect competition example results in smaller changes in prices and therefore a larger decrease in truck traffic.

MAP SHEET 52

(UPDATED 2018)

AGGREGATE SUSTAINABILITY IN CALIFORNIA

2018

CALIFORNIA GEOLOGICAL SURVEY
Department of Conservation

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MAP SHEET 52

(UPDATED 2018)

AGGREGATE SUSTAINABILITY IN CALIFORNIA

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2018

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INTRODUCTION

Sand, gravel, and crushed stone are “construction materials.” These commodities, collectively referred to as aggregate, provide the bulk and strength to Portland Cement Concrete (PCC), Asphaltic Concrete (AC, commonly called “black top”), plaster, and stucco. Aggregate is also used as road base, subbase, railroad ballast, and fill. Aggregate normally provides 80 to 100 percent of the material volume in the above uses.

The building and paving industries in California consume large quantities of aggregate and future demand for this commodity is expected to increase throughout California. Aggregate materials are essential to modern society, both to maintain the existing infrastructure and to provide for new construction. Therefore, aggregate materials are a resource of great importance to the economy of any area. Because aggregate is a low unit-value, high-bulk-weight commodity, it must be obtained from nearby sources to minimize economic and environmental costs associated with transportation. If nearby sources do not exist, then transportation costs can quickly exceed the value of the aggregate. Transporting aggregate from distant sources results in increased construction costs, fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, and road maintenance.

To give an idea of the scale of these impacts, from 1987 to 2016, California consumed an average of about 180 million tons of construction aggregate (all grades) per year. Moving in 25 ton truckloads that is 7.2 million truck trips per year. With an average 25-mile haul (50-mile round trip) that amounts to 360 million truck miles traveled, more than 51 million gallons of diesel fuel used, and more than 570,000 tons of carbon dioxide emissions produced annually. If the haul distance is doubled to 50 miles (100-mile round trip) the numbers double to 720 million truck miles traveled, more than 102 million gallons of diesel fuel used, and over 1.1 million tons of carbon dioxide emissions produced.

Land-use planners and decision makers in California are faced with balancing a wide variety of needs in planning for a sustainable future for their communities and regions. Mining is often seen as a controversial land use during the permitting process. However, there are benefits to having local sources of construction aggregate. Increasingly, as existing permitted aggregate supplies are depleted, local land-use decisions regarding aggregate resources can have regional impacts that go beyond local jurisdictional boundaries.

These factors, universal need, increasing demand, the economic and environmental costs of transportation, and multiple land-use pressures make information about the availability and demand for aggregate valuable to land-use planners and decision makers charged with planning for a sustainable future for California’s citizens.

California Geological Survey (CGS) Map Sheet 52 and this accompanying report provide general information about the current availability of, and future demand for, California’s permitted aggregate reserves. Map Sheet 52 was originally published in 2002 (Kohler, 2002) and subsequently updated in 2006 (Kohler, 2006) and 2012 (Clinkenbeard, 2012). Map Sheet 52 (2018) is an update of the version published in 2012.

Map Sheet 52 updates data from 49 reports compiled by the CGS for more than 30 aggregate study areas throughout the state (see Appendix). These study areas cover about 30 percent of the state and provide aggregate for about 85 percent of California's population. This report is divided into three parts:

- Part I - provides data sources and methods used to derive the information presented.
- Part II - compares the updated 2018 Map Sheet 52 to the prior (2012) map.
- Part III - an overview of construction aggregate.

All aggregate data and any reference to "aggregate" in this report and on the map, pertain to "construction aggregate," defined as alluvial sand and gravel or crushed stone that meets standard specifications for use in PCC or AC unless otherwise noted.

The estimates of permitted resources, aggregate demand, and years of permitted reserves remaining on Map Sheet 52 (2018) and in this report, are based on conditions as of January 1, 2017 and do not reflect changes, such as production, mine closures, or new or expanded permits, that may have occurred since that time. Although the statewide and regional information presented on the map and in this report may be useful to decision-makers, it should not be used as a basis for local land-use decisions. The more detailed information on the location and estimated amounts of permitted and non-permitted resources, and future regional demands contained in each of the aggregate studies employed in the compilation of Map Sheet 52 should be used for local land-use and decision-making purposes.

PART I: DESCRIPTION OF MAP SHEET 52, AGGREGATE SUSTAINABILITY IN CALIFORNIA

Map Sheet 52 is a statewide map showing a compilation of data about aggregate availability collected over a period of about 40 years and updated to January 1, 2017. The purpose of the map is to compare projected aggregate demand for the next 50 years with currently permitted aggregate reserves in various regions of the state. The map also shows the projected years of permitted reserves remaining and highlights regions where less than 10 years of permitted aggregate supply remain. The following sections describe data sources and methodology used in the development of the map.

Mineral Land Classification Reports and Aggregate Studies

Aggregate reserves and projected aggregate demand shown on Map Sheet 52 are updated from mineral land classification reports published by CGS between 1979 and 2017 (see Appendix). They were prepared in response to California's Surface Mining and Reclamation Act of 1975 (SMARA) that requires the State Geologist to classify land based on the known or inferred mineral resource potential of that land. SMARA, its regulations and guidelines, are described in Special Publication 51 (State Mining and Geology Board, 2000). The regulations and guidelines can be found on the State Mining and Geology Board website at http://www.conservation.ca.gov/smgb.

The Mineral Land Classification process identifies lands that contain economically significant mineral deposits. The primary goal of mineral land classification is to ensure that the mineral resource potential of lands is recognized and considered in land-use planning. The classification process includes an assessment of the quantity, quality, and extent of aggregate deposits in a study area.

Mineral land classification reports may be specific to aggregate resources, may contain information about both aggregate and other mineral resources, or they may only contain information on minerals other than aggregate. Reports that focus on aggregate include aggregate resource classification and mapping, estimates of permitted and non-permitted aggregate resources, projected 50-year demand for aggregate resources, and an estimate of when the permitted reserves will be depleted. Map Sheet 52 is a statewide updated summary of 50-year demands and permitted resources for all regional SMARA classification reports pertaining to construction aggregate.

Mineral land classification studies for aggregate may use either a Production-Consumption (P-C) region or a county as the study area boundary. A P-C region is one or more aggregate production districts (a group of producing aggregate mines) and the market area they serve. P-C regions sometimes cross county boundaries. Mineral land classification reports include information from one or more P-C regions, or from a county. For ease in discussion, the area covered by each P-C region or county aggregate study is referred to as an "aggregate study area." SMARA guidelines recommend that the State Geologist periodically review the mineral land classification in defined study regions to determine if new classifications are necessary. The projected 50-year forecast of aggregate demand in the region may also be revised.

The index map of aggregate studies shown in the lower left-hand corner of Map Sheet 52 shows the latest reports that cover an aggregate study area. Earlier reports covering the same areas or portions of areas are referenced in the Appendix with an asterisk ("*"). Original mineral land classification reports and update reports are listed in the Appendix and can be found on the CGS Information Warehouse at http://maps.conservation.ca.gov/cgs/informationwarehouse/.

Fifty-Year Aggregate Demand Forecast

The fifty-year aggregate demand forecast for each of the aggregate study areas is presented on Map Sheet 52 as a pie chart (See *Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves* section), and is presented in Table 1 of this report. The demand information may be new, or updated from previously published mineral land classification reports. The demand forecast information depicted on Map Sheet 52 is for the period January 1, 2017 through December 2066.

The aggregate study areas with the greatest projected future demand for aggregate are the South San Francisco Bay and Temescal Valley-Orange County areas. Each is expected to require more than a billion tons of aggregate by the end of 2066. Other areas with projected high demands are Western San Diego County, San Gabriel Valley, San Bernardino, Sacramento County, and Palmdale. Each of these areas is projected to need more than 500 million tons of aggregate in the next 50 years. Aggregate study areas having smaller demands generally are in rural, less populated areas. The aggregate study areas of El Dorado County, Glenn County, Nevada County, Shasta County, and Tehama County are all projected to require less than 100 million tons of aggregate over the next 50 years.

Methodology

The steps used for forecasting California's 50-year aggregate needs using the per capita consumption model are:

1. Collecting yearly historical production and population data.

2. Dividing yearly aggregate production by the population for that same year to determine annual historical per capita consumption.

3. Determining the average of the annual historical per capita consumption values for the range of years being used.

4. Projecting yearly population for a 50-year period from the beginning of 2017 through 2066.

5. Multiplying each year of projected population by the average historical per capita consumption and adding the results for each year to obtain the 50-year aggregate demand.

Table 1. Comparison of 50-Year Demand to Permitted Aggregate Reserves for Aggregate Study Areas as of January 1, 2017.

AGGREGATE STUDY AREA[1]	50-Year Demand (million tons)	Permitted Aggregate Reserves (million tons)	Permitted Aggregate Reserves Compared to 50-Year Demand (percent)	Projected Years Remaining
Bakersfield P-C Region	338	1,708	505	More than 50
Barstow-Victorville P-C Region	163	117	72	31 to 40
Claremont-Upland P-C Region	202	90	45	21 to 30
El Dorado County	82	15	18	11 to 20
Fresno P-C Region	305	556	182	More than 50
Glenn County	41	22	54	21 to 30
Merced County	154	61	40	21 to 30
Monterey Bay P-C Region	333	297	89	41 to 50
Nevada County	41	52	127	More than 50
North San Francisco Bay P-C Region	492	263	53	21 to 30
Palmdale P-C Region	569	163	29	11 to 20
Palm Springs P-C Region	238	163	68	31 to 40
Placer County	188	387	206	More than 50
Sacramento County	724	327	45	21 to 30
Sacramento-Fairfield P-C Region	295	109	37	21 to 30
San Bernardino P-C Region	939	156	17	11 to 20
San Fernando Valley/ Saugus-Newhall[2]	**387**	**17**	**4**	**10 or fewer**
San Gabriel Valley P-C Region	751	297	40	21 to 30
San Luis Obispo-Santa Barbara P-C Region	226	58	26	11 to 20
Shasta County	82	49	60	31 to 40
South San Francisco Bay P-C Region	1,320	506	38	21 to 30
Stanislaus County	160	39	24	11 to 20
Stockton-Lodi P-C Region	409	203	50	21 to 30
Tehama County	49	30	61	31 to 40
Temescal Valley-Orange County[2]	1,079	862	80	41 to 50
Tulare County	130	53	41	21 to 30
Ventura County[2]	241	84	35	11 to 20
Western San Diego County P-C Region	763	265	35	11 to 20
Yuba City-Marysville P-C Region	344	679	197	More than 50
Total	11,045	7,628	69	

[1] Aggregate study areas follow either a Production-Consumption (P-C) region boundary or a county boundary. A P-C region includes one or more aggregate production districts and the market area that those districts serve. Aggregate resources are evaluated within the boundaries of the P-C Region. County studies evaluate all aggregate resources within the county boundary.

[2] Two P-C regions have been combined into one study area.

Bold = study area with ten or fewer years of permitted reserves.

For this update, the range of years of historical production and population data used were generally from 1980-2016.

The per capita consumption model has proved to be effective for projecting aggregate demand in major metropolitan areas. However, the per capita model may not work well in county aggregate studies or in P-C regions that import or export a large percentage of aggregate resulting in a low correlation between P-C region production and population. In such areas, projections may be made based on historical production or, multiple projections based on differing assumptions may be used to better characterize a range of future demand.

For regions that export large amounts of aggregate to neighboring P-C regions, projections are based on an historical production model where 50-year aggregate demand is determined by extending a best-fit line of historical aggregate production data for a county or region. This model was used to project Yuba City-Marysville's 50-year demand because the region exports about 70 percent of its aggregate into neighboring areas such as Sacramento County and Placer County. The 50-year demand for Glenn and Tehama counties, the Palmdale P-C Region, and the Temescal Valley-Orange County area was also projected using this method.

Permitted Aggregate Reserves

Approximately 7.6 billion tons of permitted aggregate reserves lie within the aggregate study areas shown on Map Sheet 52. Permitted aggregate reserves are aggregate deposits that have been determined to be acceptable for commercial use, exist within properties owned or leased by aggregate producing companies, and have permits allowing mining of aggregate material. A "permit" is a legal authorization or approval by a lead agency, the absence of which would preclude mining operations. Although some permitted reserves face legal challenges, these reserves are included in this study pending resolution of those challenges.

In California, mining permits usually are issued by local lead agencies (county or city governments). Map Sheet 52 shows permitted aggregate reserves as a percentage of the 50-year demand on each pie chart (See *Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves* section). Beneath the study area name located next to its corresponding pie chart is the permitted resource in tons along with the 50-year demand. These figures are also given in Table 1.

Permitted aggregate resource calculations shown on the map and in Table 1 initially were determined from information provided in reclamation plans, mining plans, and use permits issued by the lead agencies. When information was inadequate to make reliable independent calculations, CGS staff used resource estimates provided by mine operators or owners. These data were checked against rough calculations made by CGS staff, and any major discrepancies were discussed with the mine operators or owners. Permitted reserve calculations have been updated to account for production from 2010-2016 and are current as of the beginning of 2017.

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves

Fifty-year aggregate demand compared to the currently permitted aggregate reserves is represented by a pie chart for each aggregate study area on Map Sheet 52. Each pie chart is in the approximate center of the aggregate study area it represents. There are four different sizes of charts, each representing a 50-year demand range. The smallest pie chart represents 50-year demands of less than 200 million tons, while the largest chart represents demands of over 800 million tons. The 50-year demand (in tons) is shown on the map with the amount of permitted reserves beneath the study area name located next to its corresponding pie chart (permitted reserves, left / 50-year demand, right). The whole pie represents the total 50-year aggregate demand for a particular aggregate study area. The blue portion of the pie represents the permitted aggregate resource (shown as a percentage of the 50-year demand) while the purple-colored portion of the pie represents that portion of the 50-year demand that will not be met by the currently permitted reserves. For example, if the blue portion is 25 percent and the purple portion is 75 percent of a pie chart that represents a total demand of 400 million tons, the permitted reserves are 100 million tons, and the region will need an additional 300 million tons of aggregate to supply the area for the next 50 years. The pie representing the Bakersfield aggregate study area is completely colored blue, showing permitted aggregate reserves are equal to or greater than the area's 50-year aggregate demand. Detailed examples are provided in the legend of Map Sheet 52.

Except for the Bakersfield P-C Region, Fresno P-C Region, Nevada County, Placer County, and the Yuba City-Marysville P-C Region, all the aggregate study areas have less permitted aggregate reserves than they are projected to need for the next 50 years. Fifteen of the aggregate study areas shown on the map have less than half of the permitted reserves they are projected to need in the next 50 years.

Estimates of Years of Permitted Reserves Remaining

The right-hand column of Table 1 indicates the projected years of permitted reserves remaining for the various aggregate study areas. Calculations of depletion years are made by comparing the currently permitted reserves to the projected annual aggregate consumption in the study area on a year-by-year basis. This is not the same as dividing the total projected 50-year demand for aggregate by 50 because, as population increases, so does the projected annual consumption of aggregate for a study area. Data are presented as ranges; 10 or fewer, 11-20, 21-30, 31-40, 41-50, and more than 50 years. This information is included on Map Sheet 52 beneath the study area name along with the permitted reserves and the projected 50-year demand. These estimates are based on conditions as of January 1, 2017 and do not reflect changes, such as new or expanded permits, that may have occurred since that time.

Only one of the aggregate study areas in Table 1, the San Fernando Valley-Saugus Newhall area, is projected to have less than 10 years of permitted aggregate reserves remaining as of January 1, 2017.

Seven of the aggregate study areas in Table 1 have between 11 and 20 years of permitted aggregate reserves remaining, ten have between 21 and 30 years of permitted aggregate reserves remaining, four have 31 to 40 years remaining, two have 41 to 50 years, and five have more than 50 years of permitted reserves remaining.

These numbers are estimates and the actual lifespan of existing permitted reserves in a study area can be influenced by many factors. In periods of high economic growth, demand may increase, shortening the life of permitted reserves. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area. Conversely, a slow economy may reduce demand for a period of time, extending the life of permitted reserves, or new or expanded permits may be granted in a study area, increasing the permitted reserves and the lifespan of permitted reserves in that area.

Non-Permitted Aggregate Resources

Non-permitted aggregate resources are deposits that may meet specifications for construction aggregate, are recoverable with existing technology, have no land use overlying them that is incompatible with mining, and currently are not permitted for mining. While not shown on Map Sheet 52, non-permitted aggregate resources are identified and discussed in each of the mineral land classification reports used to compile the map (See Appendix).

There are approximately 74 billion tons of non-permitted construction aggregate resources in the aggregate study areas shown on Map Sheet 52. While this number seems large, it is unlikely that all of these resources will ever be mined because of social, environmental, or economic factors. The location of aggregate resources too close to urban or environmentally sensitive areas can limit or prevent their development. Resources may also be located too far from a potential market to be economic. Despite such possible constraints, non-permitted aggregate resources are the most likely future sources of construction aggregate potentially available to meet California's continuing demand. Factors used to calculate non-permitted resource amounts and to determine the aerial extent of these resources, are given in each of the mineral land classification reports listed in the Appendix.

Aggregate Production Areas and Districts

Aggregate production areas are shown on Map Sheet 52 by five different sizes of triangle. A triangle may represent one or more active aggregate mines. The relative size of each symbol corresponds to the amount of yearly production for each mine or group of mines. Yearly production was based on data from the Department of Conservation's Division of Mine Reclamation (DMR) records for the calendar year 2016.

The smallest triangle represents an area that produced less than 0.5 million tons of aggregate in 2016. These triangles often represent a single mine operation and many are in rural parts of the state. The largest triangle represents aggregate mining districts

with production of more than 5 million tons in 2016. Only two aggregate production districts fall into this category – the Temescal Valley District in western Riverside County and the San Gabriel Valley District in Los Angeles County.

PART II: COMPARISONS BETWEEN THE PRIOR (2012) AND THE UPDATED (2018) MAP SHEET 52

The prior version of Map Sheet 52 was published in 2012. Permitted aggregate resource data for that map were current as of January 1, 2011. Work conducted for that study took place during 2011/2012. The latest aggregate production and location data available for the prior map were from 2010 records. The aggregate demand projections for the prior map were based on California Department of Finance (DOF) county population projections from the 2010 U.S. census. Fifty-year aggregate demand from January 1, 2011 through the year 2060 was determined for the included study areas.

This updated Map Sheet 52 was completed and published in 2018. Permitted aggregate resource data for the updated map is current as of January 1, 2017. All work conducted for the updated study took place during 2017/2018. The latest aggregate production and location data available for the updated map are from 2016 records. The aggregate demand projections for the updated map were based on DOF county population estimates and projections for 2010 to 2060 (DOF, 2018). Fifty-year aggregate demand from January 1, 2017 through the year 2066 was determined for the included study areas.

Changes have occurred in both aggregate supplies (permitted aggregate reserves) and in 50-year aggregate demand since Map Sheet 52 (2012) was completed. Changes in permitted aggregate reserves are shown in Table 2. Changes in 50-year demand are shown in Table 3.

Aggregate Study Area Changes

Six aggregate study areas on the original (2002) Map Sheet 52 were modified for the 2006 map, resulting in three fewer study areas. They included the Southern California P-C regions of Orange County, Temescal Valley, San Fernando Valley, Saugus-Newhall, Western Ventura County, and Simi Valley. These regions were combined into three regions when they began to run out of permitted reserves and became dependent on aggregate sources from neighboring regions. The importation of aggregate from neighboring regions typically results in longer haul distances, higher costs, and increased carbon dioxide emissions, air pollution, traffic congestion, and highway maintenance. The shift in supply area also results in more rapid depletion of permitted reserves in neighboring regions.

In the 2006 and 2012 versions of Map Sheet 52, information for eastern and western Merced County and northern and southern Tulare county were reported. This was because separate market regions existed in those study areas. While those separate market regions may still exist, in this update, information is reported for Merced and Tulare counties and not for the eastern and western or northern and southern areas, respectively.

Table 2. Comparison of Permitted Aggregate Reserves Between Map Sheet 52, 2012 and Map Sheet 52, 2018.

AGGREGATE STUDY AREA	Map Sheet 52, 2012 Permitted Aggregate Reserves as of 1/1/11 (million tons)	Map Sheet 52, 2018 Permitted Aggregate Reserves as of 1/1/17 (million tons)	Percent Difference
Bakersfield P-C Region	143	1,708	1,094
Barstow Victorville P-C Region	124	117	-6
Claremont-Upland P-C Region	109	90	-17
El Dorado County	18	15	-17
Fresno P-C Region	46	556	1,109
Glenn County	33	22	-33
Merced County**	N/A**	61	N/A**
Monterey Bay P-C Region	323	297	-8
Nevada County	26	52	100
North San Francisco Bay P-C Region	110	263	139
Palmdale P-C Region	152	163	7
Palm Springs P-C Region	152	163	7
Placer County	152	387	155
Sacramento County	42	327	679
Sacramento-Fairfield P-C Region	128	109	-15
San Bernardino P-C Region	241	156	-35
San Fernando Valley/Saugus-Newhall*	77	17	-78
San Gabriel Valley P-C Region	322	297	-8
San Luis Obispo-Santa Barbara P-C Region	75	58	-23
Shasta County	52	49	-6
South San Francisco Bay P-C Region	404	506	25
Stanislaus County	45	39	-13
Stockton Lodi P-C Region	232	203	-13
Tehama County	32	30	-6
Temescal Valley-Orange County*	297	862	190
Tulare County**	N/A**	53	N/A**
Ventura County (combined Western Ventura County and Simi Valley P-C Region)*	96	84	-13
Western San Diego County P-C Region	167	265	59
Yuba City-Marysville P-C Region	392	679	73
Total	4,067	7,628	88

* Two P-C Regions have been combined into one study area.
** In Map Sheet 52 (2012) separate values for east and west Merced County and north and south Tulare County were presented. In this update, information is given only for the counties as a whole and not the parts.

Table 3. Comparison of 50-Year Demand Between Map Sheet 52, 2012 and Map Sheet 52, 2018.

AGGREGATE STUDY AREA	Map Sheet 52, 2012 50-Year Demand as of 1/1/11 (million tons)	Map Sheet 52, 2018 50-Year Demand as of 1/1/17 (million tons)	Percent Difference
Bakersfield P-C Region	438	338	-23
Barstow-Victorville P-C Region	159	163	3
Claremont-Upland P-C Region	203	202	0
El Dorado County	76	82	8
Fresno P-C Region	435	305	-30
Glenn County	59	41	-31
Merced County**	N/A**	154	N/A**
Monterey Bay P-C Region	346	333	-4
Nevada County	100	41	-59
North San Francisco Bay P-C Region	521	492	-6
Palmdale P-C Region	577	569	-1
Placer County	151	238	58
Palm Springs P-C Region	295	188	-36
Sacramento County	670	724	8
Sacramento-Fairfield P-C Region	196	295	51
San Bernardino P-C Region	993	939	-5
San Fernando Valley/Saugus-Newhall*	476	387	-19
San Gabriel Valley P-C Region	809	751	-7
San Luis Obispo-Santa Barbara P-C Region	240	226	-6
Shasta County	93	82	-12
South San Francisco Bay P-C Region	1,381	1,320	-4
Stanislaus County	214	160	-25
Stockton Lodi P-C Region	436	409	-6
Tehama County	62	49	-21
Temescal Valley-Orange County*	1,077	1,079	0
Tulare County **	N/A**	130	N/A**
Ventura County (combined Western Ventura County and Simi Valley P-C Regions)*	298	241	-19
Western San Diego County P-C Region	1,014	763	-25
Yuba City-Marysville P-C Region	403	344	-15
Total	12,047	11,045	-8

* Two P-C Regions have been combined into one study area.
** In Map Sheet 52 (2012) separate values for east and west Merced County and north and south Tulare County were presented. In this update, information is given only for the counties as a whole and not the parts.

No additional study areas have been combined in this update. It is likely that in some future update the San Fernando Valley-Saugus Newhall aggregate study area and the Palmdale study area may be combined as permitted reserves in the San Fernando Valley-Saugus Newhall aggregate study area are depleted. In addition, a study of the Greater Sacramento Area currently nearing completion will likely result in the combination of several previously existing study areas.

Changes in Permitted Aggregate Reserves

Fifteen of the study areas shown on the updated map experienced a decrease in permitted aggregate reserves since the 2012 map was completed (See Table 2). Most of these decreases likely represent aggregate production within those study areas since the last update of Map Sheet 52.

A large part of the reduction in the San Fernando Valley-Saugus Newhall study area is due to the subtraction of the 56 million tons of permitted aggregate reserves previously associated with the CEMEX Soledad Canyon Sand and Gravel Mining Project. In 2015, the Bureau of Land Management withdrew the contracts that would have allowed mining. The issue is currently under appeal with the Interior Board of Land Appeals. If, at a future date, the contracts are restored then the permitted reserves will be restored.

Twelve of the study areas shown on the updated map had increases in permitted aggregate reserves. Most of these increases are because of newly permitted or expanded mining operations within the various study areas. An expansion may increase the footprint of the mine or increase permitted mining depth. Some of these increases may be the result of recalculation of the permitted aggregate reserves in a study area.

Total permitted reserves for all the included study areas increased to 7,628 million tons from 4,067 million tons – an apparent increase of 3,561 million tons. The actual increase was likely slightly more because of production since 2010. Approximately two-thirds of the increase is due to permitting activities in the Bakersfield, Fresno, and Sacramento study areas.

Changes in Fifty-Year Demand

Of the study areas shown on the updated Map Sheet 52, five had increases in 50-year demand, two had less than a one percent change, and 20 showed decreases in projected 50-year demand (See Table 3). The large number of study areas with decreasing 50-year demand is likely due in part to incorporation of lower per capita consumption rates caused by the slow recovery of the construction industry in California in the years following the economic recession of 2007-2009.

Comparison of Areas with Less than 10-Years of Permitted Aggregate Reserves

The 2018 Map Sheet 52 shows only one aggregate study area with less than a 10-year supply of permitted aggregate reserves – San Fernando Valley-Saugus Newhall.

Compared to the 2012 version of the map, which showed four aggregate study areas with less than a 10-year supply of aggregate – Sacramento County and the Fresno, San Fernando Valley-Saugus Newhall, and Western San Diego P-C regions.

PART III: OVERVIEW OF CONSTRUCTION AGGREGATE

Construction aggregate was the leading non-fuel mineral commodity produced in California in 2016. Valued at $1.42 billion, aggregate made up about 42 percent of California's $3.4 billion non-fuel mineral production in 2016.

Aggregate Quality and Use

Aggregate normally makes up 80 to 100 percent of the material volume in PCC and AC and provides the bulk and strength to these materials. Rarely, even from the highest-grade deposits, is in-place aggregate physically or chemically suited for every type of aggregate use. Every potential deposit must be tested to determine how much of the material can meet specifications for a particular use, and what processing is required. Specifications for PCC, AC, and various other uses of aggregate have been established by several agencies, such as the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, and the California Department of Transportation to ensure that aggregate is satisfactory for specific uses. These agencies and other major consumers test aggregate using standard procedures of the American Society for Testing Materials (ASTM), the American Association of State Highway Officials, and other organizations.

Most PCC and AC aggregate specifications have been established to ensure the manufacture of strong, durable structures capable of withstanding the physical and chemical effects of weathering and use. For example, specifications for PCC and concrete products prohibit or limit the use of rock materials containing mineral substances such as gypsum, pyrite, zeolite, opal, chalcedony, chert, siliceous shale, volcanic glass, and some high-silica volcanic rocks. Gypsum retards the setting time of portland cement; pyrite dissociates to yield sulfuric acid and an iron oxide stain; and other substances contain silica in a form that reacts with alkali substances in the cement, resulting in cracks and "pop-outs."

Specifications also call for precise particle-size distribution for the various uses of aggregate that is commonly classified into two general sizes: coarse and fine. Coarse aggregate is rock retained on a 3/8-inch or a #4 U.S. sieve. Fine aggregate passes a 3/8-inch sieve and is retained on a #200 U.S. sieve (a sieve with 200 weaves per inch). For some uses, such as asphalt paving, particle shape is specified. Aggregate material used with bituminous binder (asphalt) to form sealing coats on road surfaces shall consist of at least 90 percent by weight of crushed particles. Crushed stone is preferable to natural gravel in AC because asphalt adheres better to broken surfaces than to rounded surfaces and the interlocking of angular particles strengthens the AC and road base.

The material specifications for PCC and AC aggregate are more restrictive than specifications for other applications such as Class II base, subbase, and fill. These restrictive specifications make deposits acceptable for use as PCC or AC aggregate the scarcest and most valuable aggregate resources. Aggregate produced from such deposits can be, and commonly is, used in applications other than concrete. PCC- and AC-grade aggregate deposits are of major importance when planning for future

availability of aggregate commodities because of their versatility, value, and relative scarcity.

Factors Affecting Aggregate Deposit Quality

The major factors that affect the quality of construction aggregate are the rock type and the degree of weathering of the deposit. Rock type determines the hardness, durability, and potential chemical reactivity of the rock when mixed with cement to make concrete. In alluvial sand and gravel deposits, rock type is variable and reflects the rocks present in the drainage basin of the stream or river. In crushed stone deposits, rock type is typically less variable, although in some types of deposits, such as sandstones or volcanic rocks, there may be significant variability of rock type. Rock type may also influence aggregate shape. For example, some metamorphic rocks such as slates tend to break into thin platy fragments that are unsuitable for many aggregate uses, while many volcanic and granitic rocks break into blocky fragments more suited to a wide variety of aggregate uses. Deposit type also affects aggregate shape. For example, in alluvial sand and gravel deposits, the natural abrasive action of the stream rounds the edges of rock particles, in contrast to the sharp edges of particles from crushed stone deposits.

Weathering is the in-place physical or chemical decay of rock materials at or near the Earth's surface. Weathering commonly decreases the physical strength of the rock and may make the material unsuitable for high strength and durability uses. Weathering may also alter the chemical composition of the aggregate, making it less suitable for some aggregate uses. If weathering is severe enough, the material may not be suitable for use as PCC or AC aggregate. Typically, the older a deposit is, the more likely it has been subjected to weathering. The severity of weathering commonly increases with increasing age of the deposit.

Comparison of Alluvial Sand and Gravel to Crushed Stone Aggregate

The preferred use of one aggregate material over another in construction practices depends not only on specification standards, but also on economic considerations. Alluvial gravel is typically preferred to crushed stone for PCC aggregate because the rounded particles of alluvial sand and gravel result in a wet mix that is easier to work than a mix made of angular fragments. Also, crushed stone is less desirable in applications where the concrete is placed by pumping because sharp edges will increase wear and damage to the pumping equipment. The workability of a mix consisting of portland cement with crushed stone aggregate can be improved by adding more sand and water, but more cement must then be added to the mix to meet concrete durability standards. This results in a more expensive concrete mix and a higher cost to the consumer.

In addition, aggregate from a crushed stone deposit is typically more expensive than that from an alluvial deposit due to the additional costs associated with the ripping, drilling and blasting necessary to remove material from most quarries and the additional crushing required to produce the various sizes of aggregate. Manufacturing sand by crushing is costlier than mining and processing naturally occurring sand. Although more care is required in pouring and placing a wet mix containing crushed stone, PCC made with this aggregate is as satisfactory as that made with alluvial sand and gravel of comparable

rock quality. Owing to environmental concerns and regulatory constraints in many areas of the state, it is likely that extraction of sand and gravel resources from instream and floodplain areas will become less common in the future. If this trend continues, crushed stone may become increasingly important to the California market.

Aggregate Price

The price of aggregate throughout California varies considerably depending on location, quality, and supply and demand. The highest quality aggregate, and typically most costly, is that which meets the specifications for use in PCC or AC. All prices discussed in this section are for PCC/AC-grade aggregate at the plant site or FOB (freight on board). Transportation cost, which adds to the final cost of aggregate, is discussed in the next section.

Regional variations make it difficult to estimate the average price of PCC-grade aggregate for the state. Over the last decade, prices have varied from more than $20 per ton in areas with depleting or depleted aggregate supplies and high demands such as San Diego and parts of the Bay Area, to $9 to $12 per ton in areas such as Yuba City-Marysville with abundant aggregate supplies and low to moderate demands. In many areas of the state it is likely that prices fall between these two endmembers.

Transportation and Increasing Haul Distances

Transportation plays a major role in the cost of aggregate to the consumer. Aggregate is a low-unit-value, high-bulk-weight commodity, and it must be obtained from nearby sources to minimize both the dollar cost to the aggregate consumer and other environmental and economic costs associated with transportation. If nearby sources do not exist, then transportation costs may significantly increase the cost of the aggregate by the time it reaches the consumer.

This makes the mining of aggregate much more competitive than most other mined commodities. The location, distance to market, and access to major transportation routes greatly influence the economic feasibility of an aggregate mine.

Most aggregate in California moves to its final point of use by truck. Trucking is typically charged at an hourly rate and rates may vary in different regions of the state. The typical distance traveled per hour may also vary, being greater in less congested or more rural areas, and less in densely populated urban areas. Other factors that affect hauling rates include fuel costs, toll bridges and toll roads, road conditions, and terrain. Transportation cost is the principal constraint defining the market area for an aggregate mining operation and the cost of transporting aggregate over long distances can equal or exceed the base cost of the aggregate.

Throughout California, aggregate haul distances have gradually increased as more local sources of aggregate diminish. Consequently, older P-C regions, most of which were established in the late 1970s, have changed considerably since their boundaries were drawn. This is especially evident in Los Angeles, Orange, and Ventura counties where aggregate shortages have led to the merging of six P-C regions shown on the original

(2002) map into three regions for the updated maps. In some parts of the state, one-way haul distances that were 20-30 miles decades ago are now sometimes 100 miles or more. Increased aggregate haul distances not only increase the cost of aggregate to the consumer, but also increase environmental and societal impacts such as increased fuel consumption, carbon dioxide (CO_2) emissions, air pollution, traffic congestion, and road maintenance.

Imported Aggregate

In some regions, local aggregate production is sufficient to meet the local demand, but in others, there is more demand than can be met by local production leading to a shortfall that is typically met by importing construction aggregate from neighboring aggregate producing regions.

There are both advantages and disadvantages to importing construction aggregate. Imports can provide needed aggregate in areas with depleted reserves/resources and can supply specific types of aggregate that are in short supply in the region. However, imported aggregate is often more expensive because of additional transportation costs. Increased costs for aggregate leads to more expensive construction projects in both the public and private sectors. Importing aggregate from neighboring regions also leads to more rapid depletion of reserves/resources in those regions, potentially contributing to price increases or aggregate shortages in those regions.

In addition to the greater economic costs, there are often increased environmental and societal costs associated with the import of aggregate when compared to local production. The environmental impacts include higher emissions of greenhouse gases, such as CO_2, and air pollution. The societal impacts include increased traffic congestion and road wear and maintenance due to increased truck traffic. In the case of imports, these environmental and societal impacts occur both within the importing region and in the neighboring regions that supply the material and through which the material is transported.

Currently almost all aggregate produced or imported into California is transported to its final point of use by truck. In discussions of aggregate import, other modes of transportation such as rail, barge, or ship are often mentioned as alternative methods of moving aggregate. In 2011, the San Diego Association of Governments (SANDAG) Service Bureau published the San Diego Region Aggregate Supply Study (SANDAG Service Bureau, 2011). This study included an evaluation of fuel use and CO_2 emissions for several scenarios involving different transport options for importing aggregate into the San Diego area. While the published study is specific to the San Diego region, it provides an interesting analysis of the impacts of importing construction aggregate. The following discussion is adapted from Special Report 240 (Gius, Busch, and Miller, 2017).

The SANDAG study looked at the impacts based on various combinations of transport options for the following five scenarios:

- In region production
- Import by truck from neighboring regions
- Import by rail/truck from San Bernardino County
- Import by barge/truck from Baja California, Mexico
- Import by ship/truck from British Columbia, Canada.

Fuel consumption, CO_2 emissions, and some other pollutant emissions (nitrogen oxides (NO_x) and particulate matter (PM)) were estimated based on round-trip travel, with aggregate transported to the point of use and the vehicle returning empty. For scenarios involving non-truck transport (rail, barge, and ship), delivery to the final point of use by truck was included. The transport scenarios and transport type and mileage considerations are presented in Table 4. More detail can be found in the SANDAG study (SANDAG Service Bureau, 2011).

Table 4. Summary of SANDAG Aggregate Transport Scenarios

SANDAG AGGREGATE TRANSPORT SCENARIOS	
TRANSPORT OPTION	**MILEAGE BY MODE**
Local: Truck	26 miles one way / 52 miles round trip
Import: Truck	100 miles one way / 200 miles round trip
Import: Rail + Truck	Rail: 200 miles one way / 400 miles round trip Truck: 20 miles one way / 40 miles round trip
Import: Barge + Truck	Barge: 70 miles one way / 140 miles round trip Truck: 20 miles one way / 40 miles round trip
Import: Ship + Truck	Ship: 1,540 miles one way / 3,080 miles round trip Truck: 20 miles one way / 40 miles round trip

Adapted from SANDAG Service Bureau, 2011

Transportation methods that move larger amounts of aggregate per load can be more efficient in terms of fuel consumption (gallons of fuel consumed per net ton-mile traveled) and CO_2, NO_x, and PM emissions (grams of CO_2, NO_x, and PM emitted per net ton-mile traveled). However, even though these transport options may be more efficient on a net ton-mile basis, the total fuel consumption and emissions are dependent on the distance traveled. If those distances are large, total fuel consumption and emissions may exceed those of less efficient transportation methods over shorter distances. This is demonstrated by SANDAG's findings. Even though transport by rail, barge, and ship

have lower fuel consumption and CO_2 emissions per net ton-mile than transport by truck (Table 5), the total fuel usage and CO_2 emissions for those transport scenarios are greater than in-region production with truck delivery because of the distances involved (Table 6).

Table 5. Fuel Consumption and CO_2 Emissions from Aggregate Transport with Payload

Mode	Payload	Fuel Consumption (gallons/net ton per mile)	CO_2 Emissions (grams/net ton per mile)
Truck	25 tons	0.0086	86.9
Rail	100 tons per hopper car	0.0021	21.4
Barge	1,500 tons	0.0068	69.6
Ship	72,786 tons	0.0004	5.3

Adapted from Tables 4-2 and 4-4, SANDAG Service Bureau, 2011

Table 6. Fuel Consumption and Emissions for Aggregate Transport Scenarios – Estimates per Million Tons of Aggregate Transported

Transport Option	Total Fuel Consumption (gallons)	Total CO_2 Emissions (metric tons)	Total NO_x Emissions (metric tons)	Total PM Emissions (metric tons)
Local: Truck	296,000	3,000	26.5	1.1
Import: Truck	1,138,000	11,537	102	4.4
Import: Rail + Truck	788,000	7,985	120.4	3.3
Import: Barge + Truck	804,000	8,210	147.1	5.1
Import: Ship + Truck	1,406,000	16,703	282.2	16.3

Adapted from SANDAG Service Bureau, 2011

Table 6 shows that, per million tons of aggregate transported, local production with transport by truck consumes less fuel and produces less CO_2, NOx, and PM than the other transport options investigated by SANDAG. Transport Option 2, import of one million tons of aggregate by truck from neighboring regions, consumes almost four times as much fuel and produces almost four times the emissions as the local production and delivery of a similar amount of aggregate. In addition, the impacts occur not only in the Western San Diego County P-C Region, but in neighboring regions through which the materials are transported.

While this analysis pertains to San Diego County, similar analyses, with appropriate parameters, could be done for other regions. What it does point out is that, even though some methods of transportation may be more efficient on a per ton-mile basis, if the transport distances are great enough, the overall impacts may be greater than those of local production.

Factors Affecting Aggregate Demand

Several factors may influence aggregate demand. In periods of high economic growth, demand may increase, depleting permitted reserves more rapidly than expected. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area. Conversely, a period of declining economy or of low economic growth, such as that during the recession of 2007 to 2009 and the subsequent slow economic recovery, can reduce demand for a period of time, extending the life of permitted reserves. In some cases, importation of aggregate from other areas may extend the life of a region's permitted reserves.

SUMMARY AND CONCLUSIONS

Aggregate is essential to the needs of modern society, providing material for the construction and maintenance of roadways, dams, canals, buildings, and other parts of California's infrastructure. Aggregate is also found in homes, schools, hospitals, and shopping centers.

In the 30-year period from 1987 to 2016, Californians consumed an average of about 180 million tons of construction aggregate (all grades) per year or about 5.3 tons per person per year. Demand for aggregate is expected to increase as the state's population continues to grow and infrastructure is maintained, improved, and expanded. For example, the Road Repair and Accountability Act of 2017 (SB1) will provide approximately 5 billion dollars annually for a variety of maintenance, rehabilitation, and other transportation related projects over the next decade. Because aggregate is a low unit-value, high-bulk-weight commodity, it must be obtained from nearby sources to minimize the dollar cost to the aggregate consumer and other environmental and economic costs associated with transportation.

Comparing regional needs to available reserves and resources demonstrates the important aggregate resource issues facing lead agencies in California. These issues include the need to plan carefully for the use of lands containing these resources and the need to consider the permitting of additional aggregate resources before currently permitted deposits are depleted.

Increasingly, as existing permitted aggregate supplies are depleted, local land-use decisions regarding aggregate resources are having regional impacts that go beyond local jurisdictional boundaries. Planning for future construction aggregate needs in our communities should take into consideration not only the needs of the community, but also the needs of the region and neighboring regions. Importing aggregate from neighboring regions leads to more rapid depletion of reserves/resources in those regions, potentially contributing to price increases or aggregate shortages in those regions.

In addition to the greater economic costs, there are often increased environmental and societal costs associated with the import of aggregate when compared to local production. The environmental impacts include higher emissions of greenhouse gases, such as CO_2, and air pollution. The societal impacts include increased traffic congestion and road maintenance due to increased truck traffic. In the case of imports, these environmental and societal impacts occur both within the importing region and in the neighboring regions that supply the material and through which the material is transported. Finally, reliance on imports places responsibility and authority for permitting related to the local aggregate supply in the hands of decision makers in other jurisdictions.

For more than 40 years, under SMARA, CGS has conducted on-going studies that identify and evaluate aggregate resources throughout the state. Map Sheet 52 (2018) is an updated summary of supply and demand data from these studies. The map presents a statewide overview of projected future aggregate needs and currently permitted reserves.

The following conclusions can be drawn from Map Sheet 52 (2018) and this accompanying report:

- In the next 50 years, the study areas identified on Map Sheet 52 (2018) will need approximately 11 billion tons of aggregate.

- The study areas shown on Map Sheet 52 currently have about 7.6 billion tons of permitted reserves, which is about 69 percent of the total projected 50-year aggregate demand identified for these study areas. This is about 10 percent of the total aggregate resources located within the study areas.

- One aggregate study area is projected to have 10 or fewer years of permitted aggregate reserves remaining as of January 2017 (San Fernando Valley / Saugus Newhall area).

- Seven aggregate study areas have between 11 and 20 years of aggregate reserves remaining.

- Ten aggregate study areas have between 21 and 30 years of aggregate reserves remaining.

- Four aggregate study areas have between 31 and 40 years of aggregate reserves remaining.

- Two aggregate study areas have between 41 and 50 years of aggregate reserves remaining.

- Five aggregate study areas (Bakersfield, Fresno, and Yuba City-Marysville P-C regions, and Nevada and Placer counties) have more than 50 years of aggregate reserves remaining.

The information presented on Map Sheet 52 (2018) and in the referenced reports is provided to assist land use planners and decision makers in identifying those areas containing construction aggregate resources, and to estimate potential future demand for these resources in different regions of the state. This information is intended to help planners and decision makers balance the need for construction aggregate with the many other competing land use issues in their jurisdictions, and to provide for adequate supplies of construction aggregate to meet future needs.

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California Department of Finance, Demographic Research Unit, *Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year increments.* January 2018.

APPENDIX: MINERAL LAND CLASSIFICATION REPORTS BY THE CALIFORNIA GEOLOGICAL SURVEY (Special Reports and Open-File Reports, with information on aggregate resources)

SPECIAL REPORTS

SR 132: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Yuba City-Marysville Production-Consumption Region. By Habel, R.S., and Campion, L.F., 1986.

*SR 143: Part I: Mineral Land Classification of the Greater Los Angeles Area: Description of the Mineral Land Classification Project of the Greater Los Angeles Area. By Anderson T. P., Loyd, R.C., Clark, W.B., Miller, R.M., Corbaley, R., Kohler, S.L., and Bushnell, M.M., 1979.

*SR 143: Part II: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Fernando Valley Production-Consumption Region. By Anderson T.P., Loyd, R.C., Clark, W.B., Miller, R.M., Corbaley, R., Kohler, S.L., and Bushnell, M.M., 1979.

*SR 143: Part III: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Orange County-Temescal Valley Production-Consumption Region. By Miller, R.V., and Corbaley, R., 1981.

*SR 143: Part IV: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Gabriel Valley Production-Consumption Region. By Kohler, S.L., 1982.

*SR 143: Part V: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Saugus-Newhall Production-Consumption Region and Palmdale Production-Consumption Region. By Joseph, S.E, Miller, R.V., Tan, S.S., and Goodman, R.W., 1987.

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*SR 143: Part VII: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region. By Miller, R.V., 1987.

*SR 145: Part I: Mineral Land Classification of Ventura County: Description of the Mineral Land Classification Project of Ventura County. By Anderson, T.P., Loyd, R.C., Kiessling, E.W., Kohler, S.L., and Miller, R.V., 1981.

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*SR 146: Part I: Mineral Land Classification: Project Description: Mineral Land Classification for Construction Aggregate in the San Francisco-Monterey Bay Area. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part II: Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part III: Mineral Land Classification: Aggregate Materials in the North San Francisco Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part IV: Mineral Land Classification: Aggregate Materials in the Monterey Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 147: Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region. By Cole, J.W., 1988.

*SR 153: Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region. By Kohler, S.L., and Miller, R.V., 1982.

SR 156: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production-Consumption Region. By Dupras, D.L., 1988.

*SR 158: Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region. By Cole, J.W., and Fuller, D.R., 1986.

*SR 159: Mineral Land Classification: Aggregate Materials in the Palm Springs Production-Consumption Region. By Miller, R.V., 1987.

*SR 160: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region. By Jensen, L.S., and Silva, M.A., 1989.

*SR 162: Mineral Land Classification: Portland Cement Concrete Aggregate and Active Mines of All Other Mineral Commodities in the San Luis Obispo-Santa Barbara Production-Consumption Region. By Miller, R.V., Cole, J.W., and Clinkenbeard, J.P., 1989.

SR 164: Mineral Land Classification of Nevada County, California. By Loyd, R.C., and Clinkenbeard, J.P., 1990.

*SR 165: Mineral Land Classification of the Temescal Valley Area, Riverside County, California. By Miller, R.V., Shumway, D.O., and Hill, R.L., 1991.

SR 173: Mineral Land Classification of Stanislaus County, California. By Higgins, C.T., and Dupras, D.L., 1993.

SR 198: Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Palm Springs Production-Consumption Region, Riverside County, California. Busch, L.L., 2007.

SR 199: Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region, San Joaquin and Stanislaus Counties, California. Smith, J.D. and Clinkenbeard J.P., 2012.

SR202 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Claremont-Upland Production-Consumption Region, Los Angeles and San Bernardino Counties, California. Miller, R.V. and Busch, L.L., 2007.

SR 205 Update of Mineral Land Classification of Aggregate Resources in the North San Francisco Bay P-C Region: Sonoma, Napa, and Marin Counties and Southwestern Solano County, California. Miller, R.V. and Busch, L.L., 2013

SR 206 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the San Bernardino Production-Consumption Region, San Bernardino and Riverside Counties, California. Miller, R.V. and Busch, L.L., 2008.

SR 209 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the San Gabriel Valley Production-Consumption Region, Los Angeles County, California. Kohler, S.L., 2010.

SR 210 Update of Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region, Kern County, California. Busch, L.L., 2009.

SR 215 Update of Mineral Land Classification: Aggregate Materials in the San Luis Obispo-Santa Barbara Production-Consumption Region, California. Busch, L.L. and Miller, R.V., 2011.

SR 231 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Temescal Valley Production Area, Riverside County, California. Miller, R.V. and Busch, L.L., 2014.

SR 240 Update of Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Western San Diego County Production-Consumption Region, California. Gius, F.W., Busch, L.L., and Miller, R.V. 2017.

* These Mineral Land Classification reports have been updated and are not shown on the index map (lower left-hand corner of Map Sheet 52).

OPEN-FILE REPORTS

OFR 92-06: Mineral Land Classification of Concrete Aggregate Resources in the Barstow-Victorville Area. By Miller, R.V., 1993.

OFR 93-10: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part I - Ventura County. By Miller, R.V., 1993.

OFR 94-14: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part II - Los Angeles County. By Miller, R.V., 1994.

OFR 94-15: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part III - Orange County. By Miller, R.V., 1995.

OFR 95-10: Mineral Land Classification of Placer County, California. By Loyd, R.C., 1995.

OFR 96-03: Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region. By Kohler-Antablin, S.L., 1996.

*OFR 96-04: Update of Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region. By Miller, R.V., 1996.

OFR 97-01: Mineral Land Classification of Concrete Aggregate Resources in the Tulare County Production-Consumption Region, California. By Taylor, G.C., 1997.

OFR 97-02: Mineral Land Classification of Concrete-Grade Aggregate Resources in Glenn County, California. By Shumway, D.O., 1997.

OFR 97-03: Mineral Land Classification of Alluvial Sand and Gravel, Crushed Stone, Volcanic Cinders, Limestone, and Diatomite within Shasta County, California. By Dupras, D.L, 1997.

OFR 99-01: Update of Mineral Land Classification: Aggregate Materials in the Monterey Bay Production-Consumption Region, California. By Kohler-Antablin, S.L., 1999.

OFR 99-02: Update of Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region, California. By Youngs, L.G. and Miller, R.V., 1999.

OFR 99-08: Mineral Land Classification of Merced County, California. By Clinkenbeard, J.P., 1999.

OFR 99-09: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Clay Resources in Sacramento County, California. By Dupras, D.L., 1999.

OFR 2000-03: Mineral Land Classification of El Dorado County, California. By Busch, L. L., 2001

OFR 2000-18: Mineral Land Classification of Concrete-Grade Aggregate Resources in Tehama County, California. By Foster, B.D., 2001

* These Mineral Land Classification reports have been updated and are not shown on the index map (lower left-hand corner of Map Sheet 52).

CALIFORNIA GEOLOGICAL SURVEY

AGGREGATE SUSTAINABILITY IN CALIFORNIA

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves

By

John P. Clinkenbeard (PG #4731)
and Fred W. Gius (PG #7788)

2018

Contributions By:
Matt O'Neal, Joshua Goodwin
and Lawrence L. Busch

GIS Design and Map Layout By:
Milton Fonseca

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves*

The pie charts show the projected 50-year demand for aggregate as of January 2017 compared to currently permitted aggregate reserves (in short tons). The 50-year demand for a particular study area is graphically represented by one of four pie diagram sizes. Study area boundaries are shown on the index map of aggregate studies (lower left).

** Permitted aggregate reserves are those portions of the resources for which local lead agencies (counties and cities) have issued mining permits. Non-permitted aggregate resource information is given in each aggregate study report. See accompanying text for references to these reports.*

LEGEND

50-year demand that will not be met by existing permitted reserves.
Permitted aggregate reserves.

50-year demand is < 200 million tons.

50-year demand is > 200 to 500 million tons.

50-year demand is > 500 to 800 million tons.

50-year demand is more than 800 million tons.

Examples

50-year demand for aggregate is 100 million tons; permitted reserves total 25 million tons of the 50-year demand.
25/100 Million Tons (permited reserves/ 50-year demand)
11 to 20 Years (years of permitted reserves remaining)

50-year demand for aggregate is 510 million tons; permitted reserves are greater than or equal to the 50-year demand.
550/510 Million Tons (permited reserves/ 50-year demand)
More Than 50 Years (years of permitted reserves remaining)

Areas With Short Term Aggregate Supply

< 10 years of permitted reserves remaining in the study area.

Aggregate Production Areas
(Symbols represent one or more aggregate mines, tonnage represents 2016 annual production)

- < 0.5 Million Tons per Year
- > 0.5 - 1.5 Million Tons per Year
- > 1.5 - 3 Million Tons per Year
- > 3 - 5 Million Tons per Year
- > 5 Million Tons per Year

Population

1 Dot = 100 Persons
(based on 2010 Census Data)

- City
- Interstate Route
- U.S. Route
- State Route
- Primary Highway
- Secondary Highway
- County Boundary
- River
- Lake/ Ocean

N

0 10 20 40 60 Miles
0 20 40 80 Kilometers

Scale: 1:1,100,000
Projection: Teale Albers
Datum: NAD 83

Map Usage and Limitations

This map is intended to provide general information about the current availability of California's permitted construction aggregate reserves to state, regional, and local land-use planners and decision-makers. It is designed to assist planning agencies in considering construction aggregate needs in the regional planning process. However, the map is not intended to be used as the sole source of information about construction aggregate availability, or as the basis for site-specific land-use decisions. Although the statewide and regional information on this map may be useful to local decision-makers, the more detailed information contained in the referenced aggregate studies should be used for local land-use decision-making purposes.

Shasta County
49/82 Million Tons
31 to 40 Years

Tehama County
30/49 Million Tons
31 to 40 Years

Glenn County
22/41 Million Tons
21 to 30 Years

Yuba City-Marysville
679/344 Million Tons
More Than 50 Years

Nevada County
52/41 Million Tons
More Than 50 Years

Placer County
387/188 Million Tons
More Than 50 Years

El Dorado County
15/82 Million Tons
11 to 20 Years

Sacramento-Fairfield
109/295 Million Tons
21 to 30 Years

Sacramento County
327/724 Million Tons
21 to 30 Years

North San Francisco
263/492 Million Tons
21 to 30 Years

Stockton Lodi
203/409 Million Tons
21 to 30 Years

South San Francisco
506/1,320 Million Tons
21 to 30 Years

Stanislaus County
39/160 Million Tons
11 to 20 Years

Merced County
61/154 Million Tons
21 to 30 Years

Monterey Bay
297/333 Million Tons
41 to 50 Years

Fresno
556/305 Million Tons
More Than 50 Years

Tulare County
53/130 Million Tons
21 to 30 Years

Bakersfield
1,708/338 Million Tons
More Than 50 Years

San Luis Obispo-Santa Barbara
58/226 Million Tons
11 to 20 Years

Palmdale
163/569 Million Tons
11 to 20 Years

Barstow Victorville
117/163 Million Tons
31 to 40 Years

Claremont-Upland
90/202 Million Tons
21 to 30 Years

San Bernardino
156/939 Million Tons
11 to 20 Years

Ventura County
84/241 Million Tons
11 to 20 Years

Palm Springs
163/238 Million Tons
31 to 40 Years

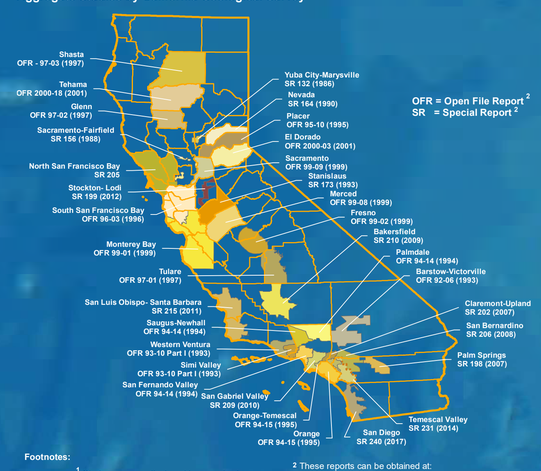
San Fernando Valley-Saugus Newhall
17/387 Million Tons
10 or Fewer Years

San Gabriel Valley
297/751 Million Tons
21 to 30 Years

Temescal Valley-Orange County
862/1,079 Million Tons
41 to 50 Years

Western San Diego County
265/763 Million Tons
11 to 20 Years

Aggregate Studies by California Geological Survey[1]



OFR = Open File Report[2]
SR = Special Report[2]

Footnotes:

[1] Study areas are displayed in several colors for clarity purposes.

[2] These reports can be obtained at:
Geologic Information and Publications
California Geological Survey
801 K Street, MS 14-34
Sacramento, CA 95814-3532
Tel: (916) 327-1850

Or visit our website:
http://www.conservation.ca.gov/

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SPECIAL REPORT 206

UPDATE OF MINERAL LAND CLASSIFICATION FOR PORTLAND CEMENT CONCRETE-GRADE AGGREGATE IN THE SAN BERNARDINO PRODUCTION-CONSUMPTION REGION, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

2008

CALIFORNIA GEOLOGICAL SURVEY
Department of Conservation

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ARNOLD SCHWARZENEGGER
GOVERNOR

THE RESOURCES AGENCY
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SECRETARY FOR RESOURCES

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SPECIAL REPORT 206

UPDATE OF MINERAL LAND CLASSIFICATION FOR PORTLAND CEMENT CONCRETE-GRADE AGGREGATE IN THE SAN BERNARDINO PRODUCTION-CONSUMPTION REGION, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

By

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2008

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Plate 3. Updated Aggregate Resource Sector Map for Portland Cement Concrete-Grade Aggregate in the Southern San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

EXECUTIVE SUMMARY

This report updates information presented in a classification report on portland cement concrete-grade (PCC) aggregate in the San Bernardino Production-Consumption (P-C) Region first published in 1984. That report was published by the California Department of Conservation's Division of Mines and Geology (now California Geological Survey) as Special Report 143, Part VII (SR 143, Part VII) – *Mineral Land Classification of the Greater Los Angeles Area, Part VII, Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region* (Miller, 1984).

Sand and gravel deposits having material suitable for use as PCC aggregate are classified in this update report. Deposits suitable for lower grades of aggregate use, such as asphaltic aggregate, base, subbase, and fill were not considered in this classification process because of their general abundance in the San Bernardino P-C Region. However, all of the mines that produce PCC aggregate in the region also produce lower grades of aggregate.

SR 143, Part VII assisted the State Mining and Geology Board (Board) in a subsequent process called *designation*. Designation is the formal recognition by the Board of lands containing mineral resources of regional or statewide significance that are needed to meet the demands of the future. The Board's designation of lands in the San Bernardino P-C Region was published in 1987 as SMARA Designation Report No. 5 (California Department of Conservation, 1987). This update classification report does not change that designation.

In this update report, the following conclusions are reached:

- The permitted reserves are projected to last until the year 2024, 16 years from the present (2008).
- Two new areas, Sectors J and K, are identified. Sector J contains a total of 334 million tons of additional aggregate resources. The resource figure for Sector K is proprietary.
- About 18 percent, or 4,427 acres, of the 24,656 acres of lands designated by the Board in 1987 has been lost to land uses incompatible with mining. This equates to 959 million tons of PCC-grade aggregate resources lost.
- The anticipated consumption of aggregate in the San Bernardino P-C Region for the next 50 years (through the year 2057) is estimated to be 1,131 million tons, of which 735 million tons must be PCC quality. This is more than twice the previous 50-year projection.
- There remain an estimated 5,986 million tons of unpermitted PCC-grade aggregate resources in the San Bernardino P-C Region.
- From 1987 to 2007, about 109 million tons of new PCC-grade aggregate reserves have been permitted.

PART I - INTRODUCTION

In 1984, a report titled "Mineral Land Classification of the Greater Los Angeles Area, Part VII, Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region" (Miller, 1984 – second printing in 1987) was published by the California Division of Mines and Geology (predecessor to the California Geological Survey or "CGS"). It is referred to in this update report as SR 143, Part VII. In SR 143, Part VII, a part of southwestern San Bernardino County and a part of eastern Riverside County were classified for portland cement concrete-grade (PCC) aggregate (see Figure 1). The region is covered by all or part of 26 U.S. Geological Survey 7-1/2 minute quadrangle maps as shown on Figure 2.

Subsequent to the publication of SR 143, Part VII, and completion of an Environmental Impact Report (California Department of Conservation, 1985) the State Mining and Geology Board (Board) designated approximately 40 square miles of land within the San Bernardino Production-Consumption (P-C) Region as having mineral resources of statewide or regional significance (California Department of Conservation, 1987).

This report presents a reevaluation and update of SR 143, Part VII, and a review of the areas designated by the Board, for the benefit of local lead agencies in the San Bernardino P-C Region (see Table 1 for a list of lead agencies). This report is intended as an update to and not a replacement for SR 143, Part VII. In addition, this report does not alter the previous designation of lands in the San Bernardino P-C Region.

BACKGROUND

SR 143, Part VII and this update were produced by the State Geologist as specified by the Surface Mining and Reclamation Act (SMARA) of 1975. SMARA was passed by the California State Legislature in response to the loss of significant mineral resources due to urban expansion, the need for current information concerning the location and quantity of essential mineral deposits, and to ensure adequate mined-land reclamation. To address mineral resource conservation, SMARA mandated a two-phase process called *classification-designation*.

The objective of the classification-designation process is to ensure, through appropriate local lead agency policies and procedures, that mineral materials will be available when needed and do not become inaccessible as a result of inadequate information during the land-use decision-making process.

SMARA mandates that the Board develop guidelines for mineral land classification. The Board adopted SMARA guidelines on June 30, 1978 and revised them in 2000. The guidelines are available on the California Department of Conservation website at http:/www.consrv.ca.gov/SMGB/Guidelines/ClassDesig.pdf.

The guidelines require the State Geologist to classify specified areas into Mineral Resource Zones (MRZs). The guidelines also require that classification reports for construction aggregate resources include the following additional information: (1) the location and estimated total

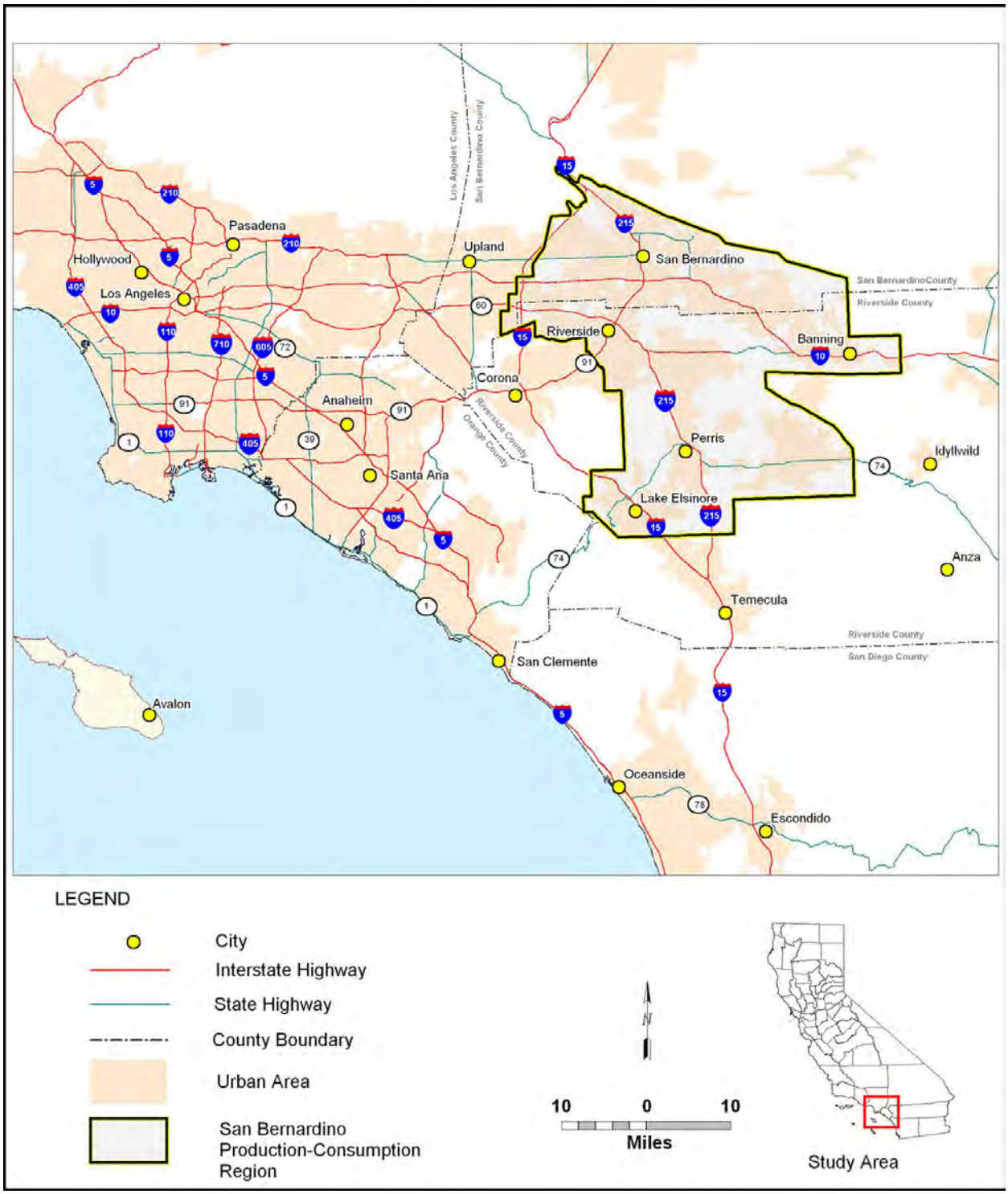


Figure 1. General location map of the San Bernardino P-C Region.

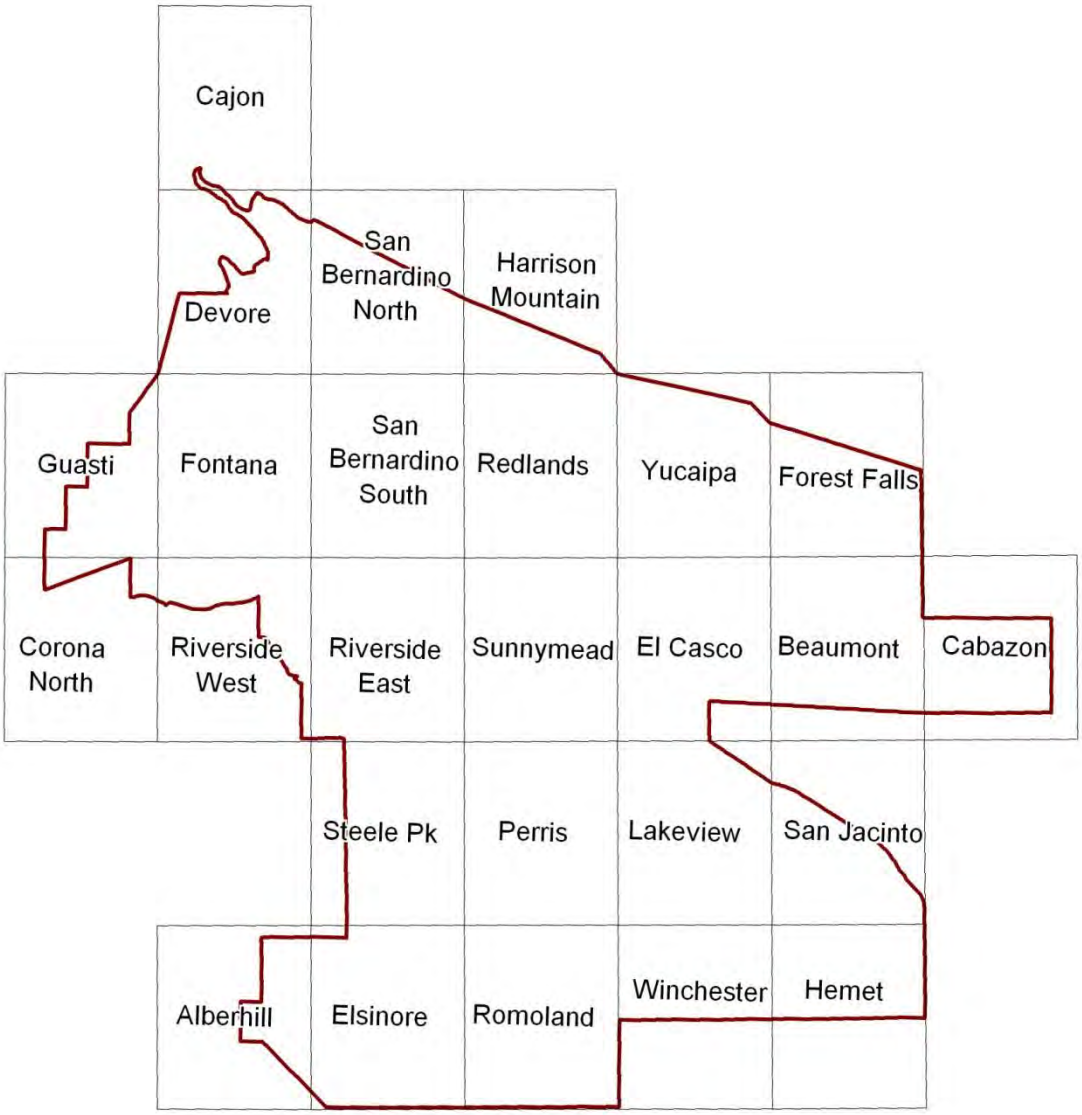


Figure 2. Index map of U.S. Geological Survey 7-1/2 minute quadrangles covering the San Bernardino P-C Region

quantity of construction aggregate in areas with land-uses compatible with potential mining; (2) limits of the market area that these potential resources would supply; and (3) an estimate of the total quantity of aggregate material that will be needed to supply the area for the next 50 years.

Table 1. Lead agencies in the San Bernardino P-C Region (county and incorporated city governments).

LEAD AGENCY	Lead agencies with active aggregate operations within their jurisdiction	Lead agencies with land designated for PCC-grade aggregate within their jurisdiction
County of San Bernardino	*	*
City of Colton		*
City of Fontana		*
City of Grand Terrace		
City of Highland	*	*
City of Loma Linda		
City of Ontario		*
City of Rancho Cucamonga		*
City of Redlands	*	*
City of Rialto	*	*
City of San Bernardino	*	*
City of Yucaipa		
County of Riverside	*	*
City of Banning	*	*
City of Beaumont		
City of Calimesa		
City of Canyon Lake		
City of Hemet		
City of Lake Elsinore		*
City of Moreno Valley		
City of Perris		
City of Riverside		*
City of San Jacinto		

OVERVIEW OF CLASSIFICATION

The classification of construction aggregate resources involves the six distinct but interrelated steps that are listed below.

1. Determination of Study Boundary: Study areas may be a county, a portion of a county, or a P-C region that may contain parts of one or more counties. P-C regions were selected such that the majority (95 percent) of the construction aggregate produced in the region is consumed in the region. (See explanation following this list).

2. Establishment of Mineral Resource Zones (MRZs): Based on geologic appraisals, lands within the study area were classified in SR 143, Part VII as MRZ-1, MRZ-2, or MRZ-3. In this update report, this MRZ classification has been retained and is shown on Plate 1. This classification system is discussed in Part II of this report. The geologic appraisals include a study of pertinent geologic reports and maps, and field investigations of geologic units exposed in outcrops and at active and inactive mines and quarries.

3. Identification of Sectors: Lands known to contain significant aggregate resources (areas classified as MRZ-2 in Step 2 above) are evaluated to determine if current uses of these lands preclude mining. Areas currently permitted for mining and areas found to have land uses compatible with possible mining are identified as *Sectors* (Plates 2 and 3).

4. Calculation of Resource Tonnages within Sectors: Investigation and analysis of on-site conditions, measurement of the areal extent of deposits, drill-hole information, waste-material percentages, and deposit densities are used to calculate total tonnages of aggregate reserves (deposits in land owned or controlled by an aggregate producer and permitted for mining) and resources (all deposits of aggregate, including the permitted reserves) within each Sector.

5. Forecast of 50-Year Needs and the Life Expectancy of Current Reserves: The total tonnage of aggregate needed to satisfy the estimated demand in the study area over the next 50 years is based on multiplying the projected population over that period with the average annual per-capita rate of total aggregate consumption from 1981 to the time of the study. Results of this forecast are used to determine the life expectancy of the study area's current reserves.

6. Identification of Alternative Resources: Alternative sources of aggregate are identified and briefly discussed.

When the determination of the study boundary for the San Bernardino P-C Region originally was made in the early 1980s, the region consumed at least 95 percent of the aggregate produced within the region. Since then, marketing patterns have changed so that this is no longer true. Based on discussions with aggregate operators, it is estimated that approximately 70 percent of the region's aggregate production in 2007 was exported beyond the P-C Region boundary. A small part of this may have been offset by imports from the neighboring Claremont-Upland P-C Region. There are two factors that have led to this increase in inter-regional aggregate

commerce. The depletion of aggregate reserves in large areas such as Orange County and northern San Diego County have increased exports to those regions, and consolidation of ownership may have led to longer hauls to company-owned concrete batch plants outside of the P-C region. Also, aggregate is being transported by rail from the San Bernardino P-C Region to the San Gabriel P-C Region.

Classification of the San Bernardino P-C Region was done with regard to the suitability of the material for use in PCC aggregate. Materials suitable only for asphaltic aggregate, base, subbase, and fill were not classified because of their abundance in the region.

OVERVIEW OF DESIGNATION

This update report contains the classification step of the two-phase process provided by SMARA. The designation phase follows the receipt and acceptance of this classification report by the Board. Designation is the formal recognition by the Board, after consultation with lead agencies and other interested parties, of areas containing mineral deposits of regional or statewide economic significance. Procedures for the designation of lands containing significant mineral deposits are specified in Section II.2 of the Board's Guidelines for Classification and Designation of Mineral Lands (http:/www.consrv.ca.gov/SMGB/Guidelines/ClassDesig.pdf).

The Board previously designated lands in the San Bernardino P-C Region in a report titled "Designation of Regionally Significant Construction Aggregate Resource Areas in the Claremont-Upland and San Bernardino Production-Consumption Regions: SMARA Designation Report No. 5" (California Department of Conservation, 1987). This update report reviews the current land uses of the previously designated areas, but does not alter that designation.

LEAD AGENCY RESPONSE TO CLASSIFICATION

The Board, upon receipt of the classification information from the State Geologist, transmits the classification report to the appropriate lead agencies and makes it available to other interested parties. Within 12 months of receipt of the report, each lead agency must develop and adopt mineral resource management policies to be incorporated in its general plan. These policies will:

1. Recognize the mineral land classification information, including the classification maps transmitted to the lead agency by the Board.

2. Emphasize the conservation and development of the identified mineral deposits.

Lead agencies that have jurisdiction within the San Bernardino P-C Region are shown in Table 1. The information in this update and the revised projection of aggregate needs in the region should be used by the lead agencies in evaluating the effectiveness of their current mineral resource management policies and in planning for future construction aggregate demands in their jurisdictions. These plans should be updated if necessary.

PART II - MINERAL LAND CLASSIFICATION OF AGGREGATE IN THE SAN BERNARDINO P-C REGION

This section of the report contains information concerning the location, quality, and quantity of aggregate resources in the San Bernardino P-C region.

MINERAL RESOURCE ZONES

As set forth in Section 2761 (b) of SMARA, the State Geologist shall classify land solely on the basis of geologic factors and without regard to existing land use. Areas subject to mineral land classification studies are divided by the State Geologist into various Mineral Resource Zone (MRZ) categories that reflect varying degrees of mineral resource potential. When SR 143, Part VII was written, the nomenclature for mineral land classification consisted of four categories—MRZ-1, MRZ-2, MRZ-3, and MRZ-4. Since then, the nomenclature has been expanded to include subdivisions of the MRZ-2 and MRZ-3 categories into "a" and "b" subcategories, as explained in the Board's Guidelines for Classification and Designation of Mineral Lands under Section I, part 3. The original categories for mineral land classification were retained for this update report. Following is a brief description of the three MRZ categories used in this update report (MRZ-4 is not used):

MRZ-1: Areas where available geologic information indicates that little likelihood exists for the presence of significant mineral resources.

MRZ-2: Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists. This zone shall be applied to known mineral deposits or where well-developed lines of reasoning, based upon economic-geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRZ-3: Areas containing known or inferred mineral occurrences of undetermined mineral resource significance.

CLASSIFICATION CRITERIA

To be considered **significant** for the purpose of mineral land classification, a mineral deposit, or a group of mineral deposits that can be mined as a unit, must meet marketability and threshold value criteria adopted by the Board (California State Mining and Geology Board website). Threshold values are intended to indicate in a general way the approximate minimum size of a mineral deposit that will be considered significant for classification and designation. The threshold value criteria vary for different minerals depending on their uniqueness and commodity-type category. The Board determined threshold value of the first marketable product in 1998 dollars to be $1,250,000 for a metallic ore or rare mineral deposit, $2,500,000 for an industrial mineral deposit other than construction aggregate, and $12,500,000 for a construction aggregate deposit. In order to adjust these threshold values to reflect 2008 dollars, each value

was multiplied by an inflation factor of 1.34. This factor was determined by dividing the U.S. Department of Labor's (California Department of Finance website, 2008) estimated Consumer Price Index (CPI) for December, 2007 (219.6) by the CPI for 1998 (163.7). Threshold values in 2007 dollars (rounded to the nearest thousand) are as follows:

Metallic or rare mineral deposits	$ 1,675,000
Industrial minerals other than construction aggregate	$ 3,350,000
Construction aggregate	$ 16,750,000

Construction aggregate sells for about $13 per ton in the San Bernardino P-C Region; therefore, $16,750,000 equates to about 1.3 million tons of aggregate material.

REEVALUATION OF MINERAL LAND CLASSIFICATION FOR PCC-GRADE AGGREGATE IN THE SAN BERNARDINO P-C REGION

Analysis of new data obtained since the publication of SR 143, Part VII has resulted in two areas being reclassified from MRZ-3 to MRZ-2 for PCC-grade aggregate.

Areas Reclassified to MRZ-2 from MRZ-3 for PCC-Grade Aggregate

In this update report, 1,657 acres previously classified MRZ-3 for PCC-grade aggregate in SR 143, Part VII are reclassified as MRZ-2 for PCC. These areas are in the City of Fontana (Lytle Creek Fan) and in the north edge of the City of Lake Elsinore (Gavilan Hills) as shown on Plate 1.

Lytle Creek Fan (MRZ-2 PCC-1)

This area contains sand and gravel deposits that are part of the Lytle Creek alluvial fan, southwest of the mouth of Lytle Creek Canyon (Plate 1) and covers an area of 1,567 acres. Excavation for the Mid-Valley Sanitary Landfill has yielded new information on the quality of aggregate material in this area. Robertson's Ready Mix Concrete, Inc., has been selling material from this deposit for use as PCC-grade aggregate since 1999. Other parts of the Lytle Creek Fan were classified MRZ-2 in SR 143, Part VII and subsequently designated by the Board.

Gavilan Hills (MRZ-2 PCC-2)

The second area reclassified to MRZ-2 from MRZ-3 is a 90-acre crushed-stone deposit in the Gavilan Hills north of the City of Lake Elsinore. The rock material here is a granitic rock of the Peninsular Ranges Batholith known as tonalite. Pacific Aggregates, Inc., has been mining and selling this material as PCC-grade aggregate since 2006.

REEVALUATION OF PCC-GRADE AGGREGATE IN THE SAN BERNARDINO P-C REGION

A reevaluation of PCC-grade aggregate resources in the San Bernardino P-C Region is presented in this section of the report. The reevaluation was conducted on the basis of a quantitative evaluation of suitable PCC-grade aggregate resources classified as MRZ-2.

Concepts Used in Identifying Aggregate Resource Sectors

The State Geologist is responsible for identifying and calculating the amount of aggregate resources contained in areas classified as MRZ-2. Recognizing that there are lands within these areas that have already been urbanized, and therefore the mineral resources within them have a limited opportunity for conservation, development, and utilization, the State Geologist further limits the aggregate resource calculations to areas within "Sectors."

Sectors are areas that have been classified as MRZ-2 by the State Geologist, and that have current land uses deemed compatible with potential mining based on criteria provided by the Board. Compatible land uses are defined as those that are non-urbanized or that have very low-density residential developments (one dwelling unit per ten acres or less), land without high-cost improvements, and land used for agriculture, grazing, or open space. Urbanization and/or incompatible land uses are defined as improvements of high cost, such as high-density residential developments, intensive industrial developments, commercial developments, and major public facilities.

Mineral land classification, which is done without regard for current land use, results in a delineation of the resource areas on maps; but this by itself does very little to put into perspective the resource base that is available to meet the future needs of a region. Sectors are used to focus the attention of land-use planners and local governments on the areas that remain accessible for mineral extraction. The State Geologist calculates the available resources of each Sector and identifies the amount of remaining resources that have been permitted for mining. Resources that have been permitted for mining are termed "reserves." The calculated reserves and resources of all the Sectors within a P-C Region are compared with the State Geologist's forecast of the 50-year needs of that P-C Region for the particular mineral resource.

Each Sector, or group of Sectors, meets or exceeds the Board's threshold value, and each Sector may be considered for designation as an area of regional or statewide significance by the Board pursuant to SMARA. The Board only considers areas in Sectors for designation.

For this update, the determination of land use as non-urbanized was based on conditions of the lands as of December 2007. The land use was determined by reference to satellite imagery, field reconnaissance, and consultation with local planners.

The Board's criteria for creating Sectors focuses on the apparent suitability of the land for mining and does not take into consideration land commitments (other than approved tracts or Specific Plans) that may have been made that restrict the accessibility of some of the Sectors for mining. It is possible, therefore, that the available resource base as calculated by the State Geologist may be overestimated.

Calculation of Available Resources

The resource estimates presented in this section are limited to those remaining aggregate resources identified in the Sectors designated by the Board (California Department of Conservation, 1987) and two newly identified resource Sectors. Some Sectors are subdivided

into numbered subsectors to recognize the location of existing highways, canals, bridges, power lines, pipelines, etc., to allow for more realistic resource tonnage calculations.

Resource tonnage calculations for this report were made by assuming that the tonnage of resources lost was proportional to the area lost to urban development in each sector. The factors used in this report to determine the areal extent and tonnage of PCC-grade aggregate resources remaining within the designated Sectors are the same as those used in SP 143, Part VII and listed in that report under the descriptions for individual Sectors.

Resource tonnage calculations for this update report used area calculations from Geographic Information System (GIS) software. The calculations are current as of January 2008. Neither SR 143, Part VII or the designation report (California Department of Conservation, 1987) included the area calculations for individual subsectors.

Previously Designated Resource Sectors

In SR 143, Part VII, all lands in the San Bernardino P-C Region classified as containing significant aggregate resources (MRZ-2) and not precluded from mining by incompatible land uses, were divided into nine Sectors—A, B, C, D, E, F, G, H, and I, with Sectors A through G further subdivided into 111 subsectors. In 1987, the Board designated parts of Sectors A through G and all of Sectors H and I (California Department of Conservation, 1987). The areas of the designated Sectors were recalculated for this update using a GIS. The recalculated total is 24,656 acres. Only the Sectors designated in 1987 were retained in this report. Following is a brief summary of the designated Sectors, which are shown on Plates 2 and 3:

Sector A – Deposits of the Lytle Creek alluvial fan in and around the City of Fontana. Eighteen of the original 30 subsectors are currently designated to be of regional significance. These are Sectors A-4, A-6 through A-9, A-13 through A-19, A-23, A-24, and A-27 through A-30. The area and resources remaining in each Subsector are listed in the Appendix.

Sector B – Deposits of the Lytle Creek alluvial wash, northwest of and partly within the City of San Bernardino. Thirteen of the original 18 subsectors are currently designated to be of regional significance. These are Sectors B-1, B-2, B-5 through B-10, B-12, and B-14 through B17. The area and resources remaining in each Subsector are listed in the Appendix.

Sector C – Deposits of the Cajon Creek alluvial wash, immediately north of the confluence with Lytle Creek alluvial wash. Seven of the original 14 subsectors are currently designated to be of regional significance. These are Sectors C-1, C-3 through C-6, C-8, and C-10. The area and resources remaining in each Subsector are listed in the Appendix.

Sector D – Alluvial fan deposits in the central part of the San Bernardino Valley near the community of Mira Loma. Five of the original seven subsectors are currently designated to be of regional significance. These are Sectors D-2 through D-6. The area and resources remaining in each Subsector are listed in the Appendix.

Sector E – Deposits of alluvium in and near the Santa Ana River channel, downstream of the Interstate Highway 215 crossing to the upstream part of the Santa Ana River Wildlife Area. Fourteen of the original 24 subsectors are currently designated to be of regional significance. These are Sectors E-1, E-2, E-4, E-5, E-9, E-10, E-13, E-14, E-17, E-19, E-20, and E-22 through E-24. The area and resources remaining in each Subsector are listed in the Appendix.

Sector F – Deposits of alluvium of the Santa Ana River and its major tributaries upstream of Interstate Highway 215. Seventeen of the original 33 subsectors are currently designated to be of regional significance. These are Sectors F-1 through F-6, F-9, F-12, F-14 through F-18, F-20, F-23, F-32, and F-33. The area and resources remaining in each Subsector are listed in the Appendix.

Sector G – Deposits of alluvium in the San Gorgonio River channel and floodplain, east of the City of Banning. Both subsectors G-1 and G-2 are currently designated to be of regional significance. The area and resources remaining in these two subsectors are listed in the Appendix.

Sector H – Deposits of alluvium in the channel of Rice Canyon Creek and part of its fan, near the community of Alberhill in Riverside County. This Sector is currently designated to be of regional significance. The resources in this Sector have been depleted.

Sector I – Deposits of alluvium in the channel of McVickers Canyon Creek and part of its fan, northwest of the City of Lake Elsinore. This Sector is currently designated to be of regional significance. The resources in this Sector have been depleted or precluded from mining by urbanization.

Newly Identified Resource Sectors

This report describes two newly identified aggregate resource sectors covering an area of approximately 1,657 acres. The new areas are identified as Sector J (Plate 2), which contains 13 subsectors, and Sector K (Plate 3). These areas are described below and summarized in Table 2. These newly identified sectors are not currently designated, but may be considered for designation by the Board in the future.

<u>Lytle Creek Fan - Sector J (1,567 acres)</u>

Sector J is a newly identified area of significant PCC-grade aggregate resources on the Lytle Creek alluvial fan. Sector J includes the area of the Lytle Creek alluvial fan nearest the mouth of Lytle Creek, north of Highland Avenue and west of Riverside Avenue and is divided into 13 subsectors (J-1 through J13) by roads, a freeway, and power lines. The new information on aggregate quality in this area is derived from the excavation associated with the Mid-Valley Sanitary Landfill. The aggregate resources in Sector J are estimated to be 100 feet thick, have a density of .065 tons per cubic foot, and have a waste factor of 10 percent. It is estimated that Sector J contains approximately 334 million tons of PCC-grade aggregate resources. Robertson's Ready Mix Concrete, Inc. operates in subsectors J-12 and J-13.

Sector J-1 is between Lytle Creek Road and the Ontario Freeway (Interstate 15).

Sector J-2 is northwest of Lytle Creek Road in Section 13, T1N, R6W, SBBM.

Sector J-3 is a triangular area between Citrus Avenue, Duncan Canyon Road, and the Ontario Freeway (Interstate 15).

Sector J-4 is southeast of the Ontario Freeway (Interstate 15), in the west half of Section 18, T1N, R5W, SBBM.

Sector J-5 is southeast of the Ontario Freeway (Interstate 15), in the northeast 1/4 of Section 18, T1N, R5W, SBBM.

Sector J-6 is the largest of the subsectors in Sector J. It is north of Summit Avenue, between Citrus Avenue and Sierra Avenue.

Sector J-7 is east of the Ontario Freeway (Interstate 15), south of Duncan Canyon Road, west of Citrus Avenue, and north of a power line. It is in the northeast ¼ of Section 24, T1N, R6W, SBBM.

Sector J-8 is south of a power line that separates it from Sector J-7, in the northeast ¼ of Section 24, T1N, R6W, SBBM.

Sector J-9 is a rectangular area between Citrus Avenue and Catawba Avenue, north of Curtis Avenue and south of Summit Avenue, in the east ½ of the northeast ¼ of Section 25, T1N, R6W, SBBM.

Sector J-10 is a strip along the eastern side of Sierra Avenue, north of Windflower Avenue, in Sections 17, 20, and 29, T1N, R5W, SBBM.

Sector J-11 is in the northeast ¼ of Section 29, T1N, R5W, SBBM.

Sector J-12 is in the southeast ¼ of Section 19, T1N, R5W, SBBM.

Sector J-13 is south of State Route 210 Freeway, just east of the Rialto Municipal Airport in the east ½ of Section 34, T1N, R5W, SBBM.

Gavilan Hills – Sector K (90 acres)

Sector K is a newly identified 90-acre area within the granitic rocks of the Peninsular Ranges Batholith. It is north of Elsinore Lake, on the northeast corner of the Corona Freeway and Nichols Road. The area is the site of an active crushed-stone quarry operated by the Pacific Aggregates, Inc. The aggregate resources in this Sector are proprietary.

Aggregate Resources in the San Bernardino P-C Region

There are several factors that have changed the amount of PCC-grade aggregate resources in the San Bernardino P-C Region identified in SR 143, Part VII. There also have been changes since the designation in 1987. These factors include the newly identified aggregate resources summarized in Table 2, the designated lands lost to urbanization since 1987 listed in Table 3, and the commercial aggregate production since 1981. There was also significant non-commercial production of PCC-grade aggregate from Sector F-15 in the Santa Ana River Wash for use in the Seven Oaks Dam construction.

Newly identified unpermitted aggregate resources, in the areas reclassified from MRZ-3 to MRZ-2 (Sectors J described above), total 334 million tons. The permitted aggregate reserves in Sector J cannot be included due to confidentiality. The aggregate resource in Sector K is all under permit, and cannot be given.

Urban development has covered 4,427acres within designated Sectors, containing about 959 million tons of PCC-grade aggregate resources (see Table 3 and Plates 2 and 3). This has reduced the designated PCC-grade aggregate resources about 14 percent.

PCC-grade aggregate resources have also been reduced by production from commercial aggregate mines by 252 million tons.

Table 2. Sectors J and K acreages and aggregate resources.

Sector	Acres	Aggregate Resources (million tons)
J-1	65.0	13.9
J-2	32.9	6.7
J-3	37.6	7.9
J-4	91.1	20.4
J-5	29.6	6.1
J-6	755.3	185.5
J-7	48.3	10.3
J-8	44.3	9.5
J-9	63.2	14.9
J-10	196.7	49.4
J-11	76.6	P
J-12	89.5	P
J-13	36.4	9.3
K	89.9	P
Totals	1,656.4	333.9

P - Sector contains reserves that are proprietary and are not added to total.

The construction of the Seven Oaks Dam used 23.6 million tons of aggregate from Sector F-15. This resource figure listed in Table 4 and the Appendix for Sector F-15 has been reduced by this amount.

As shown in Table 4, there are now 5,986 million tons of PCC-grade aggregate resources identified in the San Bernardino P-C Region.

The PCC-grade aggregate reserves (permitted resources) have decreased to 287 million tons from 430 million tons—as given in SR 143, Part VII (see Table 4). The 287 million tons of present reserves includes 109 million tons of reserves permitted since 1987.

Table 3. PCC-grade aggregate resources lost to incompatible land uses, 1987 to 2008. Only those Sectors or subsectors with areas lost to incompatible land uses are listed in this table. A complete listing of subsectors is in the Appendix.

Sector	Acres Designated in Sector in 1987	Acres Lost to Incompatible Uses	Resources Lost (million tons)
A-4	808.5	447.2	92.5
A-6	92.1	92.1	21.5
A-7	813.7	504.1	130.6
A-8	513.2	441.8	126.0
A-9	350.4	251.0	74.9
A-13	291.8	231.7	74.9
A-15	57.9	57.9	14.9
A-16	28.3	12.3	3.0
A-17	24.3	9.5	2.2
A-18	39.5	39.5	9.2
A-19	93.6	7.8	1.4
A-23	74.8	74.8	17.0
A-24	46.3	46.3	4.3
A-27	44.6	44.6	4.0
A-28	214.8	214.8	13.6
B-6	97.0	37.7	2.1
B-7	189.3	40.9	10.2
B-12	12.5	12.5	0.9
B-16	8.2	8.2	0.6
B-17	8.4	8.4	0.3
C-4	58.8	28.4	5.2
C-10	50.0	36.5	3.7
D-2	120.6	120.6	9.0
D-3	269.7	269.7	19.5
D-4	69.5	69.5	7.8
D-5	91.2	91.2	7.0
D-6	72.2	72.2	5.3
E-4	50.9	50.9	8.9
E-10	641.3	45.2	4.7
E-13	281.2	12.3	1.3
E-24	207.5	93.8	13.7

Table 3. (Continued)

Sector	Acres Designated in Sector in 1987	Acres Lost to Incompatible Uses	Resources Lost (million tons)
F-1	48.1	48.1	4.7
F-2	125.4	45.6	2.9
F-3	34.8	16.4	8.3
F-4	134.5	134.5	50.0
F-5	13.4	13.4	1.8
F-6	150.4	19.7	8.3
F-12	54.0	54.0	3.2
F-14	1,140.0	68.9	48.7
F-15	5,493.0	272.2	121.2
F-16	87.2	1.8	0.4
F-17	38.5	2.3	0.4
F-23	151.8	20.4	3.0
I	318.8	255.9	16.1
Totals	**13,512.0**	**4,426.6**	**959.2**

Table 4. Summary of PCC-grade aggregate resources and reserves in the San Bernardino P-C Region in 2008.

Sector	Resources In 2008 (million tons)	Reserves (Permitted Resources) In 2008 (million tons)
A	269.5	0
B	897.6	P
C	615.4	P
D	0	0
E	281.2	0
F	3,476.4	P
G	355.0	P
H	†	0
I	†	0
J††	334	P
K††	P	P
Subtotal*	**6,238**	
Production since 1981	**-252**	
Totals	**5,986**	**287**

P Sector contains reserves that are proprietary.
† Remainder of resources mined out.
†† Newly identified Sector (not designated).
*This subtotal is different than the column total to conceal more than one proprietary figure as provided by PRC 2207(g).

PART III – AGGREGATE PRODUCTION IN THE SAN BERNARDINO P-C REGION

As of January 2008, the following four companies operated nine mines producing PCC-grade aggregate in the San Bernardino P-C Region:

- Cemex (two mines)
- Pacific Aggregates, Inc.
- Robertson's Ready Mix Concrete, Inc. (five mines)
- Vulcan Materials Company

Following are brief descriptions of the above company operations:

Cemex operates the Lytle Creek Quarry in Lytle Creek Wash, south of Interstate Highway 15, and the Redlands Pit in the Santa Ana River Wash, mostly in the City of Redlands and partly in the City of Highland.

Pacific Aggregates, Inc. is quarrying granitic rock from a hillside north of Lake Elsinore. This quarry is known as the Nichols Canyon Mine.

Robertson's Ready Mix Concrete, Inc. owns the 4th Street Rock Crusher operation in the Lytle Creek flood control channel and the Old Webster Quarry in the upper Santa Ana River wash in the City of Highland. The company also has two mines along the San Gorgonio River; one in the City of Banning (Banning Pit) and the other near the community of Cabazon (Cabazon Pit). The company's newest mine involves the removal of material in conjunction with the Mid-Valley Landfill on the Lytle Creek alluvial fan in the City of Rialto.

Vulcan Materials Company, Western Division's Cajon Creek Pit began operation in 1998. The mine is in the Cajon Creek Wash, south of Interstate Highway 15. The project covers 1,392 acres, of which 606 acres will be mined.

AGGREGATE PRODUCTION DATA

PCC-grade aggregate production data for the San Bernardino P-C Region from 1981 to 1990 were collected from records of the U.S. Department of the Interior's Bureau of Mines (now part of the U.S. Geological Survey) and from the aggregate producers. The U.S. Bureau of Mines' records were compiled from responses to voluntary questionnaires sent annually, or biennially, to all known mine operators. Each producer was requested to divulge the production from each of their producing properties for the preceding year. The accuracy of these figures depends on the accuracy of the producers' responses. For the years 1991 through 2006, annual mine production data from the California Department of Conservation's Office of Mine Reclamation were used. As shown in Table 5 and Figure 3, PCC-grade aggregate production in the San Bernardino P-C Region has increased from 3.9 million tons in 1981 to 19.5 million tons in 2006—the last year production figures are available.

Table 5. Population, aggregate production, and per capita consumption in the San Bernardino P-C Region during the years 1981 through 2006.

YEAR	POPULATION	AGGREGATE PRODUCTION (tons*)	PER CAPITA CONSUMPTION (tons)
1981	748,832	3,876,000	5.2
1982	775,693	3,333,000	4.3
1983	801,491	3,154,000	3.9
1984	829,321	5,071,000	6.1
1985	863,843	3,774,000	4.4
1986	907,707	8,361,000	9.2
1987	960,915	5,650,000	5.9
1988	1,023,302	12,172,000	11.9
1989	1,093,438	12,065,000	11.0
1990	1,171,271	12,297,000	10.5
1991	1,260,165	7,403,000	5.9
1992	1,298,262	7,700,000	5.9
1993	1,319,372	7,666,000	5.8
1994	1,333,405	6,933,000	5.2
1995	1,352,146	6,307,000	4.7
1996	1,366,154	7,562,000	5.5
1997	1,389,652	8,152,000	5.9
1998	1,425,498	8,932,000	6.3
1999	1,463,152	9,765,000	6.7
2000	1,497,294	11,784,000	7.9
2001	1,534,859	13,149,000	8.6
2002	1,585,046	14,696,000	9.3
2003	1,640,385	17,240,000	10.5
2004	1,701,269	16,396,000	9.6
2005	1,761,551	18,785,000	10.7
2006	1,819,037	19,656,000	10.8
		Total: 251,879,000	**Average: 7.4**

***Aggregate production figures are rounded to nearest 1000 tons.**

PART IV – UPDATED ESTIMATE OF 50-YEAR CONSUMPTION OF AGGREGATE IN THE SAN BERNARDINO P-C REGION

The Board, as specified in its guidelines for classification and designation of mineral land (California State Mining and Geology Board), requires that mineral land classification reports for regions containing construction materials classified as MRZ-2 include "An estimate of the total quantity of each such construction material that will be needed to supply the requirements of both the county and the marketing region in which it occurs for the next 50 years. The marketing region is defined as the area within which such material is usually mined and marketed. The amount of each construction material mineral resource needed for the next 50 years shall be projected using past consumption rates adjusted for anticipated changes in market conditions and mining technology." This section contains the revised estimate of aggregate needs for the San Bernardino P-C Region, forecasted to the year 2057.

CORRELATION BETWEEN AGGREGATE PRODUCTION AND POPULATION

Past studies of production-consumption regions in California have shown a correlation between the amount of aggregate consumed and the population of the market area (Anderson and others, 1979). An aggregate report for Los Angeles County (Miller, 1994) contains a statistical analysis of aggregate consumption versus population suggesting that roughly two-thirds of the variation in aggregate consumption could be attributed to population variation. The fact that large market regions such as Los Angeles County show a correlation between aggregate production and population indicate that population is a major factor in determining aggregate consumption in many areas. Other factors, such as major public construction projects can randomly add large amounts of aggregate to consumption figures. The economy also has a strong influence on aggregate demand, but the simple factor of population was selected because it most influences aggregate demand over long periods of time.

A comparison of the projected aggregate demand for the San Bernardino P-C Region from SR 143, Part VII and actual production data for the period of 1981 to 2006 is shown in Figure 3. SR 143, Part VII projected that the demand for aggregate in the San Bernardino P-C region for 1981-2006 would be 207 million tons. Actual PCC-grade aggregate production in the San Bernardino P-C Region for 1981-2006 was 252 million tons. The difference between projected demand and actual production, 45 million tons, was about 22 percent more. This difference is because of a greater increase in population than was projected—the projected 2006 population was 1.14 million compared to an actual 2006 population of 1.82 million—and a recent increase in exports to other regions. Information provided by the aggregate producers in the region, indicate that exports reached nearly 70 percent of total production in 2007. If this continues, the demand on the regions aggregate resources may be much higher than is projected.

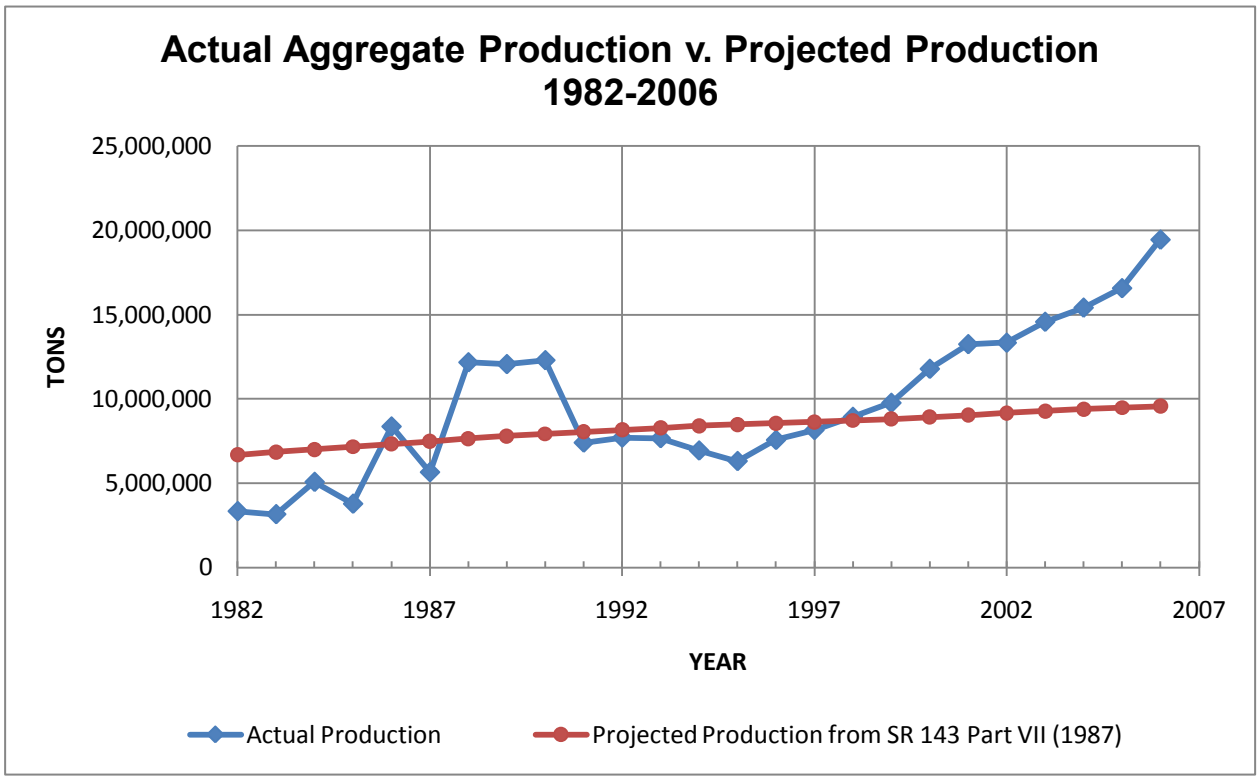


Figure 3. Comparison of projected demand in the San Bernardino P-C Region with actual PCC-grade aggregate production, 1982-2006.

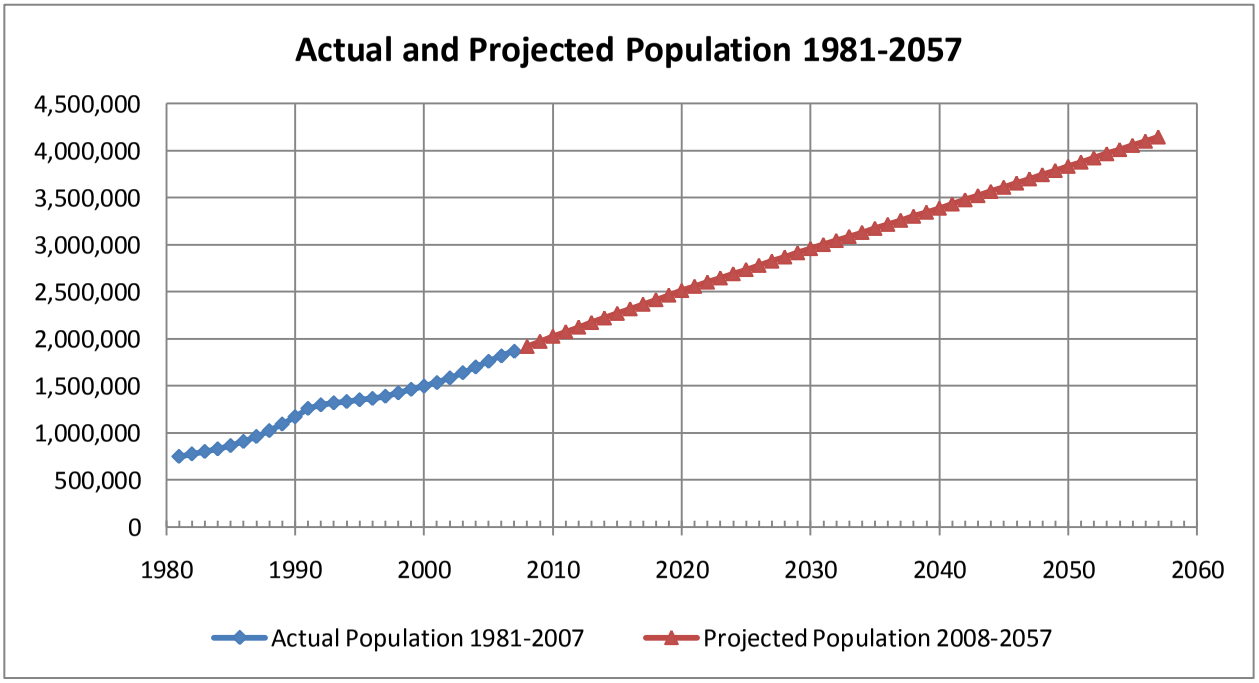
Population data for the San Bernardino P-C Region for the years 1981 to 2007 were obtained from census tract data provided by the San Bernardino County and Riverside County planning departments for the 1980 census and from census tract population data from the U.S. Census Bureau (2007) for the 1990 and 2000 censuses. Complete census tracts within the Region were summed with the population of partial tracts. The population of partial tracts was equated to be the same percentage as the included area. The population statistics between census years are interpolated. The average per capita aggregate consumption rate for the years 1981 through 2006 was 7.4 tons per person per year (Table 5). This rate was used for projecting future aggregate demands.

POPULATION PROJECTION FOR THE SAN BERNARDINO P-C REGION THROUGH THE YEAR 2057

The year-2000 population for the census tracts within San Bernardino and Riverside counties was divided by the total year-2000 population of each county, respectively, resulting in a ratio. This percentage (44.2 percent of Riverside County's total population and 47.6 percent of San Bernardino County's total population) was used to estimate the San Bernardino P-C Region's population for the years 2010, 2020, 2030, 2040 and 2050.

The population projection for the San Bernardino P-C Region (Figure 4) was estimated from official projections published by the California Department of Finance's Demographic Research Unit (California Department of Finance, 2007) and the above percentages for each county. Report 06 P-1(on the California Department of Finance's website) provides population projections for counties in California for the years 2010, 2020, 2030, 2040 and 2050. Yearly population estimates were interpolated from the bracketing 10-year projected population numbers and extrapolated for the years 2051 through 2057. The population of the San Bernardino P-C Region is projected to increase from 1,918,400 in 2007 to 4,147,600 in 2057.

Figure 4. Population of the San Bernardino P-C Region—1981-2007—and population projection to 2057.



PROJECTED AGGREGATE DEMAND FOR THE SAN BERNARDINO P-C REGION THROUGH THE YEAR 2057

A simple analysis using projected population and annual per capita consumption rate, derived by methods described in preceding sections, was used to forecast the aggregate demand of the San Bernardino P-C Region through the year 2057 (Table 6). The calculated annual per capita consumption rate of 7.4 tons (from Table 5) was multiplied by the projected annual population for each year through the year 2057.

The result of this projection shows that an estimated 1,131 million tons of aggregate will be needed to satisfy future demand in the San Bernardino P-C Region through the year 2057. Of this total, it is estimated by producers in the region that approximately 65 percent, or 735 million

Table 6. Projected population and aggregate demand in the San Bernardino P-C Region (2008-2057).

YEAR	PROJECTED POPULATION	PROJECTED AGGREGATE DEMAND (in tons)*	ESTIMATED PCC AGGREGATE DEMAND (in tons)*	YEAR	PROJECTED POPULATION*	PROJECTED AGGREGATE DEMAND (in tons)*	ESTIMATED PCC AGGREGATE DEMAND (in tons)*
2008	1,918,350	14,196,000	9,227,000	2034	3,131,999	23,177,000	15,065,000
2009	1,972,620	14,597,000	9,488,000	2035	3,175,011	23,495,000	15,272,000
2010	2,026,935	14,999,000	9,750,000	2036	3,218,023	23,813,000	15,479,000
2011	2,075,601	15,359,000	9,984,000	2037	3,261,035	24,132,000	15,686,000
2012	2,124,267	15,720,000	10,218,000	2038	3,304,047	24,450,000	15,892,000
2013	2,172,932	16,080,000	10,452,000	2039	3,347,059	24,768,000	16,099,000
2014	2,221,598	16,440,000	10,686,000	2040	3,390,071	25,087,000	16,306,000
2015	2,270,264	16,800,000	10,920,000	2041	3,434,632	25,416,000	16,521,000
2016	2,318,930	17,160,000	11,154,000	2042	3,479,192	25,746,000	16,735,000
2017	2,367,596	17,520,000	11,388,000	2043	3,523,753	26,076,000	16,949,000
2018	2,416,261	17,880,000	11,622,000	2044	3,568,314	26,406,000	17,164,000
2019	2,464,927	18,240,000	11,856,000	2045	3,612,875	26,735,000	17,378,000
2020	2,513,593	18,601,000	12,090,000	2046	3,657,435	27,065,000	17,592,000
2021	2,558,319	18,932,000	12,306,000	2047	3,701,996	27,395,000	17,807,000
2022	2,602,945	19,262,000	12,520,000	2048	3,746,557	27,725,000	18,021,000
2023	2,647,570	19,592,000	12,735,000	2049	3,791,117	28,054,000	18,235,000
2024	2,692,196	19,922,000	12,949,000	2050	3,835,678	28,384,000	18,450,000
2025	2,736,822	20,252,000	13,164,000	2051	3,880,239	28,714,000	18,664,000
2026	2,781,448	20,583,000	13,379,000	2052	3,924,799	29,044,000	18,878,000
2027	2,826,074	20,913,000	13,593,000	2053	3,969,360	29,373,000	19,093,000
2028	2,870,699	21,243,000	13,808,000	2054	4,013,921	29,703,000	19,307,000
2029	2,915,325	21,573,000	14,023,000	2055	4,058,482	30,033,000	19,521,000
2030	2,959,951	21,904,000	14,237,000	2056	4,103,042	30,363,000	19,736,000
2031	3,002,963	22,222,000	14,444,000	2057	4,147,603	30,692,000	19,950,000
2032	3,045,975	22,540,000	14,651,000	**Total 50-Year Demand:**		**1,131,233,000**	**735,302,000**
2033	3,088,987	22,859,000	14,858,000				

* Aggregate figures are rounded to the nearest 1,000 tons

tons, will be used in PCC, with the remainder being used in other construction aggregates. This updated 50-year demand is over two times the previous projected 50-year demand. This is because of the greater increase in population than was predicted by the previous projection.

COMPARISON OF THE 50-YEAR AGGREGATE DEMAND WITH CURRENT PCC-GRADE AGGREGATE RESERVES

The total PCC-grade aggregate reserves of 287 million tons in the San Bernardino P-C Region are projected to last 17 years (to the year 2024). If all of the PCC-grade aggregate reserves were used exclusively for PCC aggregate, the supply would theoretically last 31 years. In reality, 35 percent of the PCC-grade aggregate reserves likely will be used for lower grade aggregate products, and a depletion date of 2024 is more realistic. However, even this date may be optimistic. An important consideration is that not all of the aggregate reserves may be minable under the present permits because of operating restrictions or because of expiration dates that may not allow reserves to be completely mined. This last point is important because of the difficulty in obtaining permit extensions.

Comparing regional needs to available reserves and resources demonstrates the construction aggregate resource issues confronting the region. This includes the need to plan carefully for the use of lands containing these resources and the need to consider the permitting of additional aggregate resources in the region before currently permitted deposits are depleted.

Table 7 is a summary of present aggregate resources and estimated future aggregate demands for the San Bernardino P-C Region. The projected lifespan of the aggregate reserves assumes that mining of these reserves will continue to be permitted until the reserves are depleted. In addition, should unforeseen events occur, such as massive urban renewal, reconstruction in the wake of a disaster, or major economic recession, the demand for construction aggregate in the San Bernardino P-C Region could change considerably, which could alter the lifespan of aggregate reserves in the region.

ALTERNATIVE SOURCES OF AGGREGATE FOR THE SAN BERNARDINO P-C REGION

Potential sources of portland cement concrete aggregate, in addition to the deposits classified MRZ-2, exist within and near the San Bernardino P-C Region. The potential sources within the region are in areas that are classified as MRZ-3 and include areas underlain by Holocene alluvial deposits, Tertiary sedimentary deposits, and crystalline rocks. Too little is known about these alternative sources to allow more than a general description. SR 143, Part VII contains a description of these deposits in the section titled “Alternative Sources of Aggregate.”

Table 7. Summary of PCC-grade aggregate resources, PCC-grade aggregate reserves, projected 50-year demand, and depletion date for the San Bernardino P-C Region.

Estimated PCC-Grade Aggregate Resources	**5,986 Million Tons**
PCC-Grade Aggregate Reserves	**287 Million Tons**
Projected 50-Year Construction Aggregate Demand (all aggregate grades)	**1,131 Million Tons**
Projected 50-Year Demand for PCC Aggregate	**735 Million Tons**
Estimated Years Until Depletion of Current PCC-Grade Aggregate Reserves	**17 Years**
Estimated Depletion Date of PCC-Grade Aggregate Reserves	**2024**

Sources outside of the San Bernardino P-C Region are the production areas in the neighboring Claremont-Upland P-C Region to the west, about three miles away, and the Temescal Valley area, about five miles to the south and east. The additional transportation costs incurred by bringing in aggregate from these other areas could increase the price of construction aggregate in the San Bernardino P-C Region, and, these neighboring regions do not have a 50-year supply of aggregate reserves to meet their own demand (Miller and Busch, 2007; Miller, Shumway, and Hill, 1991).

RECYCLED AGGREGATE

During the past two decades, the use of recycled inert demolition debris such as concrete rubble and slab asphalt rubble has steadily increased in California. The most recycled materials in California, by tonnage, are asphalt and concrete. Recycling programs that recover demolition rubble, such as concrete and asphalt, significantly help reduce the waste-stream going into landfills and also extend the life of existing aggregate mines. However, recycled aggregate generally is not suitable for use as PCC aggregate. The bulk of recycled aggregate is used as base materials.

In the San Bernardino P-C Region, as in all of the greater Los Angeles area, the rate of recycling of demolition waste is high. A roughly estimated 700,000 tons of recycled aggregate is produced from demolished construction materials annually in the P-C Region. This figure is based on producer estimates only. Unless there is a large change in the use of recycled material for aggregate, there will not be a significant effect on the mining of new aggregate deposits and the projection of future demand for raw aggregate materials will not change significantly.

PART V – CONCLUSIONS

Within the San Bernardino P-C Region, two areas previously classified as MRZ-3 have been reclassified as MRZ-2. Newly classified areas contain about 334 million tons of unpermitted PCC-grade aggregate resources. A reevaluation of the previously designated areas within the region indicates that that about 4,427 acres, containing 959 million tons of resources, have been lost to urbanization or depleted between 1987 and 2007. After adjusting for past production, both commercial and non-commercial, the remaining designated resources and the newly identified resources total 5,986 million tons of PCC-grade aggregate resources.

Based on available historic population and production data, and population projections, the San Bernardino P-C Region will need to produce 1,131 million tons of aggregate during the next 50 years. Of this projected demand, it is estimated that 65 percent, or 735 million tons, must be suitable for use in PCC. The presently permitted aggregate reserves of 287 million tons represent approximately 25 percent of the projected construction aggregate demand of the next 50 years. These permitted reserves are projected to last until the year 2024, 17 years from the present. If a major earthquake or similar unforeseen catastrophic event strikes the region and necessitates reconstruction, existing reserves may be depleted sooner. A comparison of the results of the current study with those of the 1987 study is presented in Table 8.

Table 8. Results of this update report compared with Special Report 143, Part VII and the designation report for the San Bernardino P-C Region.

	Previous Reports†	This Update Report
Identified PCC-Grade Aggregate Resources*	6,887 Million Tons	5,986 Million Tons
PCC-Grade Aggregate Reserves*	430 Million Tons	287 Million Tons
Projected 50-year Aggregate Demand	480 Million Tons	1,131 Million Tons
Estimated Number of Years Until Reserves* are Depleted	41 Years	17 Years
Estimated Depletion Date of Reserves*	2022	2024
Calculated Per Capita Aggregate Consumption	8.4 Tons	7.4 Tons

† SR 143, Part VII and the designation report (California Department of Conservation, 1987).
* Reserves are aggregate deposits that have been determined to be acceptable for commercial use, that exist within properties owned or leased by aggregate producing companies, and for which permits have been granted to allow mining and processing of the material. Resources include reserves as well as all potentially usable aggregate materials that may be mined in the future, but for which no permit allowing mining has been granted.

ACKNOWLEDGMENTS

CGS gratefully acknowledges the cooperation of all the local government agencies, organizations, and especially the aggregate producers, all of whom provided information during the course of this study. Special thanks are extended to Doug Sprague of Vulcan Materials Company, Christine Jones and Dave Samaro of Cemex, Christine Goeyvaersts of Robertson's Ready Mix, Chad Warren and Dan Lincoln of Pacific Aggregates, Pete Pouwels of Holliday Rock Products, David Jones of the County of Riverside Planning Department, Chuck Wideen of the County of Riverside Department of Building and Safety, and George Kenline of the County of San Bernardino Land Use Services Department.

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APPENDIX – SECTOR SUMMARIES

Summary of Designated Sector acreages, PCC-grade aggregate resources, and reserves in the San Bernardino P-C Region in 2008. (Note: Newly identified Sectors J and K are not designated)

Sector	Acres Remaining in Sector	Resources in 2008* (million tons)	Reserves (Permitted Resources) in 2008 (million tons)
A-4	434.6	74.8	0
A-6	†	0	0
A-7	309.6	80.2	0
A-8	71.4	20.4	0
A-9	99.4	29.7	0
A-13	60.1	19.4	0
A-14	24.4	8.3	0
A-15	†	0	0
A-16	16	3.8	0
A-17	14.8	3.5	0
A-18	†	0	0
A-19	85.8	15.8	0
A-23	†	0	0
A-24	†	0	0
A-27	†	0	0
A-28	†	0	0
A-29	232.0	11.6	0
A-30	19.7	2.0	0
B-1	118.9	45.4	0
B-2	10.9	1.8	0
B-5	3,708.0	709.2	P
B-6	59.3	3.2	0
B-7	148.4	36.8	0
B-8	267.3	59.1	0
B-9	169.6	28.5	P
B-10	85.1	12.0	P
B-12	†	0	0
B-14	18.4	1.3	0
B-15	8.8	0.3	0
B-16	†	0	0
B-17	†	0	0
C-1	510.0	101.5	0
C-3	165.0	39.1	P

Sector	Acres Remaining in Sector	Resources in 2008* (million tons)	Reserves (Permitted Resources) in 2008 (million tons)
C-4	30.4	5.6	0
C-5	413.0	118.2	P
C-6	1,260.9	344.0	P
C-8	26.7	5.6	0
C-10	13.5	1.4	0
D-2	†	0	0
D-3	†	0	0
D-4	†	0	0
D-5	†	0	0
D-6	†	0	0
E-1	49.2	3.0	0
E-2	15.2	0.8	0
E-4	†	0	0
E-5	294.0	62.8	0
E-9	23.0	4.0	0
E-10	596.1	62.1	0
E-13	268.9	29.1	0
E-14	313.8	58.3	0
E-17	19.9	2.9	0
E-19	102.0	18.0	0
E-20	37.6	5.3	0
E-22	41.3	6.1	0
E-23	77.2	12.1	0
E-24	113.7	16.7	0
F-1	†	0	0
F-2	79.8	5.1	0
F-3	18.4	9.3	0
F-4	†	0	0
F-5	†	0	0
F-6	130.7	55.4	0
F-9	51.6	6.3	0
F-12	†	0	0
F-14	1,071.1	756.5	P
F-15	5,220.8	2,301.2	P
F-16	85.4	16.7	0
F-17	36.2	6.5	0
F-18	433.6	117.2	0
F-20	581.6	164.6	0
F-23	131.4	19.6	0
F-32	62.9	7.6	0
F-33	76.5	10.4	0

Sector	**Acres Remaining in Sector**	**Resources in 2008*** (million tons)	**Reserves (Permitted Resources) in 2008** (million tons)
G-1	470.6	75.0	P
G-2	1,677.0	280.0	P
H	0	€	0
I	0	€	0
J-1††	65.0	13.9	0
J-2††	32.9	6.7	0
J-3††	37.6	7.9	0
J-4††	91.1	20.4	0
J-5††	29.6	6.1	0
J-6††	755.3	185.5	0
J-7††	48.3	10.3	0
J-8††	44.3	9.5	0
J-9††	63.2	14.9	0
J-10††	196.7	49.4	0
J-11††	76.6	P	P
J-12††	89.5	P	P
J-13††	36.4	9.3	0
K††	89.9	P	P
Totals	**22,293.4**	**5,986.0****	**287**

* Reserves mined since 1980 are not subtracted due to confidentiality.
P Sector contains reserves that are proprietary
† Completely lost to urbanization
€ Remainder of resources mined out.
†† Newly identified Sector (not designated)
** Due to confidentiality, commercial production since 1981 has not been subtracted from individual Sectors. However, all past production has been subtracted from the resource total (6,238 million tons minus 252 million tons = 5,986 million tons).

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: DISTRICT DIRECTORS

Date: November 18, 2011

From: MALCOLM DOUGHERTY
Acting Director

Subject: **Aggregate Resource Policy Statement and Tools**

This memo is in response to multiple requests from resource developers, planning departments, and California Department of Transportation (Caltrans) staff about our policy toward mining projects. It clarifies the policy and provides tools for districts to encourage an increased supply of aggregate materials statewide.

Our policy is that Caltrans will continue to work with local and State agencies to help gain approval of new aggregate mining sites throughout the state, acknowledging the need for an increased aggregate supply. As a responsible agency under the California Environmental Quality Act, however, we do not endorse specific mining projects. In light of this, Caltrans will provide the technical assessment and information pertaining to availability locally as well as infrastructure needs of aggregate projects in your region, including education of local stakeholders and early public engagement regarding long-term aggregate issues.

The following tools are attached to aid you in this regard:

- A sample letter that can be addressed to our local and regional transportation planning partners. This letter outlines our policy toward mineral resource development in general.
- The 2011 update of the Construction Aggregate Supply Limitations Fact Sheet.
- The 2006 Department of Conservation Map Sheet 52, which shows the permitted aggregate materials supply in relation to projected demand over 50 years.

The above tools were developed in support of an ongoing consortium known as the Aggregate Availability Group. This group, as per its 2009 charter, includes management and staff-level representatives from the Caltrans Divisions of Planning, Design, and Construction, the California Business, Transportation and Housing Agency, the California Department of Conservation, the California Construction and Industrial Materials Association, and the Governor's Office of Planning and Research. One of the main goals of this effort has been to produce maps and other tools to engage the public, legislators, and local jurisdictions. These staff will apprise you of new materials as they become available.

Please take the time to review the attached tools. This issue is as important as ever, and it is my hope that ongoing collaboration will help us secure the resources that we need to provide world-class transportation options for years to come.

Attachments:
(1) Sample Policy Statement Letter
(2) Construction Aggregate Supply Limitations Fact Sheet
(3) Department of Conservation Map Sheet 52, Aggregate Availability in California

Attachment 1

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

nor

DEPARTMENT OF TRANSPORTATION
<DISTRICT>
<ADDRESS>
<CITY, STATE, ZIP>
<PHONE>
<FAX >
<WEB URL>

Flex your power!
Be energy efficient!

<DATE>

<Name>
<Title>
<Organization>
<Street Address>
<City, State, Zip Code>

Dear<RECIPIENT>:

As you are aware, aggregate resources play a vital role in our efforts to build and improve our State's infrastructure. Indeed, our State's mineral resource development is essential to our economic well-being, as well as our intentions to grow more responsibly and provide the safest, fastest, and most efficient transportation options possible. While it is important that we find ways to meet our current needs for construction materials, we must also anticipate future demand and expand our aggregate supply in an environmentally appropriate and culturally circumspect manner. In doing so, we prepare our future generations to navigate the challenges that our State will face as population increases and accessible resources grow scarce.

Throughout the State, attention is being given to what is increasingly seen as an urgent resource issue. The recently enrolled Assembly Bill 566 (Galgiani, 2011) codified several legislative findings, among them that mineral extraction is essential to the needs of society, and that the development of local mineral resources is vital in reducing truck emissions in our State.

The California Department of Transportation (Caltrans) continues to coordinate with public decision-makers, the construction industry, and government officials in exploring opportunities to improve the reclamation and permitting processes and increase California's aggregate supply. While the pressure for resources has eased for the last three years due to a sharp decline in residential construction, the transportation sector continues to build projects and the housing market is showing signs of regaining strength. This is not a time to relax our efforts, but to redouble them in anticipation of full economic recovery.

In the last five years, Caltrans has delivered approximately 1,700 highway projects worth $19 billion that were moved into construction. There are currently 825 construction contracts underway with a contract value that exceeds $10 billion. Highway projects are only one part of the story, however, as local and regional agencies continue to maintain and improve the roads in their jurisdictions.

In addition to the outlay of the traditional transportation agencies, the California High Speed Rail Authority expects to break ground on the first 179 mile stretch of its high-speed railway in fall 2012. This section, from Merced to Bakersfield, will require over five million tons of sand, gravel, and crushed stone, which is about four percent of the total production that the State saw in 2009.

With the passage of SB 391 (Liu, 2009) and SB 375 (Steinberg, 2008), Caltrans and local

transportation agencies were challenged to conceive of new ways to reduce greenhouse gas (GHG) emissions while providing world class transportation facilities for our constituents. The statewide modal plans and Regional Transportation Plans, which shape California's transportation future, outline extensive improvements to the current system. Yet, between long truck hauls averaging 50 miles and international importing of materials, the GHG impact of aggregate delivery continues to mount. An increased aggregate reserve that is closer to construction sites is key to addressing our dire air quality and climate change concerns.

While we are continuing to work with local and State agencies to help gain approval of new aggregate mining sites throughout the state, there is still much to be done to ensure that these essential resources will be available for development in the far reaches of our long-range plans. I would like to encourage you to explore new strategies to increase aggregate reserves in your region, including education of local stakeholders, early public engagement, and willingness to collaborate in the mitigation of environmental and transportation system impacts from aggregate production and distribution.

The attached Fact Sheet provides information on the potential economic, social, air quality, and environmental factors that are affected by local aggregate supply. This is a good starting point for collaborative discussions that aim to find solutions to issues regarding aggregate availability. Also attached is a map that shows statewide aggregate supply and demand.

Finally, I would like to invite you to contact <CALTRANS DISTRICT REPRESENTATIVES> (http://www.dot.ca.gov/localoffice.htm), who are available upon request to speak at public meetings in your area regarding the importance of increasing California's aggregate supply in an environmentally sustainable manner. While the permitting of new mining facilities must be done with attention to all of the possible impacts to surrounding areas, Caltrans encourages the development of new sources for construction aggregate. Our economy and our environment depend on it.

Please share this information with your planning commissions, city councils, and county boards of supervisors.

Thank you in advance for helping to improve mobility across California.

Sincerely,

<Signature Block Name>
District Director

Attachments:
(1) 2011 Construction Aggregate Supply Limitations Fact Sheet
(2) Department of Conservation Map Sheet 52, *Aggregate Availability in California*

Construction Aggregate Supply Limitations
Some Estimates of Economic Impact–November 2011

- Aggregates are low-value, heavy-weight building materials used in construction, including sand, gravel, crushed stone, and recycled concrete. Aggregates are mined and either used as raw material (for example, as foundations) or serve as composite materials in the production of concrete and asphalt. The main end markets for aggregates include private residential construction (34 percent), commercial construction (17 percent), and public infrastructure projects (43 percent, including 26 percent for public highways, streets and transit).

- Aggregates are usually shipped from quarries or production sites close to their end market because transportation is a major element in the cost of delivered aggregates and the cost depends on the distance of the delivery. According to the industry, shipping costs for aggregates can outweigh production costs if the material is trucked more than 20 miles.[1] Permitting new aggregate sites would lead to shorter haul distance to minimize transport/shipping cost.

- According to the California Geological Survey (CGS), California has an estimated 74 billion tons of aggregate resources underlying mineral lands classified by the State Geologist. However, only about six to seven percent have actually been permitted by local agencies for mining activities. Permitting of mining sites is difficult and time consuming due to environmental, land development, and zoning laws, and could take between five and ten years. At the current rate of production, available aggregate supply in some areas in the State could be depleted in a decade.

- According to the California Department of Finance, housing construction activity in California more than doubled between 1996-2005, the longest sustained growth period in recent history; but experienced more than 80 percent decline during 2006-2009 (from 209 to 36 thousand units). Despite a 23 percent rebound in housing construction spending in 2010, overall construction industry in California remains depressed. This has contributed to a significant reduction in both production and value of construction aggregate in recent years.

- According to the CGS, California produced 133.5 million tons (valued at $1.4 billion) of construction sand, gravel, and crushed stone in 2009, compared to 237.3 million tons (valued at $1.9 billion) in 2006, an almost 44 percent drop since 2006. The transportation of 133.5 million tons of construction aggregates generates about 5.3 million truckloads (@ 25 tons per truck), or a total of 10.7 million truck trips a year (including empty trucks returning to the aggregate sites) related to the transportation of construction aggregates in the State.

- According to the Teichert Construction and West Coast Aggregates, Inc. the average hauling distance for aggregates in California may be as high as 50 miles. Truck transportation accounts for about 99 percent of shipping aggregates for 40 miles or less.[2] At an average 50-mile distance, the total aggregate-truck VMT would be 535 million miles per year (10.7 million trucks x 50 miles).

- Let us assume that permitting additional mining facilities would reduce the average hauling distance from 50 to 35 miles statewide. Using an average hauling distance of 35 miles, the total annual aggregate-truck miles of travel would be 375 million miles (10.7 million trucks x 35 miles). The 15-mile shorter hauling distance would reduce aggregate-truck miles of travel by 160 million miles per year (535-375), and annual diesel fuel consumption by 20 million gallons [using California Air Resources Board (CARB) diesel fuel consumption rate of 0.13 gallons per vehicle-mile at 55-60 mph speed].

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[1] Therese Dunphy, "Evening the Playing Field," *Aggregates Manager*, August 2006.
[2] Tina Grady Barbaccia, "Off-highway Transportation," *Aggregates Manager*, July 2006.

- A recent University of California, Berkeley study[3] confirms that the most likely, and dominant, effect of the opening of new sites for the production of construction aggregates would be a reduction in truck miles of travel for hauling aggregates (i.e., new quarry will be located closer to the users to minimize transportation costs), thus a reduction in emissions from trucks.

- Based on the CARB emission factors estimates, and assuming an average 55-60 miles per hour speed, a reduction of 160 million miles of truck travel (or 20 million gallons of diesel fuel consumption) would reduce truck emissions (CO, NOx, PM10, SOx, VOC, and CO2) by about 22,436 tons a year.

- The total transportation cost of aggregates (at $0.10 per ton per mile) shipped 35-miles average distance throughout California would be $936 million (10.7 million trucks x 25 tons x 35 miles x $0.1), and over $1.3 billion if shipped an average distance of 50 miles. The statewide transportation cost savings of reduced hauling distance would amount to $376 million a year (or a 30 percent cost savings).

- The California Department of Transportation (Caltrans) estimates that on average, about $2.5 billion is spent on State and local capital outlay projects each year, and on average, aggregates account for 8-10 percent of total project costs, or about $250 million annually. A 30 percent increase/decrease in shipping cost of aggregates would increase/decrease the total annual project costs by $75 million per year.

- The reduction in aggregate-related truck miles of travel would also reduce traffic congestion and traffic accidents on roads, but these impacts would be difficult to estimate. An additional benefit from truck trip reduction would be reduced pavement deterioration. Caltrans expects to spend about $700 million annually on pavement rehabilitation projects. Assuming trucks account for 60 percent of the pavement damage on the State highways, and aggregate-trucks on average account for 5 percent of all heavy truck travel on the State highways, the trucks shipping aggregates would account for about $20 million of cost savings in the pavement rehabilitation each year.

- Project delays due to lack of aggregate supply in the area, would also result in project cost escalation and reduced user benefits (reduced travel time and accidents) that would have otherwise been generated. A delay of 10 percent of the projects (or $250 million in capital outlay expenditures) for one year would increase the cost of the State and local capital outlay program by $13 million a year (at 5 percent average cost escalation factor).

- Generalizing, and pro rating, the user benefits estimated for the 2008 Interregional Transportation Improvement Program projects, a delay of ten percent of the capital outlay program for one year could also cost California about $97 million in increased roadway congestion and traffic accidents.

In conclusion, the overall picture may indicate that the concerns over the limited supply of construction aggregates may have eased for now due to the severe housing decline and economic slowdown. However, over the long run, with the eventual housing and economic rebound, the supply-demand imbalance will continue for many areas. Meanwhile, for some specific localities and construction projects, the challenge of adequate and cost-effective supply of construction aggregates persists.

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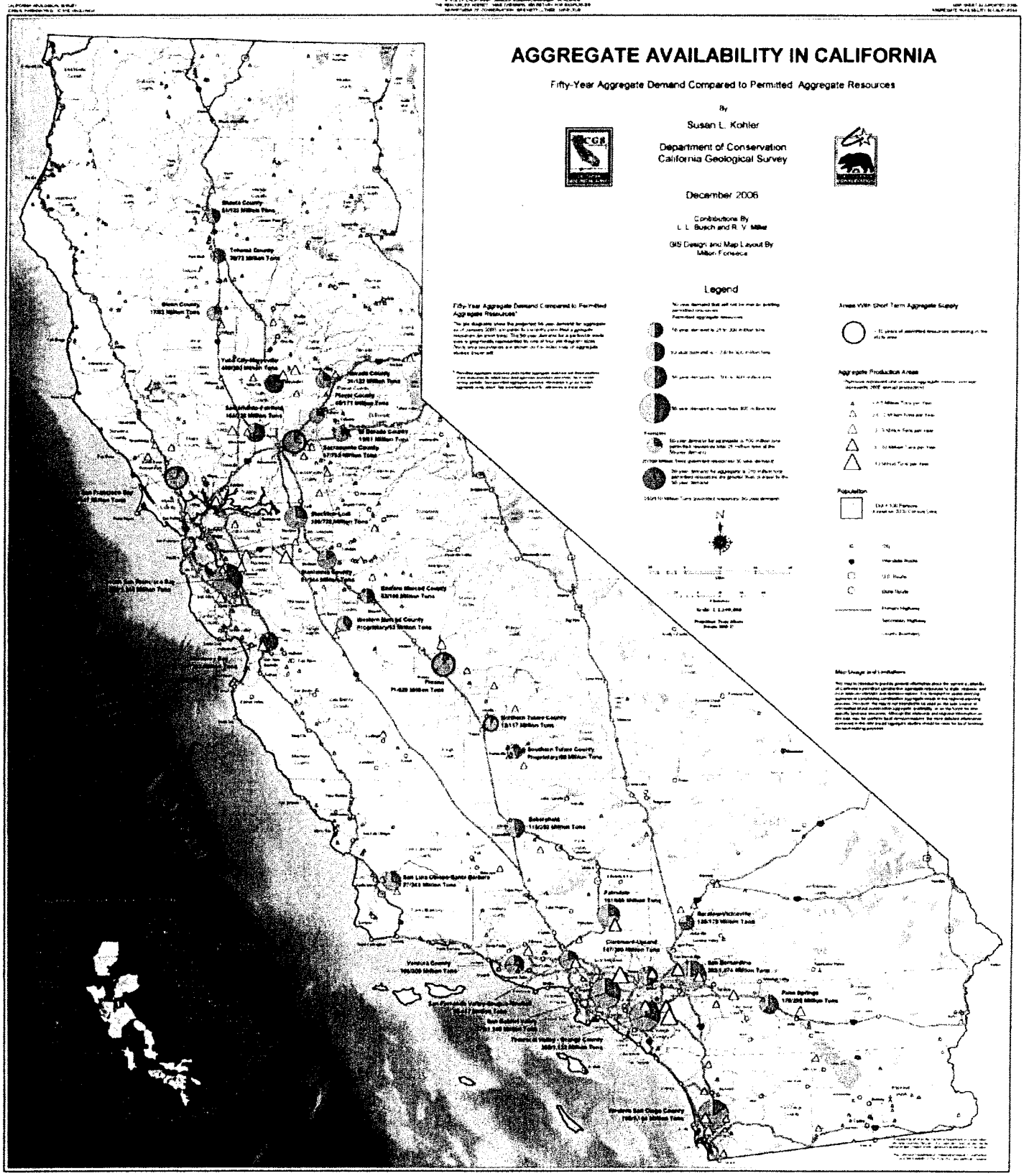
[3] Peter Berck, "A Note on the Environmental Costs of Aggregates," *Working Paper No. 994*, Dept. of Agricultural and Resource Economics and Policy, University of California, Berkeley, January 2005.

Attachment 3



APPENDEIX C DOCUMENTATION SUPPORTING THE BASELINE CONDITION

C.1 – Baseline Engine Data
C.2 – Historical Production
C.3 – Soil Sampling Lab Report

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Table C.1a - Baseline Fuel Consumption

Equipment	Engine Model	Make	Engine Model #	EPA Family ID#	Engine HP	Fuel Consumption (gallons/year)														
						2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Loader	2005	992G CAT FEL	---	5CPXL18.0ESK	900	---	---	---	---	34,964	91,051	6,819	26,831	15,155	---	---	---	---	---	---
Loader	2007	990H CAT FEL	C27	7CPXL27.0ESL	628	---	---	---	---	---	---	---	---	18,592	31,851	33,585	49,159	47,391	42,928	44,828
Dozer	1995	D9N Dozer	---	---	410	---	---	---	6,206	18,156	1,455	1,142	---	---	---	---	---	---	---	---
Dozer	2007	D9T Dozer	C18	7CPXL18.1ESL	410	---	---	---	---	---	---	---	---	7,725	13,388	20,546	29,461	28,679	25,208	28,465
Grader	2006	14H Grader	3176	5CPXL10.3ESK	240	---	---	---	2,969	2,413	2,889	1,933	2,140	2,213	2,099	1,860	2,173	2,367	1,976	2,323
Water Truck	1998	210M Water Truck	KTA19 CUM	KTA19 CUM	450	4,342	2,345	9,251	15,143	14,322	---	---	---	---	---	---	---	---	---	---
Water Truck	2006	773F CAT H2O Truck	3412E	6CPXL27.0ESK	693	---	---	---	---	15,839	25,452	2,905	24,880	29,185	30,283	29,056	31,490	30,512	26,693	27,234
Water Truck	2006	357 Pete H2O Truck	C13	7CPXL12.5ESK	380	---	---	---	---	2,680	4,423	4,018	4,125	4,091	4,092	3,075	3,597	3,404	5,037	3,437
					Total Fuel Consumption (gallons/year):	4,342	2,345	9,251	24,318	88,374	125,270	16,817	57,976	76,961	81,713	88,122	115,880	112,353	101,842	106,287

Table C.1b - Engine Emissions Factors

Equipment	EPA Engine Cert. E.F.'s (g/kw-hr)					EPA Engine Cert. E.F.'s (g/hp-hr)				EPA Engine Cert. E.F.'s (g/lb fuel)				EPA Engine Cert. E.F.'s (lb/gal)				Max Hour Emissions (lbs)				Max Hour Fuel Use	Load Factor [1]
	HC	NOx	NMHC+NOx	CO	PM	HC	NOx	CO	PM	HC	NOx	CO	PM	HC	NOx	CO	PM	HC	NOx	CO	PM		
Loader						--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		0.36
Loader	N/A	N/A	3.6	2.8	0.16	0.13	2.55	2.09	0.12	0.37	7.0	5.69	0.33	0.01	0.11	0.09	0.01	44	827	677	39	16.87	0.36
Loader	N/A	N/A	5.5	1.0	0.08	0.21	3.90	0.75	0.06	0.56	10.6	2.03	0.16	0.01	0.17	0.03	0.00	46	882	169	13	11.77	0.36
Dozer					0.38	0.68	8.17	2.70	0.68	1.85	22.3	7.36	1.85	0.03	0.35	0.11	0.03	120	1,440	476	120	9.18	0.43
Dozer	N/A	N/A	5.8	0.8	0.08	0.22	4.11	0.60	0.06	0.59	11.2	1.63	0.16	0.01	0.17	0.03	0.00	38	725	105	11	9.18	0.43
Grader	N/A	N/A	5.0	1.8	0.15	0.19	3.54	1.34	0.11	0.51	9.7	3.66	0.30	0.01	0.15	0.06	0.00	18	349	132	11	5.12	0.41
Water Truck	N/A	N/A				0.32	6.25	0.92	0.15	0.87	17.0	2.51	0.41	0.01	0.26	0.04	0.01	55	1,069	157	26	8.90	0.38
Water Truck	N/A	N/A	3.6	2.8	0.16	0.13	2.55	2.09	0.12	0.37	7.0	5.69	0.33	0.01	0.11	0.09	0.01	35	672	550	31	13.71	0.38
Water Truck	N/A	N/A	3.6	2.2	0.1	0.13	2.55	1.64	0.07	0.37	7.0	4.47	0.20	0.01	0.11	0.07	0.00	19	369	237	11	7.52	0.38

[1] (CalEEmod Appendix D Table 3.3 Offroad Default Horsepower and Load Factors)

Data Set C.2 - Production by Day

2006	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January																																0
February																																0
March																																0
April																																0
May																																0
June																																0
July																																0
August																																0
September																																0
October																106,897	10,080	10,000	13,230	11,610	10,500	0	10,000	10,000	10,000	7,650	10,000	8,640	0	5,355	27,141	251,103
November																												48,742	29,600	200,819		279,161
December	14,400	8,360		11,250	13,960	13,149			10,530		3,310	11,610	11,240	10,440	33,585	15,570		14,400	13,506	10,420	10,420								33,258			239,408
																																769,672

2007	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January		4,770	12,200	10,850	9,500	4,940		2,340	13,770	13,950	14,130	10,980	13,950	35,480	3,870	10,170	12,170	13,230				11,070	8,910	12,150	10,200	8,370			8,500	8,500	8,300	262,300
February	7,200							6,500	9,090	9,500		9,810	9,640	14,130	9,630	12,780	12,420			13,860	9,540	5,940	7,920	8,120		10,530	11,520	10,200				178,330
March					9,000	13,420	8,900	13,850	9,000	8,540		10,350	13,272	16,249	12,490	12,546	14,420		13,257	12,740	14,878	10,010	12,314	11,872		8,765	12,197	9,481	8,116	11,045	11,045	277,757
April				9,425	6,005	11,136	13,303		17,645	14,763	13,427	7,250	17,839	12,203		18,557	18,230	12,928	9,428	13,958			17,633	18,719	12,579	12,271	11,272	9,230		15,216		293,017
May	16,711	15,883	13,603	14,481	7,023		9,657	13,280	13,158	8,954	12,900			12,000	14,996	14,201	15,487	12,123	10,059		13,113	9,450	10,710	9,540	9,014	15,840			12,522	14,235	15,120	314,060
June	20,075			27,910	10,740	8,934	11,340	17,610	18,640		10,530	17,505	25,677	11,680	14,080	9,073		15,950	15,139	14,608	13,025	16,428	7,481		10,695	11,330	14,214	10,197	11,352			344,213
July		10,062							15,232	14,303	14,798	14,984	12,250	13,015		13,655	11,992	16,178	13,323	13,824			12,992	15,876	9,633	10,073	10,218			12,570	12,072	247,050
August	7,650	4,232				7,184	8,816	7,988	7,687	7,752			4,757	18,575	17,162	12,150				9,540	10,260	8,111		9,526			17,612	17,641	8,731	8,424	10,152	203,950
September					9,544	11,861	13,901			23,891	12,562	7,912	8,280	8,100			11,293	8,553	10,011	5,272	8,370			8,628	8,360	11,974	10,058					178,570
October			6,770	11,142	7,920						8,694	10,128			9,363			4,035	17,010					17,722	14,254	16,389			17,881	8,109	7,378	156,795
November	6,858	6,393			8,188	7,706	7,431	7,094					7,190		7,209	7,357										7,386	7,608	7,738	4,588	5,867		98,613
December			5,463	7,449	7,000	5,008				6,480	6,815	7,059	6,512																			51,786
																																2,606,441

2008	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January															5,861	4,094	104	5,164			7,813	6,721	7,477	5,403				4,213			5,520	52,370
February	6,533			6,706	6,941	7,219	4,326	7,454				6,390	7,739	2,582				7,383	7,690	6,607	6,127					6,542	7,109	5,404	7,372			110,124
March				5,587			7,601				7,889	7,953	7,196	5,210			8,046	7,760	7,827	6,918				7,750	7,769	7,887	7,697	6,607			8,397	118,094
April	6,491	6,657	8,407	6,107			7,234	7,704	5,977	6,247				6,401	7,406	8,066					6,949	7,682	8,482					4,626	6,994	7,780		119,210
May	7,678				6,574	5,820	5,500	6,168				7,363	4,253	806	8,449				5,134	5,052	5,479	7,940	5,824						5,709	7,630	8,113		103,492
June		8,183	6,277	8,234	8,047				7,109	4,901	7,301	7,108		15,931		5,037	4,975	7,561	3,645				5,360	6,635	7,787	7,475				14,934		136,500
July							6,356	3,618	6,393	3,758		15,748		7,087	5,472	8,181	8,760	8,252			6,350	7,663	4,629	10,458		15,100		9,763	6,997	7,504	8,109	150,198
August	2,943			9,261	4,983	5,609		6,669			8	8,192	6,575	3,496	6,669	15,739		7,552	7,186	5,885	5,885	7,394		14,122	9,323	9,510	10,186	7,189	16,640	15,462		186,478
September		9,297	10,247	7,166	9,529	14,931			2,822	10,733	7,769					4,572		10,348				4,237	9,993	4,965	10,567				4,625	9,475		131,276
October	8	9,603				10,362	5,500	8,973	5,215	6,591								15,000		10,109	8,124		10,104			13,500	8,730	4,756	7,860	6,180	7,955	138,570
November			6,985	2,874	6,700	9,820		17,961		5,004	8,942	4,859	3,940		14,832											8,249			1,500			91,666
December	5,035	5,411	3,701	5,383	6,712			6,567		9,700	10,889	7,106			21,513																	82,017
																																1,419,995

2009	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January															2,321	6,626			6,034	10,105	7,959	6,979	8,066			11,389	7,992	8,332				75,803
February		9,303		6,628	7,697								8,356	1,007		1,774			3,673				6,616	9,558	10,816	10,230	11,987					87,645
March		5,728	7,035	7,894	8,956	6,427			7,173	4,410	6,623	8,179				6,540	6,174	6,860	6,871					7,359	9,238	9,683				6,282	5,449	126,881
April	7,575	6,465				5,388	5,511	6,136	5,272				5,718	5,255	5,964	5,614	6,106			5,399	6,076	6,435	6,512	6,197			6,849	7,085	8,026	5,819		123,402
May	8,815			6,916	5,587								6,714	5,230	6,232			5,571	5,346	6,360	5,745					2,642	4,115		4,842	4,108		78,223
June	3,434	3,409	1,639		3,132			3,923	3,590	3,788	1,508	3,408			4,853	4,947	4,126	4,480	3,607			3,733	3,152	4,199	3,876	3,925			4,082	3,925		76,736
July	4,428	3,901				4,183	4,142	4,329	4,896	4,899			5,170	4,486	4,559	6,995	5,138	5,117		6,376	6,360	6,716					5,805	6,003	4,188	5,233	5,349	108,273
August			5,493	4,497	3,670	4,519	5,545			5,135	4,093	4,913	4,541	4,875			4,653	5,090	6,588	5,491	5,935			5,652	3,647	4,672	5,976				4,820	99,805
September	5,362	6,886	7,192	5,812				6,879	7,221	5,364	5,925			5,690	6,110	5,629	6,291				6,300	6,204	5,735	6,043	5,886			5,668	5,834	6,253		122,284
October	1,264	5,296			5,751	5,088	5,365	5,783	5,026			4,662	5,820	2,414	4,508	4,678			5,879	5,589	5,725	5,820				4,854	6,575	5,716	5,743	6,093		107,649
November		5,856	4,515	4,207	4,745	5,815			3,816	5,681	5,508	5,428	5,834			5,349		6,441	6,550	5,760			1,626									77,131
December	7,789	8,173	8,267	5,136			3,971		6,708	7,434				6,616	6,688	7,457	6,020	3,538			5,555	3,553	4,375					6,997	6,262	4,682		109,221
																																1,193,053

Data Set C.2 - Production by Day

2010	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January				5,851	4,658	6,738	7,715	7,178			8,039	7,709	2,245					5,986								5,659	6,609	7,055	6,672			82,114
February		6,669		6,165	5,540							4,998			2,461				7,379			5,051	6,116	6,042	5,378	5,442						61,241
March	5,435	5,055	2,574	6,998	4,811			6,506	3,331	5,425	5,386	4,969			1,817	3,912	5,299	5,634	2,665			5,091	5,501	6,020	6,471	6,264			6,670	5,827	5,101	116,762
April	1,574	6,256			3,314	6,111	3,495						5,047	6,169	5,214	5,788			5,576	5,045	4,839	5,265	1,750			5,936	5,048	5,245	5,111	5,617		92,400
May			5,416	6,050	6,116	6,255	5,427			6,146	5,661	5,635	6,047				3,727	5,453	5,664	4,738				5,492	5,584	5,343	5,502	5,293				99,549
June		5,633	5,472	5,528			3,190	6,156	6,000	6,250	2,878			5,601	5,793	5,686	5,391				5,421	5,463	5,452	5,484	3,258			5,117	5,005	4,286		103,064
July	5,284					5,512	5,537	5,903	5,928			5,615	5,064	5,501	5,773	5,152			5,277	5,328	5,051	6,052				5,326	4,896	5,171	5,365	5,176		102,911
August		5,048	4,362	5,490	4,721	5,249			5,197	5,445	5,377	5,294	5,417			5,298	5,036	4,959	4,724	4,417			3,538	4,807	4,197	3,839	4,157				5,155	101,727
September	5,177	4,639	4,935				3,926	1,294	4,876	5,261			2,816	4,747	3,658	4,143	3,199			4,696	8	8	5,228	5,220			4,998	3,215	3,033	3,728		78,805
October	4,315			4,340	4,763	4,740	4,588	5,097			5,034	2,947	4,914	3,115	3,909				4,903	4,007	4,782	4,770			701	4,362	1,324	4,041	4,607			81,259
November	3,048		1,461	2,858	3,131			317	4,492	2,543		1,719			5,408	4,723	4,578	4,750	4,838			4,682	4,874						3,600	4,870		61,892
December	4,709	5,061	2,554			5,282	4,872	4,425	5,132	3,849																			2,963	3,677		42,524
																																1,024,248

2011	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January											4,643	311	6,882				4,778	6,754	7,946					4,373	6,483	7,050	6,864	5,621			6,367	68,072
February	6,943		6,340	4,222			6,848	6,459		6,971	5,647			3,553	7,205	6,332	5,950				5,759	5,656	7,142	5,950				6,486				97,463
March	6,886	7,811	7,736				8,613	7,450	7,344	7,283				3,911	7,257	7,018	7,685						1,627	6,502	1,254			4,884	5,054	3,424	4,868	106,607
April					5,612	5,910	8	5,068			5,965	6,073	3,908	5,920	5,035			6,166	5,920	6,553	6,376	6,239				5,582	5,743	5,940				92,018
May			4,634	3,428	4,459	4,287			5,042	4,916						5,774	4,902	4,743	5,446	5,006			2,143	4,782	5,281	4,996	5,263				4,767	79,869
June	5,172	5,321	4,492			5,964	7,086	6,881	7,181	6,105			6,271	5,677	3,395	6,194	6,264			6,406	4,190	6,139	5,959	6,590								105,287
July	2,600													5,245	4,900			3,476	3,761	4,444	4,483	4,559			450	6,855	6,477	6,298	5,487			59,035
August		7,015	5,478	6,224	6,338			5,157	5,664	2,312	5,358	6,024			5,474	5,878	4,869	7,252				5,247	4,361	5,200	5,439	6,285			6,101	5,185	4,152	115,013
September	6,212	7,136						5,641	6,170			5,864	6,669	5,301	6,650	4,473			5,387	7,085	6,879	7,515	6,578			6,757	7,571	7,916	6,672	6,933		123,409
October			4,820	6,514	1,243		4,756			7,093	7,233	7,480	5,192	9,330			6,279	9,542	3,630		1,881			4,426		3,672	3,706	4,285			2,817	93,899
November	4,500		5,691	5,073			7,184	7,468	6,504	7,450	6,301			7,904	6,341	5,000	5,000	7,577										6,214	6,189	4,160		98,556
December					5,430	6,401	7,022	5,678	6,202			4,490		4,694	6,384	6,492			5,457	5,453	5,241											68,944
																																1,108,172

2012	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January			6,255	5,944	6,327	6,331			7,554	7,594	7,361	7,638				6,240	6,974	5,424	6,622	8,169				7,699	7,190	5,848						109,170
February	5,394		7,250	8,432			6,059	6,444	6,481	7,728			7,594		5,417							6,604	7,132	6,971			7,904	3,776				93,186
March					6,218		1,966	5,110	9,217			6,734	5,187	7,672	6,971	8,039				4,305	8,141	6,447	6,292				4,514	4,768	5,678	5,878		103,137
April		5,934	5,765	4,117	6,102				6,257	6,526	2,220	6,242				5,282	5,789	6,226	6,031				5,828	5,557	5,834	2,984					7,765		94,459
May		4,169	6,583	6,219			4,859	4,000	7,397	6,072		6,859		7,517	10,646	7,240	5,679	8,024	7,696		9,491	8,022	8,011									118,484
June								1,617			3,154	5,955	7,680	7,805	7,375			8,103	7,516	7,052	8,178				6,504	6,933	4,987	6,264	7,672			96,795
July									5,597	3,872	5,340	5,422				6,959	7,055	5,643	6,305	6,836			6,644	6,507	6,241	6,301	5,070					83,792
August									6,216	7,239			7,500	6,844	5,301	5,836	4,907			6,227	6,801	6,206	6,983	6,053	7,072		5,981	6,766	6,347	5,422	5,239	112,940
September											7,186	6,935	7,332	6,034			6,138	6,484	5,655	5,549	7,143			7,473	6,995	5,746	7,408	7,000				93,078
October	6,422	5,753						7,931	8,943	6,271	3,756	6,079				5,078	7,065	7,228				7,509	7,079	7,070	8,021				6,795			101,000
November					6,021	7,109	6,467	5,092	7,914			6,404	6,648	4,784	7,232	6,839										5,828	7,182	6,498	1,923			85,941
December				6,652	6,456	2,988	7,540			7,066	6,584	5,800	299				7,217	2,695	9,695	6,297	2,472											71,761
																																1,163,743

2013	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January		1,792		7,530			7,149	7,385	4,512	7,567				6,213	6,389	5,282					5,730	6,922	6,834	3,040				7,887	6,396	6,396	6,999	104,023
February				6,285		6,545	6,750	5,026			6,922	6,600	7,291					6,475	6,607	6,374	6,866					5,815	6,717	6,489				90,762
March				6,836	6,229	6,857					6,393	6,325						6,367	5,906	5,312								5,497	6,996			62,718
April		5,931	4,056	3,641	6,213			6,497	5,863	5,609	5,275				5,115	3,818	4,687	5,613				5,114	4,502	4,898	5,142	5,357				3,501	4,243		95,075
May	5,452	662					3,966	5,215	5,042	4,776			2,194	4,706	5,361	5,501				5,229	4,722	5,337	5,324	4,785				4,900	5,196	5,121	5,004	88,493
June			4,952	4,960	6,500	6,823	2,958	4,762		6,120	5,573	4,321	6,168	3,049	4,697					7,664	8,032			6,972	5,989	6,661	6,031	5,537				107,769
July	5,352	4,612						6,421	6,189	6,992	6,866	7,078			6,794	6,298	6,227	6,369	6,705			5,871	6,666	5,404	6,526	7,772			5,486	6,469	6,832	126,929
August	6,162	6,647			2,185	5,538	6,597	6,412	6,762			6,019	5,208	6,653	5,314	8,173				7,009	6,798	7,497	7,566			7,363	431	7,313	4,223	6,538		126,408
September			6,579	7,070	7,329	7,222			7,532	7,061	6,012	7,551	6,017			5,511	6,012	7,896	7,724	7,820			6,934	6,095	6,209	6,160	7,297			5,335		135,366
October	4,928	6,629	7,168				6,706	6,290	6,035	6,727				6,620	6,450	4,178	7,038				7,072	6,663	6,499	7,345	7,310			7,271		7,821	7,529	126,279
November	2,946			7,107	6,221	6,719	5,165	6,556			6,556	5,277	6,645	7,725	7,144			2,779		4,253	2,461				5,893	4,153	3,242					90,842
December		4,564	6,300	5,107	5,453	6,303			1,034				3,062	5,750		6,083	9,105	7,394	7,085	4,192	7,057					7,372	6,389					92,250
																																1,246,914

Data Set C.2 - Production by Day

2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January		6,567	6,712			6,747	7,240	6,619	6,676					1,168				7,267		9,141	7,433	10,226	6,862	7,580			8,905	7,379	6,712	5,696	6,837	125,767
February			6,793	3,199	6,881	7,130	5,686			1,879	4,089	6,677	4,700				9,478	6,295	7,680	7,793	7,298			6,974		8,334		3,632				104,518
March				6,850	7,711	7,719	5,174			6,887	6,719		6,708	7,123			5,740	8,395	8,417	10,506	1,690			8,531	6,591	7,501	7,072					119,334
April	6,109	6,427	6,708	6,491			7,039	6,569	7,477	7,526	7,379			7,234	6,464	1,217	2,000	6,717			7,198	6,953	7,279	7,327	5,840			3,660	1,176	1,189		125,979
May	6,522	8,017			7,137	5,973	5,917	6,612	6,490			6,464	4,626	4,659	6,951				5,352		7,513	6,532	6,422				3,915	5,867	5,162	4,778		114,909
June				6,379		5,249			6,041	6,077	6,036	5,679	5,784			6,382	5,348	6,223	5,782	6,051	6,238		6,141	4,409	7,898	8,666	6,612	6,825		478		118,298
July		7,539	6,537				7,289	6,657	7,004	6,385	5,777	6,038		7,817	8,404	7,976	6,702	7,811	7,021		8,206	7,684	5,772	8,129	7,651	6,357		8,178	7,606	6,408	8,416	173,364
August	8,400	4,723		3,801	5,817	7,033	5,189	6,156	3,264		7,422	661	8,839	6,298	6,568			7,897	6,243	7,589	6,096	6,570			8,534	7,182	3,473	3,558	6,364				137,677
September		7,049	9,534	6,976	8,592	5,816		6,718	7,265	7,523	5,418	6,907	4,941		6,572	6,331	8,401	7,286	6,772	4,637		6,227	5,131	6,263	6,867	6,968	4,551		4,330	4,195		161,270
October	3,932	5,792	4,277											5,211	9,129	8,307	6,596	5,652		7,069	7,088	5,698	7,822	6,930	5,881		5,564	7,257	7,401		8,434	118,040
November			4,672	7,482	7,624	8,174	7,167			7,990	7,103	8,731	8,435	6,850			5,175	2,708	6,861	6,675	6,446			6,236	5,856	6,448						120,633
December	6,436	5,618						9,315	7,461	7,970	6,505	1,398						5,570	6,710	6,976		7,242							6,274	6,759		84,234
																																1,504,023

2015	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January					8,264	9,161	9,277	6,743	7,986			7,952	903	9,373	9,000	6,824					5,486		6,490			6,881	5,520	7,493	4,953	5,152		117,458
February		7,236	6,341	7,176	6,994	7,031			6,876	5,758	3,689	6,600	7,392			4,929	5,520	7,163	7,666	7,513	6,745		5,650	6,328	6,888	7,003	3,939					134,437
March		5,994	6,571	6,446	4,647				7,598	7,194	6,020	6,305	6,237	6,344		6,559	6,473	6,384	6,070	6,059			7,652	7,359	5,668	9,092	8,367			6,967	7,420	147,426
April	7,786	7,726	5,069			7,186	7,283	7,553	6,434	6,603			5,914	5,006	6,187	1,654	5,967				3,713	7,437	7,712	6,860			8,339	6,135	7,307	6,586		134,457
May	7,408			7,086	5,751	6,817	7,473				7,054	6,380	7,419	7,191				5,783	6,241	5,703	7,911	6,764				7,137	4,026	6,324	2,000			114,468
June	6,990	6,653		6,647	6,913			8,201		7,972	7,780	5,762			6,649	6,437	9,720	9,443	2,500			6,255	4,802	5,279	5,387				6,715	3,869		123,974
July	5,731	5,990				6,338	6,176	6,340	6,331				5,001	5,562	6,342	6,381		4,500		5,000		4,649	6,047	6,496	1,900		5,159	4,715	5,777			104,435
August			6,430	4,571	6,592	5,852	5,849	6,190		5,900	8,102	7,301	8,294	7,981	6,664		5,866	5,218	7,361	8,528	5,258	7,493		7,482	5,744	7,500	7,110	3,500			6,538	157,324
September	6,500	8,000	7,377	7,880	6,295			6,860	5,209	5,479	7,000	6,704		7,698	5,905			7,450				5,600	6,826	7,764	7,605	7,000		6,782	6,681	4,293		140,908
October	3,245	4,871	7,480		7,075	5,019	7,098	7,375	8,220	3,520		3,942	6,498	6,015	7,312	6,613	6,650		7,408	7,222	7,230	5,601	7,699	5,600		5,039	6,914	6,655	6,450	5,000		161,751
November		6,649	7,208	6,625	6,215	7,915	6,237		7,235	6,060	5,194	6,490	7,622			4,100	6,503	6,402	6,735	7,270	6,905		8,503	7,040	6,590					7,290		140,788
December	6,540	7,170	5,630	4,999			6,416	6,059	6,202	7,457	6,516	5,150		6,085	4,898	6,185	5,540	2,727	3,767		4,910	5,578	4,881					6,800	6,315	7,384	7,591	134,800
																																1,612,226

2016	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January				8,991	7,016									3,000	7,250	7,455		9,250	6,294	8,347	8,377	8,230	7,497		8,306	4,334	8,037	7,492	8,432	6,863		125,171
February	2,300	5,122	5,401	7,730	1,628			6,244	5,743	6,501	8,119	7,768	8,219		2,600	7,668	7,874	8,335	7,535	8,309		7,832	7,285	8,370	8,077							138,660
March				1,600	5,714		6,397	5,941	7,120	6,351	7,287			6,606	6,820	8,548	7,806	7,590	6,684		8,695	7,311	6,419	7,012	8,434	7,216		7,866	6,524	7,288	7,388	158,617
April	7,951			7,052	6,836	7,357	8,396	5,733			7,175	6,457	5,013	5,207	3,936			6,090	3,798	3,623	3,734				1,801	4,131	4,898	9,005	5,206			113,399
May		5,149	4,365	5,471	4,258	2,212			4,723	4,670	5,603	5,287				5,518	5,292	4,521	5,414	5,122						5,274	4,136				4,897	81,912
June	4,359	5,750	7,023			6,299	6,832	5,375	5,418	6,171			5,757	6,953	5,566	7,481	5,586	4,528		5,413	6,111	6,708	8,183	7,817	7,182		6,366	7,375	6,633	7,038		151,924
July	7,742				7,753	6,878	6,508	7,580	7,531		8,175	6,918	6,314	6,839				8,437	6,535	6,293	6,434	3,901	7,626		6,039	6,731	8,075	8,296	7,845			148,450
August	6,007	5,818	7,334	6,072	5,751			6,371	6,209	7,147	7,363	7,044	6,286		6,356	5,746	5,855	6,982	7,420	6,712		5,268	5,314	6,165	5,717	6,734	6,410		6,075	6,041	7,221	165,418
September	7,481	6,688				6,250	6,822	6,458	5,467			6,650	5,441	6,306	6,689	6,852	5,749		6,106	7,192	2,732	6,631	6,285	6,463		6,479	6,410	5,699	6,170	4,870		141,890
October			5,415	4,674	5,111						5,869	6,228	5,609	5,702	6,567		2,173	417	7,715	8,740	8,681	7,301			6,261	5,740	5,386	5,676			4,616	107,881
November	5,454	5,797	4,679	7,137	4,999		4,651	4,863	5,324	5,021	3,735					7,953	7,225	9,033	10,373		7,890	8,250	8,627					5,145	7,045	7,853		131,054
December	7,338	2,846			8,443	7,065	9,300	7,457				7,487	6,737	2,444	8,007				1,570	6,430	6,067											81,191
																																1,545,567

2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January			5,724	7,786		3,112				5,849						5,171	6,506		2,828							6,974	3,711			6,603	6,433	60,697
February	6,167	7,049	10,078	8,522		7,250			5,752	7,396			7,139	7,578	7,350	7,388							7,473	7,468	6,736		7,358	6,128				116,832
March	5,272	6,197	6,180			5,741	7,576	7,487	7,254				6,737	7,321	6,099	6,881				6,210	7,882	7,359	5,886	6,885			7,369	7,062	5,573	6,004	6,517	139,492
April			6,050	6,513	5,602	5,601	6,691			6,158	5,574	6,606	7,833				8,119	7,212	4,381	7,104	6,931			6,882	6,171	5,781	7,724	7,289					124,222
May	6,583	6,921	6,488	6,661				6,687	8,841	6,031	7,182	6,425			7,475	7,135	6,180	7,625	8,649	7,908		8,349	7,789	8,403	8,637	7,941				7,828	7,493	163,231
June	8,919	8,488					7,620	7,724	8,543	6,019		8,550	9,027	8,671	9,076	9,354			7,128	8,849	8,481	11,746	6,413			9,519	9,567	9,081	8,682	6,188		177,645
July	11,726		11,447		10,326	127	8,352	10,441		10,830	11,497	7,529	9,789	9,395	9,513		8,935	7,827	8,339	4,577		9,349		10,899	11,006	11,071	7,272	10,424	7,513		7,512	215,696
August	6,354	9,800	9,320	10,503	8,120		11,460	10,940	10,226	10,098	7,650			7,371	8,824	11,065	11,514	11,150	8,753		10,995	10,523	9,227	11,044	8,404	8,539		7,283	7,262	11,138	5,675	243,238
September					6,529	8,868	7,766	9,989	8,590		9,585	8,939	8,209	7,030	8,680	8,014		8,851	8,973	8,062	8,266	6,310	9,440		10,839	9,473	9,506	8,039	6,215	8,483		194,656
October		6,448	9,007	9,734	7,591	9,194			3,474	9,029	8,801	9,777	9,716	10,361		10,079	11,001	9,068	11,146	9,743	7,842		7,698	956	8,973	10,710	11,013			10,739	8,696	210,796
November	7,906	7,703	4,187			7,284	7,889	6,598	7,672	7,048	7,265		10,595	10,687	9,091	10,306	9,377	10,125		11,040	8,935	5,954					10,151	10,101	10,495	10,901		191,310
December	11,051	6,000		6,787	4,092			10,897	10,697		11,114	9,658																				70,296
																																1,908,111

June 21, 2018

Vulcan Materials Company
1709 Sherborn Street
Corona, California 92879-2069

Attn: Mr. James Gore
P: (951) 768-2641
E: gorej@vmcmail.com

Re: Sampling and Chemical Analyses
Vulcan Materials Cajon Pit
San Bernardino County, California
Terracon Project No. CB185058

PRIVILEGED AND CONFIDENTIAL ATTORNEY WORK PRODUCT

Dear Mr. Gore:

As requested by your attorney, Adam Guernsey of Harrison, Temblador, Hungerford & Johnson, Terracon Consultants, Inc. (Terracon) has conducted sampling and laboratory testing of aggregate from your Cajon Pit in San Bernardino County, California. Our services were performed as authorized by the Master Services Agreement Task Order dated April 30, 2018.

1.0 PROJECT INFORMATION

The Cajon Pit is located adjacent to Cajon Wash, southwest of Old Route 66 and southeast of North Palm Road. The existing easterly pit is known as Area L. A mining area designated as Area Q is proposed south of Area L. There are currently no exposures in Area Q, but the existing Area L currently has a large highwall up to approximately 120 feet high adjacent to the north side of Area Q. Based on site geology and geomorphology, representative samples of Area Q were obtained during this investigation from the highwall along the southern margin of Area L. A summary of site geology is included below.

The Cajon Pit and Area Q are located within Cajon Wash. Cajon Wash extends north along the general boundary between the San Bernardino Mountains and the San Gabriel Mountains. As such, it includes a wide range of metamorphic and granitic clast types. The surficial materials mapped at the site (San Bernardino North Quadrangle by Miller, Matti and Carson, 2001, USGS Open File Report 01-131) consist of very young wash deposits of late Holocene age. These are relatively thin and are underlain by young alluvial valley deposits, Unit 5, of Miller and others

(2001). The wash deposits and alluvial valley deposits are very similar in composition. No distinct contact between these materials was observed in the highwall.

2.0 SCOPE OF SERVICES

Terracon's scope of services includes the following:

- Review of published geologic maps.
- Field sampling of the Area L south highwall on May 1, 2018. One sample consisting of coarse and fine aggregates was taken from the highwall at three locations (Sample Nos. 1, 2 and 3). The approximate depths of the samples were as follows: 10 feet, 60 feet, and 120 feet. The locations of the samples were determined by the accessibility of the slopes by our geologist.
- Field sampling of the Area L south highwall on May 17, 2018. One sample consisting of coarse and fine aggregates was taken from the highwall at one additional location (Sample No. 4). This sample was obtained from a depth of approximately 100 feet as a check against one apparently anomalous result from the May 1 sampling. Again, the location of this sample was determined by the accessibility of the slopes by our geologist.
- Chemical analysis of the fine aggregate and coarse aggregate in each of the three samples. The chemical analysis consisted of arsenic and nickel. Initially, the acid digestion method (EPA Method 3050B) was utilized to obtain values for whole-rock constituents. A round of SPLP (Synthetic Precipitation Leaching Procedure) by EPA Method 1312 was then conducted to determine the availability of Ni and As in the environment.
- Preparation of this report documenting the sample locations, sample preparation, and test results.

The location of the easterly pit (Area L) in relation to Area Q is shown on the index map included as Exhibit 1. Exhibits 2 and 3 show the approximate locations of the samples.

3.0 SAMPLE COLLECTION AND PREPARATION

One bag of mixed coarse and fine aggregate was collected at four locations in the highwall. Since clasts types are varied, clast types were sampled in proportion to their occurrence in the local area of the highwall. This was done to provide representative samples of the clast types.

The laboratory requires all samples to be smaller than the #4 (1/4 inch) screen. Crushing of the coarse aggregate samples was therefore required. The crushed coarse aggregate passing the #4 screen was split and submitted to the lab.

The fine aggregate in each sample bag was passed through the #8 (1/8 inch) screen, split, and submitted to the lab.

Each sample submitted to the lab for the 3050B and SPLP analyses included approximately 200 grams of sample.

4.0 RESULTS - 3050B ANALYSES

The initial round of 3050B analyses arrived at our consulting laboratory, EMSL Analytical, on May 3, 2018.

The following tables summarize the results of the initial round of the 3050B analyses:

Arsenic Results – 3050B Method			
Sample Number	**Sample Type**[1]	**Depth (feet)**	**Result (ppm)**[2,3]
1	Coarse	100	Not Detected
1	Fine	100	Not Detected
2	Coarse	60	Not Detected
2	Fine	60	2.0
3	Coarse	10	Not Detected
3	Fine	10	Not Detected

1 Sample Type: "Coarse" includes a representative suite of clast types, crushed, passing the 1/4" sieve, and split. "Fine" includes the materials passing the 1/8" sieve and split.
2 Lower level reporting limit is 1.9 to 2.0 ppm; "Not Detected" is below this limit.
3 Lab results (attached) were reported in mg/kg; for consistency, all values are expressed in parts per million (ppm).

Nickel Results – 3050B Method			
Sample Number	**Sample Type**[1]	**Depth (feet)**	**Result (ppm)**[2]
1	Coarse	100	35
1	Fine	100	5.8
2	Coarse	60	13
2	Fine	60	7.7
3	Coarse	10	13
3	Fine	10	7.6

1 Sample Type: "Coarse" includes a representative suite of clast types, crushed, passing the 1/4" sieve, and split. "Fine" includes the materials passing the 1/8" sieve and split.
2 Lab results (attached) were reported in mg/kg; for consistency, all values are expressed in parts per million (ppm).

An apparently high result in the coarse fraction of Sample No. 1 (35 mg/kg) was obtained. We obtained another bag sample (Sample No. 4) from the same depth (100 feet) at a different location to assist in either confirming or denying the apparent anomaly. Sample No. 4 was obtained on May 17 and arrived at the lab on May 23. Testing was requested only for Ni on the coarse fraction and the result is below:

Nickel Results – 3050B Method			
Sample Number	**Sample Type**[1]	**Depth (feet)**	**Result (ppm)**[2]
4	Coarse	100	12

1 Sample Type: "Coarse" includes a representative suite of clast types, crushed, passing the 1/4" sieve, and split. "Fine" includes the materials passing the 1/8" sieve and split.
2 Lab results (attached) were reported in mg/kg; for consistency, all values are expressed in parts per million (ppm).

It should be noted that the 3050B method (acid digestion) yields a whole rock composition of the constituent tested. This whole rock component is not available to the environment from aggregate production and processing. Therefore, we created additional samples from the existing bags for SPLP (Synthetic Precipitation Leaching Procedure) by EPA Method 1312. This method was utilized to determine the availability of Ni and As in the environment.

5.0 RESULTS - SPLP ANALYSES

A total of 16 samples were submitted to the lab for SPLP testing utilizing the coarse and fine fractions from Sample Nos. 1 through 4, prepared as previously described. These samples arrived at the lab on June 4. There was no detection of As or Ni at the detection level of 0.10 mg/L (0.10 ppm) in any of the samples. The results are summarized in the following tables:

Arsenic Results – SPLP Method			
Sample Number	**Sample Type**[1]	**Depth (feet)**	**Result (ppm)**[2, 3]
1	Coarse	100	Not Detected
1	Fine	100	Not Detected
2	Coarse	60	Not Detected
2	Fine	60	Not Detected
3	Coarse	10	Not Detected
3	Fine	10	Not Detected
4	Coarse	100	Not Detected
4	Fine	100	Not Detected

1 Sample Type: "Coarse" includes a representative suite of clast types, crushed, passing the 1/4" sieve, and split. "Fine" includes the materials passing the 1/8" sieve and split.
2 Lower level reporting limit is 0.1 ppm; "Not Detected" is below this limit.
3 Lab results (attached) were reported in mg/L; for consistency, all values are expressed in parts per million (ppm).

Nickel Results – SPLP Method			
Sample Number	**Sample Type**[1]	**Depth (feet)**	**Result (ppm)**[2,3]
1	Coarse	100	Not Detected
1	Fine	100	Not Detected
2	Coarse	60	Not Detected
2	Fine	60	Not Detected
3	Coarse	10	Not Detected
3	Fine	10	Not Detected
4	Coarse	100	Not Detected
4	Fine	100	Not Detected

1 Sample Type: "Coarse" includes a representative suite of clast types, crushed, passing the 1/4" sieve, and split. "Fine" includes the materials passing the 1/8" sieve and split.
2 Lower level reporting limit is 0.1 ppm; "Not Detected" is below this limit.
3 Lab results (attached) were reported in mg/L; for consistency, all values are expressed in parts per million (ppm).

6.0 CONCLUSIONS

Arsenic and nickel may be present in small quantities in granitic rock, metamorphic rocks, and alluvium as accessory minerals (As), and as substitutions in mafic minerals (Ni). Whole rock (EPA 3050) analyses detected these constituents.

The less aggressive leachate method (SPLP) did not detect either As or Ni in any sample within the detection limits. The SPLP method is considered representative of the availability of these constituents to the environment.

7.0 CLOSURE

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact the undersigned at 909-824-7311.

Sincerely,
Terracon Consultants, Inc.

Jay J. Martin, E.G. 1529
Principal

Exhibits:
1) Current and Proposed Location
2) Sample Locations
3) Sample Locations Panorama
4) EMSL Test Results (3 Rounds of Results)

AERIAL PHOTOGRAPHY PROVIDED BY GOOGLE EARTH

AREA L = EXISTING EAST PIT

AREA Q = PROPOSED EXPANSION

Project Manager: JM	Project No. CB185058
Drawn by: KR	Scale: AS SHOWN
Checked by: JM	File Name:
Approved by: JM	Date: JUNE 2018

Terracon

1355 E Cooley Dr Ste C

Colton, CA 92324-3954

CURRENT AND PROPOSED LOCATION

Vulcan Materials Cajon Pit

Off Cajon Blvd. & Roadrunner Tr.

San Bernardino County, CA

Exhibit

1

AERIAL PHOTOGRAPHY PROVIDED BY GOOGLE EARTH

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager: JM	Project No. CB185058
Drawn by: KR	Scale: AS SHOWN
Checked by: JM	File Name:
Approved by: JM	Date: JUNE 2018

Terracon
1355 E Cooley Dr Ste C
Colton, CA 92324-3954

SAMPLE LOCATIONS

Vulcan Materials Cajon Pit
Off Cajon Blvd. & Roadrunner Tr.
San Bernardino County, CA

Exhibit

2

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager: JM	Project No. CB185058
Drawn by: KR	Scale: NONE
Checked by: JM	File Name:
Approved by: JM	Date: JUNE 2018

Terracon
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SAMPLE LOCATIONS

Vulcan Materials Cajon Pit
Off Cajon Blvd. & Roadrunner Tr.
San Bernardino County, CA

Exhibit
3

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Attn: **Jay Martin**
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Colton, CA 92324
Phone: (909) 824-7311
Fax:

5/10/2018

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 5/3/2018. The results are tabulated on the attached data pages for the following client designated project:

Vulcan Cajon Pit Analyses

The reference number for these samples is EMSL Order #011803320. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry
Laboratory Director

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

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EMSL Order: 011803320
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CustomerPO:
ProjectID:

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Phone: (909) 824-7311
Fax:
Received: 05/03/18 9:25 AM

Project: **Vulcan Cajon Pit Analyses**

Analytical Results

Client Sample Description #3 COARSE, 10' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0001*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Arsenic	ND	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #3 COARSE, 10' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0002*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	13	1.9	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #3 FINE, 10' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0003*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Arsenic	ND	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #3 FINE, 10' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0004*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	7.6	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

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Received: 05/03/18 9:25 AM

Project: **Vulcan Cajon Pit Analyses**

Analytical Results

Client Sample Description #2 COARSE, 60' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0005*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Arsenic	ND	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #2 COARSE, 60' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0006*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	13	1.9	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #2 FINE, 60' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0007*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Arsenic	2.0	1.9	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #2 FINE, 60' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0008*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	7.7	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

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Received: 05/03/18 9:25 AM

Project: **Vulcan Cajon Pit Analyses**

Analytical Results

Client Sample Description #1 COARSE, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0009*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Arsenic	ND	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #1 COARSE, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0010*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	35	2.0	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #1 FINE, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0011*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Arsenic	ND	1.9	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

Client Sample Description #1 FINE, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011803320-0012*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	5.8	1.9	mg/Kg	5/4/2018	TD	5/7/2018	BB
WET								
SM 2540G	Total Solids	100	N/A	%	5/9/2018	RK	5/9/2018	RK

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5/29/2018

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 5/23/2018. The results are tabulated on the attached data pages for the following client designated project:

Vulcan Cajon Pit Analyses

The reference number for these samples is EMSL Order #011803997. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry
Laboratory Director

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

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Project: **Vulcan Cajon Pit Analyses**

Analytical Results

Client Sample Description #1 Coarse, 100' ***Collected:*** 5/17/2018 ***Lab ID:*** *011803997-0001*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
3050B/6010C	Nickel	12	2.0	mg/Kg	5/25/2018	DB	5/25/2018	BB
WET								
SM 2540G	Total Solids	99	N/A	%	5/23/2018	MM	5/23/2018	MM

Definitions:

ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit (Analytical)
D - Dilution

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6/8/2018

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 6/4/2018. The results are tabulated on the attached data pages for the following client designated project:

Vulcan Cajon Pit Analyses

The reference number for these samples is EMSL Order #011804305. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry
Laboratory Director

The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

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Project: **Vulcan Cajon Pit Analyses**

Analytical Results

Client Sample Description #3 Coarse, 10' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0001*

Method	Parameter	Result	RL	Units	Prep Date	Analyst	Analysis Date	Analyst
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Client Sample Description #3 Fine, 10' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0002*

Method	Parameter	Result	RL	Units	Prep Date	Analyst	Analysis Date	Analyst
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Client Sample Description #2 Course, 60' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0003*

Method	Parameter	Result	RL	Units	Prep Date	Analyst	Analysis Date	Analyst
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Client Sample Description #2 Fine, 60' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0004*

Method	Parameter	Result	RL	Units	Prep Date	Analyst	Analysis Date	Analyst
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Client Sample Description #1 Coarse, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0005*

Method	Parameter	Result	RL	Units	Prep Date	Analyst	Analysis Date	Analyst
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

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Phone: (909) 824-7311
Fax:
Received: 06/04/18 9:00 AM

Project: **Vulcan Cajon Pit Analyses**

Analytical Results

Client Sample Description #1 Fine, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0006*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Client Sample Description #4 Coarse, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0007*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Client Sample Description #4 Fine, 100' ***Collected:*** 5/1/2018 ***Lab ID:*** *011804305-0008*

Method	*Parameter*	*Result*	*RL*	*Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS								
SPLP 1312/6010C	Arsenic	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB
SPLP 1312/6010C	Nickel	ND D	0.10	mg/L	6/6/2018	DB	6/7/2018	BB

Definitions:

ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit (Analytical)
D - Dilution

APPENDEIX D WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?

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American Thoracic Society

What Constitutes an Adverse Health Effect of Air Pollution?

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY WAS ADOPTED BY THE ATS BOARD OF DIRECTORS, JULY 1999

PURPOSE OF THE STATEMENT

As the twentieth century ends, the health effects of outdoor air pollution remain a public health concern in developing and developed countries alike. In the United States, the principal pollutants monitored for regulatory purposes (carbon monoxide, nitrogen dioxide, sulfur dioxide, particles, ozone, and lead; see Table 1) show general trends of declining concentrations, although ozone pollution now affects many regions of the country besides southern California (1). Yet, even at levels of air pollution now measured in many cities of the United States, associations between air pollution levels and health indicators are being demonstrated at concentrations around those set by standards of the U.S. Environmental Protection Agency (2, 3). In many countries of the developing world, concentrations of air pollutants are rising with industrialization and the increasing numbers of motor vehicles (4, 5). Extremely large and densely populated urban areas, often referred to as "megacities," have the potential to generate unprecedented air quality problems.

There are common principles to air quality management throughout the world. Public health protection unifies all approaches, whether based on voluntary guidelines, mandated standards for concentrations, or source control. The intent is to limit or to avoid any impact of air pollution on the public's health. Air quality management is thus based on a scientific foundation built from the epidemiologic, toxicologic, and clinical evidence on health effects of air pollution. In interpreting this evidence for public health protection, there is a need to identify those effects that are considered "adverse" and to separate them from those effects not considered adverse.

The American Thoracic Society has previously provided guidance on the distinction between adverse and nonadverse health effects of air pollution in its 1985 statement, "Guidelines as to What Constitutes an Adverse Respiratory Health Effect" (6). Definitions of adverse effects have also been offered by the World Health Organization (7–10), but the guidance of the American Thoracic Society has received particular emphasis in the United States. Preparation of the original statement was intended to coincide with consideration of the passage of an amended Clean Air Act and to provide a framework for interpreting scientific evidence relevant to the mandate of the act. In particular, the Clean Air Act requires that the Administrator of the Environmental Protection Agency promulgate, for certain pollutants, standards that will be sufficient to protect against adverse effects of the air pollutants on health. The act is silent on the definition of "adverse effect" and, at the time of the 1985 statement, there was considerable controversy around the interpretation of this language as revision of the act was being considered. Recognizing the need of policy makers for expert guidance, the American Thoracic Society released the 1985 statement, which to date constitutes the sole set of recommendations on this issue from an expert panel convened by a health organization.

The American Thoracic Society has revised the 1985 statement because new scientific findings, published since the original statement, have again raised questions as to the boundary between adverse and nonadverse in considering health effects of air pollution. These new findings reflect improved sensitivity of research approaches and the application of biomarkers that can detect even subtle perturbations of biologic systems by air pollutants. Epidemiologic research designs have been refined and large sample sizes and increasingly accurate methods for exposure assessment have increased the sensitivity of epidemiologic data for detecting evidence of effects. New statistical approaches and advances in software and hardware have facilitated analyses of large databases of mortality and morbidity information. The design of clinical studies-including controlled exposures of volunteers-has also advanced and biologic specimens may be obtained after exposure, for example, by fiberoptic bronchoscopy, to identify changes in levels of markers of injury. Toxicologic studies have also gained in sophistication through incorporation of more sensitive indicators of effect and the careful tracing of the relationship between exposure and biologically relevant doses to target sites, which may now be considered at a molecular level.

New dimensions have been added to the array of outcome measures. Medical outcomes research now recognizes that patient well-being should be broadly conceptualized and measured rigorously, in addition to considering the biological process of the disease itself. As a result, health-related quality of life, the perception of well-being, is now considered a necessary component of outcomes research. Validated instruments have been developed to assess the impact of health-related symptoms and impairment on functional status and quality of life (11-14). The formalization of the concept of environmental justice acknowledges that the effects of specific pollutants cannot be evaluated in isolation without giving consideration to the overlapping exposures of populations, often minority group members of low socioeconomic status, who live in neighborhoods that are heavily exposed to multiple environmental contaminants (15).

This new statement, like the 1985 statement, is intended to provide guidance to policy makers and others who interpret the scientific evidence on the health effects of air pollution for the purpose of risk management. The statement does not offer strict rules or numerical criteria, but rather proposes principles to be used in weighing the evidence and setting boundaries between adverse and nonadverse health effects. Even if the technical tools were available for scaling the consequences of air pollution on the multiple relevant axes, the placement of dividing lines should be a societal judgment and consequently

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TABLE 1

U.S. NATIONAL AMBIENT AIR QUALITY STANDARDS*

Pollutant	NAAQS Concentration (ppm)	NAAQS Concentration ($\mu g/m^3$)	Standard Type
Particulate matter ≥ 10 Pm ($PM_{,,}$)			
24-h average		150	Primary and secondary
Annual arithmetic mean		50	Primary and secondary
Particulate matter ≥ 2.5 μm ($PM_{2.5}$)			
24-h average		65	Primary and secondary
Annual arithmetic mean		15	Primary and secondary
Ozone (0,)			
24-h average	0.12	235	Primary and secondary
Annual arithmetic mean	0.08	157	Primary and secondary
Sulfur dioxide ($SO_,$)			
24-h average	0.14	365	Primary
Annual arithmetic mean	0.03	80	Primary
3-h average	0.50	1,300	Secondary
Nitrogen dioxide ($NO_,$)			
Annual arithmetic mean	0.053	100	Primary and secondary
Carbon monoxide (CO)			
1-h average	35	40	Primary
8-h average	9	10	Primary
Lead (Pb)			
Quarterly average		1.5	Primary and secondary

* For detailed information on scientific bases and policy considerations underlying decisions establishing the NAAQS listed here, see the AQCDs, staff papers, and NAAQS Promulgation notices cited in text. Such information can also be obtained from several internet websites (e.g., http://www.epa.giv/airs/criteria.html; http://www.epa.gov/oar/oaqps/publicat.html; and http://www.epa.gov/ncea/biblio.htm).

this committee does not propose specific boundaries for separating adverse from nonadverse effects.

OVERVIEW OF THE 1985 STATEMENT

The 1985 statement of the American Thoracic Society was directed at respiratory health effects of air pollution and emphasized the interpretation of the epidemiologic evidence. The statement recognized the spectrum of responses to air pollution, which begins with exposure and evidence of exposure and ends at death. This spectrum has been characterized as a pyramid, based in the most common consequence-exposure-and having mortality, the least common and most severe consequence, at its tip. The statement included a table that lists adverse respiratory health effects, seemingly in order of declining severity (Table 2). The 1985 statement hinged the distinction between adverse and nonadverse effects on medical considerations. The committee recognized that the boundary is further influenced by societal considerations: "Where one draws the line to categorize it as an adverse health effect or an action level between pathophysiologic or physiologic change is probably best left to the individual or the community."

The committee's definition of adverse respiratory health effects was ". medically significant physiologic or pathologic changes generally evidenced by one or more of the following: (*1*) interference with the normal activity of the affected person or persons, (2) episodic respiratory illness, (3) incapacitating illness, (4) permanent respiratory injury, and/or (5) progressive respiratory dysfunction." The committee noted that all changes are not adverse, citing the example of carboxyhemoglobin. The level of carboxyhemoglobin, beyond that from endogenous production, is indicative of exposure but it is not predictive of adverse effects until reaching threshold levels, depending on the effect and the susceptibility of the exposed person. The statement recognized that a distinction should be

TABLE 2

ADVERSE RESPIRATORY HEALTH EFFECTS

A. Increased mortality (*Increased* as used here and subsequently means significantly [$p < 0.05$] increased above that recorded in some standard, comparable population. In selected situation, $p < 0.1$ may be appropriate)
B. Increased incidence of cancer
C. Increased frequency of symptomatic asthmatic attacks
D. Increased incidence of lower respiratory tract infections
E. Increased exacerbations of disease in persons with chronic cardiopulmonary or other disease that could be reflected in a variety of ways
   1. Less able to cope with daily activities (i.e., shortness of breath or increased anginal episodes)
   2. Increased hospitalization, both frequency and duration
   3. Increased emergency ward or physician visits
   4. Increased pulmonary medication
   5. Decreased pulmonary function
F. Reduction in FEV_1 or FVC associated with clinical symptoms
   1. Chronic reduction in FEV, or FVC associated with clinical symptoms
   2. A significant increase in number of persons with FEV_1 below normal limits: chronically reduced FEV, is a 'predictor of increased risk of mortality. Transient or reversible reductions that are not associated with an asthmatic attack appear to be less important. It should be emphasized that a small but significant reduction in a population mean FEV, or $FEV_{,75}$ is probably medically significant, as such a difference may indicate an increase in the number of persons witn respiratory impairment in the population. In other words, a small part of the population may manifest a marked change that is medically significant to them, but when diluted with the rest of the population the change appears to be small
   3 An increased rate of decline in pulmonary function (FEV,) relative to the predicted value in adults with increasing age or failure of children to maintain their predicted FEV, growth curve. Such data must be standardized for sex, race, height, and other demographic and anthropometric factors
G. Increased prevalence of wheezing in the chest apart from colds, or of wheezing most days or nights. (The significance of wheezing with colds needs more study and evaluation.)
H. Increased prevalence or incidence of chest tightness
I. Increased prevalence or incidence of cough/phlegm production requiring medical attention
I. Increased incidence of acute upper respiratory infections that interfere with normal activity
K. Acute upper respiratory tract infections that do not interfere with normal activity
L. Eye, nose, and throat irritation that may interfere with normal activity (i.e., driving a car) if severe
M. Odors

drawn between effects to individuals and effects to populations and that populations are heterogeneous in their susceptibility. The comment was offered that a change in a population could be "medically significant" for that group. The statement also provides guidance on interpretation of'reversible effects and on interpreting irreversible effects. In acknowledging that research would continue to address uncertainties, the committee recommended that the guidelines should be periodically reviewed and updated.

METHODOLOGY FOR DEVELOPING THIS STATEMENT

Following the recommendation of the committee that authored the 1985 statement, the Environmental and Occupational Health Assembly of the American Thoracic Society recognized a need to reconvene a group to review and revise the prior statement. The statement had been used for more than a decade and new investigative approaches were being used to identify effects of air pollution that were not considered by the first committee. In addition, societal perspectives had shifted since the early 1980s and a forma1 concern for the impact of air

pollution on specific groups had been expressed through the environmental justice movement.

To revise the statement, a multidisciplinary committee was convened in 1997 that included expertise in pulmonary medicine, public health, epidemiology, both clinical and animal toxicology, biochemistry, and cellular and molecular biology. This committee conducted several planning meetings and consulted experts in environmental economics and in ethics. In addition, a multidisciplinary workshop was convened to gain input from the range of groups potentially interested in the statement and its application. The committee's approach was discussed at a symposium held at the 1999 Annual Meeting of the American Thoracic Society. After further revisions, the statement was reviewed and submitted to the Board of the American Thoracic Society.

BACKGROUND ON THE CLEAN AIR ACT

The preparation of the original statement was largely motivated by potential ambiguity in interpreting the language of the Clean Air Act, which addresses adverse effects of air pollution without providing clear guidance as to the distinction between adverse and nonadverse effects. In addition, questions regarding this distinction arise repeatedly in interpreting the findings of research studies, whether observational or experimental. Consequently, the 1985 statement has had broader application than just the interpretation of evidence on air pollution and health for the purpose of promulgating air quality regulations. Nonetheless, the committee found the legislative history of the Clean Air Act to be relevant to its charge.

The first national legislation on air pollution, the Air Pollution Control Act, was passed in the mid-1950s; the original Clean Air Act was passed in 1963 and last revised in 1990. The act is lengthy and complex in its provisions; most relevant to considerations in defining an adverse health effect are Sections 108 (Air Quality Criteria and Control Techniques), 109 (National Ambient Air Quality Standards), and 112 (Hazardous Air Pollutants). National Ambient Air Quality Standards (NAAQS) are set individually for six prevalent pollutants (Table 1), often referred to as "criteria pollutants." They are so designated because of the requirement for comprehensively reviewing relevant information in a criteria document. The primary NAAQS are to be set at a level that protects the public health with an adequate margin of safety, regardless of economic or technical feasibility of attainment. The secondary standards are concerned with welfare and environmental consequences.

The hazardous air pollutants, as defined in Section 112, are not covered under Sections 108 and 109 as criteria pollutants. In 1990, the Congress offered a list of 189 such pollutants and a process for listing and delisting substances. The 1990 Clean Air Act states: "The Administrator shall periodically review [and revise] the list [of 189 hazardous air pollutants] by. adding pollutants which present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic). ." Section 112(f)(2) further directs the Environmental Protection Agency to assess whether the emissions standards for the listed hazardous air pollutants required under other subsections "provide an ample margin of safety to protect public health" and if not, then the agency is to develop standards that will address the "remaining risk."

The historical record provides an indication of the intent of the Congress in framing the language of the Clean Air Act with regard to protection of the public's health. Research now shows that the most highly susceptible individuals may respond to common exposures that are often at or close to natural background pollutant levels.

With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment." The act further suggested that the adequacy of any standard could be tested in a statistically representative sample of sensitive individuals. The hearing record on the 1970 act is informative. Dr. Hon T. Middleton (Commissioner, National Air Pollution Control Administration, Department of Health, Education, and Welfare) addressed the Senate Subcommittee on Air and Water Pollution of the Committee on Public Works on May 27, 1970. He testified that the intent of any national air quality standard is to be "protective of health in all places" and set at a level below which effects have not been observed. Dr. Middleton recognized the difficulty of finding a demarcation point of exposure below which there is no effect and he noted that there may be subtle effects and evolving scientific understanding.

Further difficulties in the language of the Clean Air Act were later noted in ***A Legislative History of the Clean Air Act Amendments of 1977: A Continuation of the Clean Air Act Amendments of 1970.*** This document noted the difficulty of applying the margin of safety and the erosion of margins of safety by advancing scientific knowledge. The document also commented on the implicit assumption of a safe threshold in the language of the act and the implausibility of this assumption. The report questioned whether the NAAQS (I) protect against genetic mutations, birth defects, and cancer, (2) take sufficient account of the consequences of long-term low-level exposures or short-term peaks, and (3) sufficiently consider synergism among pollutants and the formation of secondary pollutants, e.g., sulfates, with their own toxicity. These considerations remain relevant more than 20 years later.

This selective review of the historical record indicates that Congress intended that the NAAQS would afford health protection not only to the general population but to subgroups with enhanced susceptibility to air pollution, including people with asthma and people with chronic obstructive lung disease. Nevertheless, it is also clear that some exquisitely susceptible individuals might remain outside the ambit of protection of the NAAQS. A margin of safety was to be provided but quantitative specification was not offered. The evolutionary nature of the supporting scientific evidence was repetitively acknowledged and the need to distinguish adverse from nonadverse effects was at least implicitly recognized. The current language of Section 112 explicitly acknowledges the possibility of shifting understanding of risks of specific hazardous air pollutants.

GENERAL CONSIDERATIONS

In preparing the statement, the committee identified several general considerations that are relevant to interpreting evidence on the health effects of air pollution. Each of these considerations and the committee's judgment as to their proper weighting are detailed below.

Population Health versus Individual Risk

The effects of air pollution can be viewed in the complementary contexts of the increment of an individual's risk for disease—the clinician's measure of impact-and of the additional risk incurred by a population, which is the public health perspectivc (16). Both perspectives arc relevant to interpreting research findings on air pollution and to regulations that are protective of the public's health. Any risk incurred by an exposed individual beyond some boundary, determined by the individual or on a societal basis, could be deemed unacceptable. For example. prolonged exposure to a respiratory carcinogen could result in an individual-level incremental risk of exposure of 10^{-4}, more than two orders of magnitude lower than the baseline lifetime individual risk in the United States. Nevertheless, among an exposed population of IO', the estimated number of cancer cases that might result from such an exposure would number 10^3, illustrating that minute individual risks may be significant from the standpoint of population exposures.

Exposure could also enhance risk for a population to an unacceptable degree, perhaps without shifting the risks of any particular individuals to an unacceptable level. Figure 1 illustrates the distinction. In Figure 1 A, the population's distribution of exposure shifts toward a higher level and some members of the population cross the boundary to an unacceptable risk. In Figure 1B, the shift affects the position of the population distribution, but no individuals move to an unacceptable level of risk. Effects on persons with asthma are illustrative. A population of children with asthma could have a distribution of lung function such that no individual child has a level associated with significant impairment. Exposure to air pollution could shift the distribution toward lower levels without bringing any individual child to a level that is associated with clinically relevant consequences. Individuals within the population would, however, have diminished reserve function and are at potentially increased risk if affected by another agent, e.g., a viral infection. Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population. should be considered adverse, even in the absence of the immediate occurrence of frank illness.

Ethics and Equity

The past decade has brought increasing concern over the ethics of heterogeneous, inequitable distributions of environmental and occupational exposures (IS). Within the United States, some groups receive disproportionate exposures to environmental agents that arc injurious to health; the environmental justice movement seeks to redress these inequities. The exposures of concern originate in breathing polluted outdoor air, living in substandard housing with indoor air pollution problems, including exposures to certain bioacrosols and combustion products, and working in jobs with occupational respiratory risks. Groups encompassed by this movement in the United States include various racial and ethnic minority populations. particularly those living within urban areas, and the socioeconomically disadvantaged. In the developing world, such exposures can occur at substantially higher levels and may, in some instances, extend to a majority of a given nation's population. Limited access to care and medications may enhance susceptibility to pollution.

The concept of environmental equity had not been formally voiced when the 1985 statement was written. The present committee viewed inequities of exposure as potentially representing a form of susceptibility to air pollution. In other words, individuals within the target groups may be at increased risk of experiencing adverse effects from a given level of ambient air pollution because their baseline risk level may have been raised by other exposures. Moreover, in some instances there may be genetic and nutritional factors enhancing susceptibility as well. It should be noted, however, that there are other exposure scenarios and other subpopulations with increased baseline risks that are not formally included within the environmental justice movement. The heterogeneity of populations needs full acknowledgment, whether it reflects disproportionate noxious exposures or other factors. Observing that there have been few investigations of the effects of other exposures, genetics, or nutrition on susceptibility to air pollution-related effects, either in the United States or internationally, the committee issued a call for additional research in these areas.

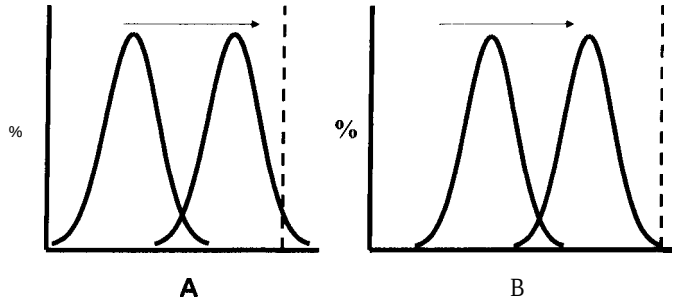

Figure 7. Hypothetical distributions **of exposure for two populations, *A* and *B*. (See text for explanation.)**

Economic Costs

Adverse health effects of air pollution incur costs, including direct costs of providing treatment for illness and indirect costs of lost work time and productivity. Cost-benefit analysis provides an estimate of the balancing of the costs of controls against the benefits; cost effectiveness analysis provides an indication of the level of control accomplished in relation to costs. Cost-benefit and cost-effectiveness analysis are assumption-laden tools now being used for policy-making purposes. Cost estimates depend on the valuation given to illness, lost work time and productivity, and even to lost life. It has been proposed that cost-benefit analysis may facilitate the process of deciding whether a given air pollution-related health impact should be considered adverse. The legislative history of the Clean Air Act explicitly excludes consideration of economic factors in setting ambient air quality standards or in developing emissions standards for hazardous air pollutants. In the context of air quality regulation, cost-benefit analysis is a multistep process involving the articulation of value judgments regarding potential costs (expenditures of public and private resources to reduce pollutant emissions and exposures) versus benefits (avoidance of specified adverse health impacts in a designated population). Benefits, in theory, should be quantified as the willingness of beneficiaries to pay to avoid the adverse impact. In practice, quantification of such health impacts from exposure to air pollution is often based on direct costs related to medical treatment and indirect costs such as school absenteeism, lost work time, decreased productivity, and, at the extreme, person-years of life lost. Valuations of a given effect may vary internationally, as differences in population age distributions, comorbidity, nutritional status, and other circumstances can affect this process. Ideally, cost–bene-

fit analysis should make explicit the value judgments underlying these assessments, highlighting distinctions among alternative pollution control strategies to achieve specific air quality standards. Willingness of individuals to pay to avoid adverse health effects is also estimated from responses to contingent valuation surveys and from market data concerning choices about employment that carries health risks.

Nevertheless, the committee concurred that the specification of which health effects should be considered adverse must precede the application of cost-benefit analysis for evaluation of air pollution control strategies. That is, once a given outcome is designated as adverse, this information can be used as input to cost-benefit analysis. Estimates of costs associated with a given health outcome. while useful from a public policy perspective, cannot be translated into any clinical or biological framework to distinguish adverse from nonadverse effects. Therefore, the committee concluded that however valuable this economists' tool may be for regulatory decision-making, cost-benefit analysis lay outside the scope of this position paper and, indeed, the expertise of the American Thoracic Society.

Susceptibility

The issue of susceptibility has been recognized throughout the history of our initiatives to regulate outdoor air pollution. Susceptibility, broadly defined, may include extrinsic factors, including the profile of exposures to other pollutants, for example, in the workplace or at home, and intrinsic factors, for example, genotype. The size of the population of individuals susceptible to indoor air pollution is large, potentially including infants and the elderly, persons with chronic heart and lung diseases, and the immunocompromised. Persons with multiple deleterious exposures may also be considered as having heightened susceptibility, particularly if the combined effects of the agents are synergistic. Even with the populations considered as susceptible there is a distribution of the degree of susceptibility. For example, levels of nonspecific airway responsiveness in persons with asthma span several orders of magnitude.

The current explosive growth in knowledge of the genetic basis of lung disease, including responses to environmental agents, will provide increasing insights into the mechanistic basis of susceptibility and provide markers of risk status. We already have evidence of between-person variation in the pulmonary function response to ozone and interstrain variation in the pulmonary effects of environmental exposures, including criteria pollutants, in rodent species. As we develop the capacity to more precisely identify those at risk, we may find it increasingly challenging to assure protection for all individuals against adverse health effects.

The present committee agreed with the principle espoused in the Clean Air Act: that regulations should extend protection to include those with enhanced susceptibility to air pollution, recognizing that some highly susceptible individuals may still respond to low-level exposures. Research now shows that some highly susceptible individuals may respond to common exposures that are often unavoidable. Furthermore, by definition, susceptible individuals cannot have the same margin of safety as the nonsusceptible groups within the population.

Heterogeneity of Perspectives

In society there is an extraordinary range of views on environmental issues and tolerance of risk. Looking more globally to other developed countries and to the developing countries, the range of perspectives is even broader. The committee acknowledges that any defined boundaries for distinguishing adverse health effects may not be embraced by all groups. This heterogeneity and the possibility that some may reject the committee's proposal challenged the committee to recommend in principle that control measures should maximize public health benefits while assuring equity.

DIMENSIONS OF ADVERSE EFFECTS

Biomarkers

Biomarkers are indicators of exposure, effect, or susceptibility that are measured in biologic materials, such as blood or bronchoalveolar lavage fluid. The concept of biomarkers has been formalized since the 1985 statement (17) and since then. a continuously increasing number of candidate indicators of exposure, effect, and susceptibility have been developed and applied in laboratory studies of humans and animals and in both occupational and environmental population studies. The progressive refinement of techniques in the field of cellular and molecular biology, and the burgeoning understanding of the complex chemical intracellular and cell-to-cell signaling pathways collectively termed "cytokines" (18), have rapidly expanded the spectrum of candidate markers of effects. It is now possible to detect very early, or initiating phases of responses at the molecular level, such as the production of mRNA for cytokines. Similarly, the progressive development of genetic assays and understanding of the human genome have provided numerous candidate markers of both effects and susceptibility (19).

Biomarkers relevant to air pollution have been measured in blood, exhaled air, urine, sputum, and in bronchoalveolar lavage fluids and tissue specimens collected by bronchoscopy. Bronchoalveolar lavage fluids, for example, are now frequently analyzed for cell numbers and types, cytokines (e.g., several interleukins and tumor necrosis factor α), enzymes (e.g., lactate dehydrogenasc and β-glucoronidase), fibronectin, protein, arachidonic acid metabolites, and reactive oxygen species. Because many of the epithelial cell types of the nasopharyngeal region are similar to epithelia and responses in the trachea, bronchi, and bronchioles, responses of nasal cells have been examined as potential biomarkers for their ability to predict parallel responses in lung airways, which are more difficult to sample.

Biomarkers have been extensively applied in toxicologic studies of air pollution, both in animals and in clinical studies involving exposures of human volunteers. The biomarkcrs are examined for their ability to provide evidence of "biologically effective" doses, including the earliest phases of homeostatic responses, the occurrence of injury, outcomes that are intermediate between injury and disease, and the presence of established disease processes. Genetic markers of susceptibility have begun to be applied to the respiratory system, and this application will undoubtedly expand rapidly. A frequent goal of biomarker development is the ability to readily measure changes that precede and predict continued or progressive events leading to clinical effects and disease (Figure 2).

To date, although biomarkers have proved informative about homeostatic adjustments to exposure and the mechanisms of injury and disease, lack of validation against previously established measures of effect. such as clinical status or even physiologic impairment, remains an important weakness. We do not know if elevations of biomarkers during short-term experimental exposures signal risk for ongoing injury and clinical effects or simply indicate transient responses that can provide insights into mechanisms of injury. The utility of some older biomarkers is well established, such as the relationships among carboxyhemoglobin. exposure to carbon monoxide,

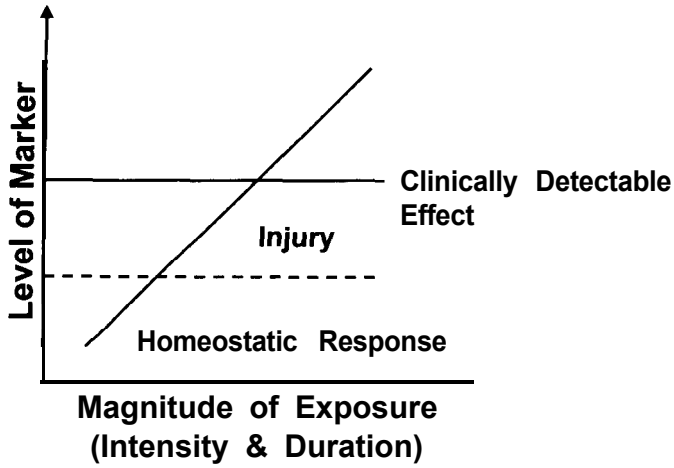

figure 2. Schema for considering biomarkers of response.

impairment of oxygen-carrying capacity, and the risk for angina in the presence of ischemic heart disease. However, the interpretative value for the majority of the many promising new cytokine and genetic biomarkers remains to be established. Not only is it difficult to assess the value of many biomarkers for distinguishing between physiological, homeostatic responses and injury, but it is also difficult to judge the value of changes during short-term exposures for predicting ongoing injury or risk for longer-term clinical effects.

The committee concluded that the continued development of biomarkers is an important need because of their considerable potential not only for detecting the adverse effects of air pollution exposure, but also for aiding the determination of the types and levels of response that should be considered adverse. We often do not know in a parallel, iterative manner, whether the exploration and validation of biomarkers will unquestionably advance our understanding of the mechanisms of homeostatic and injury responses. At this time, however, few of the rapidly growing list of candidate biomarkers have been validated to such an extent that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. Thus, we presently have only a very modest ability to translate evidence from biomarkers directly into a taxonomy of adverse health effects. Consequently, the committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.

Quality of Life

Health, in its broadest definition, includes not only the absence of disease but the attainment of well-being. Since the preparation of the 198.5 statement, the National Institutes of Health, the Centers of Disease Control, the Food and Drug Administration, and the World Health Organization have broadened their perspective of health to incorporate the concept of health-related quality of life as a valid and important health outcome. Health-related quality of life (HRQL) refers to the individual's perception of well-being, and includes such factors as self-care functioning, mental health, pain, and sense of overall well-being. Decreased health-related quality of life is widely accepted to be an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or the population in general, were consequently considered by this committee to be adverse health effects. Air pollution exposure can adversely affect several domains of quality of life including physical functioning (particularly for persons with respiratory or cardiovascular conditions) and general well-being. Stinging, watery eyes resulting from air pollution not only reflect a chronic physical symptom but may decrease overall quality of life. Outdoor air pollution and odors have been associated with psychiatric symptoms, including anxiety and depression. Increased levels of some air pollutants have been reported to be associated with an increase in psychiatric admissions. The potential effects of air pollution and respiratory symptoms on different domains of quality of life are illustrated in Figure 3.

Measurement of the impact of air pollution on health-related quality of life can be accomplished either by measuring specific domains that may be influenced by air quality (e.g., anxiety, functional status), or by using specific quality of life instruments designed to measure multiple health-related domains (e.g., MOS-SF-36, St. George's Respiratory Questionnaire). The cost-benefits of improved air quality on health-related quality of life could also be measured by the use of quality of life measures that employ utility rating scales. The effects of air pollution of a magnitude considered to be clinically significant with these instruments should be regarded as adverse in interpreting evidence on the health effects of air pollution, regardless of the affected dimension. Additional research is needed to develop an information base for interpreting data from new and more sensitive instruments directed specifically at air pollution.

Physiological impact

The 198.5 statement acknowledged a distinction between reversible and irreversible effects. Healthy persons may sustain transient reductions in pulmonary function associated with air pollution exposure, e.g., reduction of the forced vital capacity (FVC) with exercise at times of higher levels of ozone pollution. However, the committee recommends that a small, transient loss of lung function, by itself, should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered as adverse. This recommendation is consistent with the 1985 statement. The Environmental Protection Agency has also needed to address the interpretation of such data. The Envi-

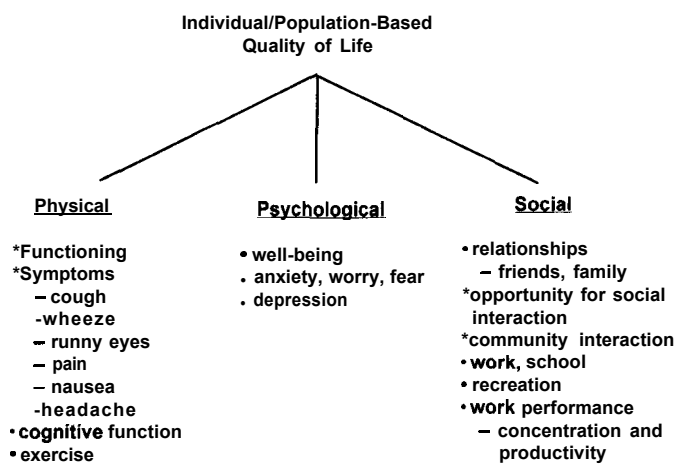

Figure 3. Quality of life domains vulnerable to the adverse health/respiratory effects of air pollution.

ronmental Protection Agency, in its 1989 review of ozone (20), offered a graded classification of lung function changes in persons with asthma. Reduction of the forced expiratory volume in 1 s (FEV_1) was graded as mild, moderate, or severe for reductions of less than 10%, 10–20%, and more than 20%, respectively. This classification has not been validated for acceptability or against other measures.

There is also epidemiologic evidence that air pollution may adversely affect lung growth or accelerate the age-related decline of lung function. Epidemiologic studies are limited in their power to detect such permanent effects and any evidence of association between air pollution exposure and permanent loss of function is indicative of an adverse effect at the population level. Some individuals may sustain clinically relevant, permanent losses of lung function. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered as adverse.

Symptoms

Air pollution exposure can evoke symptoms in persons without underlying chronic heart or lung conditions and also provoke or increase symptom rates in persons with asthma and chronic obstructive lung disease. The Environmental Protection Agency also offered a scale for cough and pain on taking a deep breath in its 1989 ozone review (20). "Infrequent cough" was classified as "None/Normal."

Do all levels of increased symptom occurrence constitute an adverse health effect? The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered as adverse at the individual level. Characterizing the degree of symptomatology associated with diminished quality of life is an appropriate focus for research and a topic that could be investigated using new approaches for assessing quality of life. A change in clinical status can be appropriately set in a medical framework as one requiring medical care or a change in medication. At the population level, any detectable increment in symptom frequency should be considered as constituting an adverse health effect.

Clinical Outcomes

A wide range of clinical outcome measures has been considered in relation to air pollution, including population-level effects, such as increases in numbers of emergency room visits for asthma or hospitalizations for pneumonia, and individual-level effects, such as increased need for bronchodilator therapy. The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered adverse.

At the population level, the magnitude of the detectable air pollution effect will depend on the extent of the data available for evaluation and methodological aspects of the data, including the degree of error affecting exposure and outcome variables. With large databases, seemingly modest effects may be detectable. However, the committee recommends that no level of effect of air pollution on population-level clinical indicators can be considered acceptable.

Mortality

Following the development of new approaches for the analysis of time-series data, extensive analyses have now been reported on the relationship between daily mortality counts and levels of air pollution on the same or prior days. Several prospective cohort studies have also addressed the effect of longer-term indicators of air pollution exposure on mortality, controlling for relevant individual factors, including age, sex, cigarette smoking, and occupational exposures, among others. Cross-sectional studies-comparing mortality across locations having different levels of air pollution while controlling for a variety of potential confounding factors-have also been conducted. The air pollution-associated mortality findings figured prominently in the recent revision of the U.S. NAAQS for particulate matter.

Associations between air pollution levels and daily mortality counts have been interpreted by some as reflecting the impact of air pollution on a pool of frail individuals with severe underlying heart or lung disease. One explanation for the day-to-day associations attributes them to a brief advancement of the time of death for extremely frail individuals who would have been expected to die soon even in the absence of an air pollution-related insult (21). Work has shown, however, that while this phenomenon of advancement, referred to as mortality displacement, may occur, it cannot provide a full explanation of the associations repeatedly found between daily fluctuations of air pollution and mortality (22, J. Schwartz, "Harvesting and long term exposure effects in the relationship between air pollution and mortality" [1999, unpublished manuscript]). In addition, some mortality time-series studies have found effects across all age strata, not just among the elderly or the very young, suggesting potentially substantial effects on person-years of life lost. Finally, studies of long-term exposures have shown a gradient of mortality risk from cardiopulmonary disease as well as differences in life expectancy across cities with different long-term pollution levels. Thus, although we still have little insight into the extent to which mortality displacement occurs, the evidentiary ensemble from several types of study designs consistently shows that air pollution can shorten the life span to an unacceptable degree.

Risk Assessment

Since the publication of the 1985 statement, quantitative risk assessment has emerged as a key tool for summarizing information on risks to health from environmental agents. Quantitative risk assessment offers a framework for organizing information on risks within its four elements: hazard identification, exposure assessment, dose-response assessment, and risk characterization. The findings of a risk assessment, encompassed in the risk characterization component, may include an overall assessment of impact, a description of the distribution of risk in the population, and an evaluation of risk for susceptible persons within the population. Quantitative risk assessment has been a cornerstone in evaluating risks of environmental carcinogens and we anticipate increasing application to non-carcinogenic health effects of environmental agents, including air pollution.

In interpreting the findings of risk assessments, guidance can be found in precedents offered by key interpretations of regulatory requirements, including the Supreme Court's decision on the benzene standard proposed by the Occupational Safety and Health Administration, and in pollutant-specific regulatory actions. Risks may be couched as the numbers of attributable events in the population and also as the level of risk incurred by individual members of the population.

The committee recognized the rising use and potential utility of quantitative risk assessment in characterizing the health effects of air pollution. However, the committee noted that the results of quantitative risk assessment can often be sensitive to assumptions regarding the distribution and magnitude of exposure, the choice of an appropriate dose-response relationship, and other input decisions. Judgments on acceptability of risk are societal and made through complex regulatory

processes involving extensive public input. The committee did not consider that its mandate extended to offering specific guidance on acceptable risk levels for populations or individuals, nor is risk assessment an appropriate basis for determining what constitutes an adverse effect.

CONCLUSIONS

Since the preparation of the 1985 statement of the American Thoracic Society, there have been tremendous advances in the scientific methods used to investigate the health effects of air pollution. These advances range from the molecular to the behavioral levels of inquiry. As a result, this statement covers topics that are new since the 1985 statement. Yet, this committee, like the 1985 group, was confronted by a lack of formal research or investigation on the very topic of this statement: the boundary between adverse and nonadverse effects. Consequently, the committee needed to exercise its collective judgment on matters that should be based in some broader, societal decision-making process. Its recommendations are summarized below.

- ***Biomarkers.*** Few of the rapidly growing list of candidate biomarkers have been validated sufficiently that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. The committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.
- ***Quality of life.*** Decreased health-related quality of life is widely accepted as an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or for the population in general, were consequently considered to be adverse by this committee.
- ***Physiological impact.*** The committee recommends that a small, transient loss of lung function, by itself. should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered adverse. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered adverse.
- ***Symptoms.*** The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered adverse at the individual level.
- ***Clinical outcomes.*** The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered as adverse.
- ***Mortality.*** This committee agreed with the conclusion articulated by the 1985 group that any effect on mortality should be judged as adverse. In addition, we are now faced with the challenge of interpreting the findings of time-series studies of effects on short time frames. In interpreting this type of evidence, consideration needs to be given to the extent of life-shortening underlying the association.
- ***Population health versus individual risk.*** Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population, should be considered adverse, even in the absence of the immediate occurrence of frank illness.

This statement was prepared by an ad-hoc committee of the Assembly on Environmental and Occupational Health. Members of the committee are:

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APPENDEIX E LIST OF RULES TENTATIVELY PROPOSED TO BE ADOPTED OR AMENDED BY SCAQMD (http://www.aqmd.gov/home/rules-compliance/rules/proposed-rules)

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- Proposed Amended Rule 219 (/docs/default-source/rule-book/Proposed-Rules/219-222/par-219.pdf?sfvrsn=4) - April 5, 2017 (PDF, 164kb)
- Proposed Amended Rule 222 (/docs/default-source/rule-book/Proposed-Rules/219-222/par-222.pdf?sfvrsn=4) - April 5, 2017 (PDF, 74kb)
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- Proposed Amended Rule 219 (/docs/default-source/rule-book/Proposed-Rules/219-222/par-219-final---feb-17.pdf?sfvrsn=2) - February 17, 2017 (PDF, 462kb)

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- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/219-222/pdsr-for-rules-219-222.pdf?sfvrsn=2) - February 17, 2017 (PDF, 73kb)
- Proposed Amended Rule Language PAR 219 Working Group #2 Draft (/docs/default-source/rule-book/Proposed-Rules/219-222/proposed-amended-rule-219-11-09-16---draft-for-working-group.pdf?sfvrsn=2) - November 10, 2016 (PDF, 260kb)
- Working Group #2 Presentation (/docs/default-source/rule-book/Proposed-Rules/219-222/second-working-group-meeting---11-9-16-final.pdf?sfvrsn=2) - November 10, 2016 (PDF, 1MB)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/219-222/second-working-group-meeting---printer-friendly.pdf?sfvrsn=2) - November 10, 2016 (PDF, 542kb)

- Proposed Amended Rules 219/222 Working Group Notice (/docs/default-source/rule-book/Proposed-Rules/219-222/219-working-group-notice.pdf?sfvrsn=6) - July 15, 2016 (PDF, 152kb)

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Proposed Amended Rule 1106
Marine and Pleasure Craft Coating Operations

- Proposed Amended Rule 1106 Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1106/par1106-draft-rule-language-rev.pdf?sfvrsn=4) - September 2015 rev-1 (PDF, 657kb)
- Proposed Amended Rule 1106 Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1106/par-1106-draft-staff-report-09-01-15.pdf?sfvrsn=6) - September 2015 rev-1 (PDF, 628kb)
- Proposed Recinded Rule 1106.1 (/docs/default-source/rule-book/Proposed-Rules/1106/prr1106-1-rescinded-draft-rule.pdf?sfvrsn=9) - September 2015 rev-1 (PDF, 294kb)
- Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1106/public-workshop-presentation---august-12-2015-(pdf-).pdf?sfvrsn=4) - August 12, 2015 (PDF, 705kb)
- Proposed Amended Rule Language (/docs/default-source/rule-book/Proposed-Rules/1106/proposed-amended-rule-language---august-2015-pdf-(-).pdf?sfvrsn=4) - August 2015 (PDF, 452kb)
- Proposed Amended Rule Language (Proposed to be Rescinded) (/docs/default-source/rule-book/Proposed-Rules/1106/preliminary-rule-language.pdf?sfvrsn=2) - August 2015 (PDF, 119kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1106/priliminary-draft-staff-report.pdf?sfvrsn=4) - August 2015 (PDF, 223kb)

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Proposed Amended Rule 1111
NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces

- PAR 1111 Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1111/par-1111-2017-18-draft-staff-report.pdf?sfvrsn=4) - January 30, 2018 (PDF, 649kb)
  - PAR 1111 Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1111/par-1111-2017-18-draft-rule.pdf?sfvrsn=10) - January 30, 2018 (PDF, 501kb)

- Working Group January 9, 2018
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1111/par1111-wg-1-9-18-final.pdf?sfvrsn=6) - January 9, 2018 (PDF, 1MB)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/1111/par1111-wg-1-9-18-final-print.pdf?sfvrsn=6) - January 9, 2018 (PDF, 267kb)

- Working Group November 15, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/par-1111/par1111-WG-11-15-17.pdf?sfvrsn=6) - November 15, 2017 (PDF, 2MB)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/par-

1111/par1111WG111517printer-friendly.pdf?sfvrsn=6) - November 15, 2017 (PDF, 144kb)

- Public Workshop and CEQA Scoping Session October 19, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/par-1111/r1111-public-workshop-ceqa-scoping_10-19-17.pdf?sfvrsn=4) - October 17, 2017 (PDF, 4MB)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/par-1111/r1111-public-workshop-ceqa-scoping-10-19-17-pf.pdf?sfvrsn=4) - October 17, 2017 (PDF, 382kb)

- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/par-1111/prelim-draft-par-1111-staff-report-10-13-17.pdf?sfvrsn=8) - October 13, 2017 (PDF, 215kb)
- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/par-1111/par-1111-prelim-draft-rule-10-13-17.pdf?sfvrsn=4) - October 13, 2017 (PDF, 120kb)
- Working Group September 21, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/par-1111/r1111-working-group-meeting_09-21-17---final.pdf?sfvrsn=4) - September 19, 2017 (PDF, 2MB)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/par-1111/r1111-working-group-meeting_09-21-17---finalfaf4b8efc2b66f27bf6fff00004a91a9.pdf?sfvrsn=4) - September 19, 2017 (PDF, 323kb)

- Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/1111/R1111taskforce072717.pdf?sfvrsn=8) - July 27, 2017 (PDF, 162kb)
- Task Force Meeting (/docs/default-source/rule-book/Proposed-Rules/1111/R1111taskforce052517.pdf?sfvrsn=8) - May 25, 2017 (PDF, 111kb)
- Task Force Meeting (/docs/default-source/rule-book/Proposed-Rules/1111/R1111taskforce042717.pdf?sfvrsn=8) - April 27, 2017 (PDF, 170kb)

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Proposed Amended Rule 1118.1
Control of Emissions from Non-Refinery Flares

(http://www.aqmd.gov/home/calendar_v2?month=8&day=25&year=2017&id=bf4eb7ef-c2b6-6f27-bf6f-ff00004a91a9)

- Working Group #3 (http://www.aqmd.gov/home/news-events/calendar_v2?month=1&day=10&year=2018&id=ce5bbcef-c2b6-6f27-bf6f-ff00004a91a9) - January 10, 2018
  - (/docs/default-source/rule-book/Proposed-Rules/1118.1/2018-01-10_pr1118-1_agenda.pdf?sfvrsn=8)Agenda (/docs/default-source/rule-book/Proposed-Rules/1118.1/2018-01-10_pr1118-1_agenda.pdf?sfvrsn=8) (PDF, 337K)
  - Greyrock GTL Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/greyrock-presentation.pdf?sfvrsn=14) (PDF, 2MB)
  - Sanitation Districts of Los Angeles County (/docs/default-source/alerts/011018-scap-presentation.pdf?sfvrsn=8) (PDF, 5MB)
  - US Biogas Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/usfm-usb-scaqmd-

1-10-18.pdf?sfvrsn=12) (PDF, 6MB)
  - PCC - Oxidation Technologies Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/fto-discussion-scaqmd.pdf?sfvrsn=14) (PDF, 2MB)
  - SCAQMD Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/2018-01-10_1118-1_wg3.pdf?sfvrsn=10) (PDF, 8MB)

- Working Group #2 (http://www.aqmd.gov/home/calendar_v2?month=10&day=24&year=2017&id=20bcb8ef-c2b6-6f27-bf6f-ff00004a91a9)- October 24, 2017
  - Agenda (/docs/default-source/rule-book/Proposed-Rules/1118.1/pr1118-1-wg-2-agenda.pdf?sfvrsn=6) - October 24, 2017 (PDF, 328kb)
  - So Cal Gas Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/pr1118-1-socalgaspres.pdf?sfvrsn=8) - October 24, 2017 (PDF, 3MB)
  - Clear Sign Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/pr1118-1-clear-sign.pdf?sfvrsn=8) - October 24, 2017 (PDF, 3MB)
  - SCAQMD Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/1118-1wg2-scaqmd-presentation.pdf?sfvrsn=10) (PDF, 2MB)

- Working Group #1 (http://www.aqmd.gov/home/calendar_v2?month=8&day=25&year=2017&id=bf4eb7ef-c2b6-6f27-bf6f-ff00004a91a9) - August 25, 2017
  - Agenda (/docs/default-source/rule-book/Proposed-Rules/1118.1/PR1118-Agenda.pdf?sfvrsn=12) - August 25, 2017(PDF, 29kb)
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1118.1/pr1118-1wgm1.pdf?sfvrsn=8) - August 25, 2017(PDF, 5.6MB)

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Proposed Rule 1127.1
Emission Reductions from Swine and Poultry Operation

- Letter to Facility Owners/Operators (/docs/default-source/rule-book/Proposed-Rules/1127_1/1127dairysurveyletter.pdf?sfvrsn=2) - February 23, 2010 (PDF, 59kb)
- Survey of Mitigation Measures for Poultry Operations (/docs/default-source/rule-book/Proposed-Rules/1127_1/1127dairysurveyform.pdf?sfvrsn=2) (PDF, 19kb)

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Proposed Amended Rule 1135
Emissions of Oxides of Nitrogen from Electric Power Generating Systems

- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1135/par_1135_wg1.pdf?sfvrsn=18) - January 24, 2018 (PDF, 870 KB) **UPDATED**
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/1135/par_1135_wg1_Updated_PF.pdf?sfvrsn=18) (PDF, 2.83 MB)

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Proposed Amended Rule 1138
Control of Emissions from Restaurant Operations

- Proposed Amended Rule 1138 (/docs/default-source/rule-book/support-documents/rule-1138/par1138s.pdf?sfvrsn=2) - July 31, 2009 (PDF, 25kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/support-documents/rule-1138/par1138pdsr.pdf?sfvrsn=2) - August 2009 (PDF, 556kb)
- Preliminary Draft Staff Report, Appendix I (/docs/default-source/rule-book/support-documents/rule-1138/par1138pdsr_appendixi.pdf?sfvrsn=2) - Emission Factors for Commercial Cooking Operations (PDF, 5kb)
- Preliminary Draft Staff Report, Appendix II (/docs/default-source/rule-book/support-documents/rule-1138/par1138pdsr_appendixii.pdf?sfvrsn=2) - Test Protocol for Determining PM Emissions from Under-Fired Charbroilers (PDF, 101kb)
- Notice of Public Workshop (/docs/default-source/rule-book/support-documents/rule-1138/par1138pwn.pdf?sfvrsn=2) - August 25, 2009 (PDF, 37kb)

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Proposed Amended Rules 1146, 1146.1, 1146.2, and Proposed Rule 1100
Transition Rules for RECLAIM Facilities

- Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/nopw-par1146-and-pr1100-final.pdf?sfvrsn=6) - January 19, 2018 (PDF, 49kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/pdsr-1146-20180119-final.pdf?sfvrsn=6) - January 19, 2018 (PDF, 1.1MB)
  - Preliminary Draft Rule 1146 (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/prelimdraftpar1146_20180119.pdf?sfvrsn=6) - January 19, 2018 (PDF, 356kb)
  - Preliminary Draft Rule 1146.1 (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/prelimdraftpar11461_20180119.pdf?sfvrsn=6) - January 19, 2018 (PDF, 319kb)
  - Preliminary Draft Rule 1146.2 (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/prelimdraftpar11462_20180119.pdf?sfvrsn=6) - January 19, 2018 (PDF, 148kb)
  - Preliminary Draft Rule 1100 (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/prelimdraftpr1100_20180119.pdf?sfvrsn=6) - January 19, 2018 (PDF, 120kb)

- Working Group Meeting #2 Presentation (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/par1146_wg_011618.pdf?sfvrsn=6) - January 16, 2018 (PDF, 460kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/par1146_wg_011618pf.pdf?sfvrsn=6) - January 16, 2018 (PDF, 461kb)

- Working Group Meeting #1 Presentation (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/par1146_wg_113017.pdf?sfvrsn=4) - November 30, 2017 (PDF, 123kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-

and-1146.2/par1146_wg_113017pf.pdf?sfvrsn=4) - November 30, 2017 (PDF, 125kb)

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Proposed Amended Rule 1147
NOx Reductions from Miscellaneous Sources

- Draft Proposed Amended Rule 1147 (/docs/default-source/rule-book/Proposed-Rules/1147/draft-par1147-for-may-2017-set-hearing-sn.pdf?sfvrsn=6) - May 3, 2017 (PDF, 199kb)
- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1147/par1147-draft-staff-report-for-set-hearing.pdf?sfvrsn=6) - May 3, 2017 (PDF, 677kb)
  - Appendix B Final Tech Assessment (http://www.aqmd.gov/docs/default-source/rule-book/support-documents/Rule1147/final-rule-1147-tech-assessment-with-append-ets-review-and-comments.pdf?sfvrsn=6) - April 20, 2017 (PDF, 10MB)

- Task Force Staff Presentation 4-20-17 (/docs/default-source/rule-book/Proposed-Rules/1147/par-1147-task-force-042017.pdf?sfvrsn=6) - April 20, 2017 (PDF. 131kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/1147/par1147-task-force-042017-printer-friendly.pdf?sfvrsn=6) - April 20, 2017 (PDF, 118kb)

- Public Workshop Staff Presentation (/docs/default-source/rule-book/Proposed-Rules/1147/par-1147-public-workshop-presentation.pdf?sfvrsn=4) - February 15, 2017 (PDF, 702kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/1147/par-1147-public-workshop-presentation-printer-friendly.pdf?sfvrsn=4) - February 15, 2017 (PDF, 547kb)

- Preliminary Draft Rule (/docs/default-source/rule-book/Proposed-Rules/1147/PAR1147prelimdraftrule.pdf?sfvrsn=4) - January 27, 2017 (PDF, 380kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1147/PAR1147prelimdraftstaffrpt.pdf?sfvrsn=4) - February 2017 (PDF, 11MB)
- Task Force Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/1147/r1147-1-17-17-task-force-meeting.pdf?sfvrsn=4) - January 17, 2017 (PDF, 143kb)
- Support Documents (http://www.aqmd.gov/home/regulations/rules/support-documents#r1147)

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Proposed Rule 1148.2
Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers

- Proposed Amended Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/7---att-f-par1148-2d-30-day-package.pdf?sfvrsn=2) - June 11, 2015 (PDF, 253kb)
- Revised Draft Staff Report Proposed Amended Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/8---att-g-par1148-2-revised-draft-staff-report-30-day-package.pdf?sfvrsn=2) - June 11, 2015 (PDF, 559kb)
- Proposed Amended Rule1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/par1148-2b-

050515-v2-for-30-day-package_final.pdf?sfvrsn=2) - May 6, 2015 (PDF, 366kb)

- Draft Staff Report Proposed Amend Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/par1148-2-draft-staff-report_05-30-15_v6_3_for-30-day-package_final.pdf?sfvrsn=2) - May 6, 2015 (PDF, 615kb)
- Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1148_2/pwspar1148-2-041515pres.pdf?sfvrsn=2) - April 15, 2015 - (PDF, 1.2M)
- Revised Draft of Proposed Amended Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/par1148-2a041515.pdf?sfvrsn=2) - April 15, 2015 (PDF, 232kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1148_2/par1148-2predraftstaff041515.pdf?sfvrsn=2)- April 15, 2015 (PDF, 371kb)
- 5th Working Group Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_5thwgmtgpres.pdf?sfvrsn=2) - March 6, 2013 (PDF, 1.3MB)
- Revised Draft of Proposed Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_sethearingrevised2.pdf?sfvrsn=2) - March 1, 2013 (PDF, 182kb)
- Notice of Public Consultation Meetings (English) (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2nopcminenglish.pdf?sfvrsn=2) - February 20, 2013 (PDF, 190kb)
- Notice of Public Consultation Meetings (Spanish) (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2nopcminspanish.pdf?sfvrsn=2)- February 20, 2013 (PDF, 198kb)
- 4th Working Group Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_4thwgmtgpres.pdf?sfvrsn=2) - February 14, 2013 (PDF, 657kb)
- Revised Draft of Proposed Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_sethearing.pdf?sfvrsn=2) - January 29, 2013 (PDF, 45kb)
- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_draftstaffreport.pdf?sfvrsn=2) - January 29, 2013 (PDF, 186kb)
- 3rd Working Group Meeting Agenda (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_3rdwgmtgagenda.pdf?sfvrsn=2) - January 24, 2013 (PDF, 135kb)
- 3rd Working Group Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_3rdwgmtgpres.pdf?sfvrsn=2) - January 24, 2013 (PDF, 470kb)
- Revised Draft of Proposed Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2-3rdwgmtg.pdf?sfvrsn=2) - January 16, 2013 (PDF, 222kb)
- Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2pwn.pdf?sfvrsn=2) - January 30, 2013 (PDF, 376kb)
- 2nd Working Group Meeting Agenda (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2-2ndwgmtg.pdf?sfvrsn=2) - January 15, 2013 (PDF, 139kb)
- 2nd Working Group Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_2ndwgmtgpres.pdf?sfvrsn=2) - January 15, 2013 (PDF, 488kb)
- Initial Draft of Proposed Rule 1148.2 (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2-2ndwgmtg.pdf?sfvrsn=2) - January 11, 2013 (PDF, 193kb)
- 1st Working Group Meeting Agenda (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_1stwgmtgagenda.pdf?sfvrsn=2) - December 12, 2012 (PDF, 139kb)
- 1st Working Group Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/1148_2/pr1148-2_1stwgmtgpres.pdf?sfvrsn=2) - December 12, 2012 (PDF, 1.4MB)

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Proposed Rule 1148.3
Natural Gas Underground Storage Facilities

- Working Group Meeting #1 Presentation (/docs/default-source/rule-book/Proposed-Rules/1148.3/pr1148-3-wgm-1-pres.pdf?sfvrsn=4) - January 26, 2017 (PDF, 2Mb)

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Proposed Rule 1153.1
Emissions of Oxides of Nitrogen from Commercial Food Ovens

- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1153-1/pr1153-1_dsr_090214.pdf?sfvrsn=2) - September 4, 2014 (PDF, 224kb)
- Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1153-1/pr1153-1_drl_090314.pdf?sfvrsn=2) - September 4, 2014 (PDF, 124kb)
- Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1153-1/pr1153-1_pwnotice.pdf?sfvrsn=2) - April 2, 2014 (PDF, 172kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1153-1/pr1153-1_prelimdraftsr.pdf?sfvrsn=2) - March 2014 (PDF, 367kb)
- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1153-1/prelimdraft_pr1153-1.pdf?sfvrsn=2) - April 2, 2014 (PDF, 186kb)
- Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1153-1/par1153-1_workshop_4-2-14.pdf?sfvrsn=2) - April 2, 2014 (PDF, 516kb)

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Proposed Rule 1178
Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities

- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1178/par1178_pdrl_010918.pdf?sfvrsn=6) - January 9, 2018 (PDF, 539kb) **NEW**
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1178/par1178_pdsr_010918.pdf?sfvrsn=6) - January 9, 2018 (PDF, 679kb) **NEW**

- Public Workshop - January 11, 2018
  - Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1178/par1178_pw_010918.pdf?sfvrsn=6) (PDF, 907kb) **NEW**
  - Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1178/par1178_nopw_010918.pdf?sfvrsn=6) - December 15, 2017 (PDF, 386kb)

- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1178/par1178_wg1_121217.pdf?sfvrsn=6) - December 12, 2017 (PDF, 498kb)

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Proposed Rule 1180
Refinery Fenceline and Community Air Monitoring

- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180-draft-staff-report-110117.pdf?sfvrsn=6) - November 1, 2017 (PDF, 7MB)
- Proposed Amended Rule 1180 (/docs/default-source/rule-book/Proposed-Rules/1180/PR1180-110117.pdf?sfvrsn=7)- November 1, 2017 (PDF, 71kb)
- Draft Socioeconomic Impact Assessment (/docs/default-source/rule-book/Proposed-Rules/1180/PR1180DraftSocio103117.pdf?sfvrsn=6) - November 1, 2017 (PDF, 469kb)
- Guidelines (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180guidelines-110117.pdf?sfvrsn=8) - November 1, 2017 (PDF, 559kb)
- Proposed Rule 1180 (/docs/default-source/rule-book/Proposed-Rules/1180/PR1180-102617.pdf?sfvrsn=6) - October 26, 2017 (PDF, 76kb)
- Refinery Related Community Air Monitoring Cost Estimate (/docs/default-source/rule-book/Proposed-Rules/1180/community-air-monitoring-cost-estimation.pdf?sfvrsn=6) - October 26, 2017 (PDF, 106kb)
- Guidelines (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180-guidelines-10-25-2017.pdf?sfvrsn=6) - October 26, 2017 (PDF, 660kb)
- Working Group Meeting #6 (http://www.aqmd.gov/home/calendar_v2?month=10&day=24&year=2017&id=4989b9ef-c2b6-6f27-bf6f-ff00004a91a9) - October 24, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1180/1180wg6-scaqmd-presentation.pdf?sfvrsn=12) - October 24, 2017 (PDF, 2MB)
  - Draft Proposed Rule 1180 (/docs/default-source/rule-book/Proposed-Rules/1180/draftPR1180.pdf?sfvrsn=14) - October 24, 2017 (PDF, 88kb)

- Working Group Meeting #5 (http://www.aqmd.gov/home/calendar_v2?month=9&day=21&year=2017&id=b173b8ef-c2b6-6f27-bf6f-ff00004a91a9) - September 21, 2017
  - Agenda (/docs/default-source/rule-book/Proposed-Rules/1180/1180WG5agenda.pdf?sfvrsn=11) - September 21, 2017 (PDF, 108kb)
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1180/1180wg5presentation.pdf?sfvrsn=11) - September 21, 2017 (PDF, 2MB)
  - Proposed Rule 1180 (/docs/default-source/rule-book/Proposed-Rules/1180/proposedrule1180-092017.pdf?sfvrsn=6) - September 21, 2017 (PDF, 88kb)
  - Draft Guidelines (clean) (/docs/default-source/rule-book/Proposed-Rules/1180/PR1180guidelines(clean).pdf?sfvrsn=6) - September 21, 2017 (PDF, 620kb)
  - Draft Guidelines (strikethrough) (/docs/default-source/rule-book/Proposed-Rules/1180/PR1180-guidelines-(strikeout).pdf?sfvrsn=6) - September 21, 2017 (PDF, 1MB)

- Public Workshop Meeting (http://www.aqmd.gov/home/calendar_v2?month=9&day=6&year=2017&id=5b60b7ef-c2b6-6f27-bf6f-ff00004a91a9) - September 6, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1180/1180workshoppres090617.pdf?sfvrsn=28) - September 6, 2017 (PDF, 1MB)
  - Rule 1180 Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/1180/1180PubWorkshop.pdf?sfvrsn=6) - September 6, 2017 (PDF, 50kb)

- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180pdsr.pdf?sfvrsn=12) - August 2017 (PDF, 190kb)
- Proposed Rule 1180 (/docs/default-source/rule-book/Proposed-Rules/1180/rule1180PRlanguage.pdf?sfvrsn=14) - August 2017 (PDF, 344kb)
- Preliminary Draft Guidelines (/docs/default-source/rule-book/Proposed-Rules/1180/refineryfencelineguidelines.pdf?sfvrsn=10) - August 29, 2017 (PDF, 621kb)
- Working Group Meeting #4 (http://www.aqmd.gov/home/calendar_v2?month=8&day=29&year=2017) - August 29, 2017
  - Agenda (/docs/default-source/rule-book/Proposed-Rules/1180/R1180WG4Agenda.pdf?sfvrsn=6) - August 29, 2017 (PDF, 105kb)
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1180/R1180WG4Prez.pdf?sfvrsn=6) - August 29, 2017(PDF, 1MB)

- Working Group Meeting #3 (http://www.aqmd.gov/home/calendar_v2?month=7&day=28&year=2017&id=8ceeb5ef-c2b6-6f27-bf6f-ff00004a91a9) - July 28, 2017
- Working Group Meeting #3 Agenda (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180wg3agenda.pdf?sfvrsn=6) - July 28, 2017 (PDF, 106kb)
- Working Group Meeting #3 Presentation - A (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180wg3-pres-payam.pdf?sfvrsn=16) - July 28, 2017 (PDF, 5MB)
- Working Group Meeting #3 Presentation - B (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180WG3pres-olga.pdf?sfvrsn=6) - July 28, 2017 (PDF, 4MB)
- Proposed Rule 1180 (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180-072517.pdf?sfvrsn=6) - July 28, 2017 (PDF, 77kb)
- City of Carson Comments (/docs/default-source/rule-book/Proposed-Rules/1180/carsoncomments.pdf?sfvrsn=6) (PDF, 731kb)
- WSPA Comment Letter (/docs/default-source/rule-book/Proposed-Rules/1180/wspa072117.pdf?sfvrsn=6) (PDF, 47k)
- Katie Baad Comment (/docs/default-source/rule-book/Proposed-Rules/1180/katiebaadcomment.pdf?sfvrsn=6) (PDF, 20k)
- Working Group Meeting #2 Agenda (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180wg2agenda.pdf?sfvrsn=6) - June 13, 2017 (PDF, 107kb)
- (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180wgm2pres.pdf?sfvrsn=6)Working Group Meeting #2 SCAQMD Presentation (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180wgm2pres.pdf?sfvrsn=6) - June 13, 2017 (PDF, 6MB)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180-wgm2-presentation-printer-friendly.pdf?sfvrsn=6) (PDF, 1MB)

- Working Group Meeting #2 BAAQMD Presentation (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180-wgm-2-baaqmd-pres.pdf?sfvrsn=6) - June 13, 2017 (PDF, 530kb)
- Working Group Meeting #2 (http://www.aqmd.gov/home/calendar_v2?month=6&day=13&year=2017&id=f290b4ef-c2b6-6f27-bf6f-ff00004a91a9) - June 13, 2017
- Working Group Meeting #1 (http://www.aqmd.gov/home/calendar_v2?month=4&day=5&year=2017&id=d44db2ef-c2b6-6f27-bf6f-ff00004a91a9) - April 5, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/1180

/pr1180_wg1_040517.pdf?sfvrsn=4) (PDF, 2Mb)
- Printer Friendly (/docs/default-source/rule-book/Proposed-Rules/1180/pr1180_wg1_040517print.pdf?sfvrsn=4) (PDF, 1Mb)

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Proposed Rule 1188
Vacuum Truck Operations

- Working Group #4 Presentation (/docs/default-source/rule-book/Proposed-Rules/rule-1188/wgm-4_pr1188-2014ppt.pdf?sfvrsn=2) - November 20, 2014 (PDF, 160kb)
- Working Group #3 Presentation (/docs/default-source/rule-book/Proposed-Rules/rule-1188/rule-1188---3rd-working-group-meeting-presentation.pdf?sfvrsn=6) - July 29, 2014 (PDF, 58kb)
- Working Group #3 Preliminary Draft Proposed Rule (/docs/default-source/rule-book/Proposed-Rules/rule-1188/rule-1188---initial-draft-of-proposed-rule-1188.pdf?sfvrsn=4) - July 29, 2014 (PDF, 215kb)
- Working Group #2 Presentation (/docs/default-source/rule-book/Proposed-Rules/rule-1188/rule-1188---2nd-working-group-meeting-presentation.pdf?sfvrsn=6) - June 12, 2014 (PDF, 69kb)
- Working Group #1 Presentation (/docs/default-source/rule-book/Proposed-Rules/rule-1188/rule-1188---1st-working-group-meeting-presentation.pdf?sfvrsn=6) - May 6, 2014 (PDF, 60kb)

POTW (Publicly Owned Treatment Works) Forms:

- Form POTW - Operator Log (/docs/default-source/rule-book/Proposed-Rules/rule-1188/form-potw-operator-log.pdf?sfvrsn=4)
- Form POTW - Survey (/docs/default-source/rule-book/Proposed-Rules/rule-1188/form-potw-survey.pdf?sfvrsn=4)
- Form POTW - Truck (/docs/default-source/rule-book/Proposed-Rules/rule-1188/form-potw-truck.pdf?sfvrsn=4)
- Form POTW2 - Contractor Info Request (/docs/default-source/rule-book/Proposed-Rules/rule-1188/form-potw2_contractor-inforequest.pdf?sfvrsn=4)

Survey Forms and Instructions (Refineries and other Non-POTW Facilities)

- Survey Form 1: Affected Facilities (/docs/default-source/rule-book/Proposed-Rules/rule-1188/pr-1188-survey-form-1.pdf?sfvrsn=4)
- Survey Form 2: Vacuum Truck Operators (/docs/default-source/rule-book/Proposed-Rules/rule-1188/pr-1188-survey-form-2.pdf?sfvrsn=4)
- Survey Form 3: Vacuum Truck Info Request (/docs/default-source/rule-book/Proposed-Rules/rule-1188/pr-1188-survey-form-3_-vt-inforequest.pdf?sfvrsn=4)
- Instructions for Completing Final Survey Forms (/docs/default-source/rule-book/Proposed-Rules/rule-1188/instructions-for-completing-final-survey-forms.pdf?sfvrsn=4)

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Proposed Rule 1304.2
Greenfield or Existing Electrical Generating

- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pdsr-1304-2-3.pdf?sfvrsn=2) - September 7, 2016 (PDF, 944kb)
- Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr1304-2-1304-3-pw-2016.pdf?sfvrsn=2) - September 7, 2016 (PDF, 309kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr1304-2-1304-3-pw-2016-printer-friendly-version.pdf?sfvrsn=2) - September 7, 2016 (PDF, 153kb)

- Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2_1304-3_nopw_090716.pdf?sfvrsn=2) - September 7, 2016 (PDF, 33kb)
- Preliminary Draft Proposed Rule 1304.2 (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pd1304-2_081716.pdf?sfvrsn=2) - August 17, 2016 (PDF, 83kb)
- Working Group #5 Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/prs-1304-5-1-may-31-2016.pdf?sfvrsn=6) - May 31, 2016 (PDF, kb)
- Notice of Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-1304-3-wg-53116.pdf?sfvrsn=8) - May 31, 2016 (PDF, 195kb)
- Notice of Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-1304-3-working-group.pdf?sfvrsn=2) - March 1, 2016 (PDF, 183kb)
- Preliminary Draft of Proposed Rule Language (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pdpr1304-2.pdf?sfvrsn=2) - February 26, 2016 (PDF, 495kb)
- 3rd Working Group Presentation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr-1304-2-wg-3-presentation.pdf?sfvrsn=4) - April 22, 2015 (PDF, 3MB)
- Draft of Proposed Rule Language (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-draft-rule-4wgm3.pdf?sfvrsn=2) - April 22, 2015 (PDF, 363kb)
- 3rd Working Group Meeting Invitation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/wg3-first-meeting-notice.pdf?sfvrsn=2) - April 22, 2015 (PDF, 35kb)
- Natural Gas Power Plant Presentation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/natural-gas-power-plants-presentation.pdf?sfvrsn=0) - February 7, 2014 (PDF, 90kb)
- 1st Working Group Meeting Invitation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-meeting-invite-for-7-10-14.pdf?sfvrsn=0) - July 10, 2014 (PDF, 20kb)
- Presentation for 1st Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-presentation-for-1st-working-group.pdf?sfvrsn=2) - July 10, 2014 (PDF, 3MB)
- Draft of Proposed Rule Language (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/draft-rule-language-november-14-2014.pdf?sfvrsn=2) - November 14, 2014 (PDF, 228kb)
- 2nd Working Group Meeting Invitation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-meeting-invite-for-7-10-14.pdf?sfvrsn=0) - November 20, 2014 (PDF, 39kb)
- Presentation for 2nd Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-presentation-for-2nd-working-group.pdf?sfvrsn=2) - November 20, 2014 (PDF, 5MB)publfdsf

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Proposed Rule 1304.3
Qualified Native Load Electrical Generating Facility Fee for Use of SOx and PM10 Offsets

- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pdsr-1304-2-3.pdf?sfvrsn=2) - September 7, 2016 (PDF, 944kb)
- Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr1304-2-1304-3-pw-2016.pdf?sfvrsn=2) - September 7, 2016 (PDF, 309kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr1304-2-1304-3-pw-2016-printer-friendly-version.pdf?sfvrsn=2) - September 7, 2016 (PDF, 153kb)

- Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2_1304-3_nopw_090716.pdf?sfvrsn=2) - September 7, 2016 (PDF, 33kb)
- Preliminary Draft Proposed Rule 1304.3 (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr1304-3_081716.pdf?sfvrsn=2) - August 17, 2016 (PDF, 80kb)
- Working Group #5 Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/prs-1304-5-1-may-31-2016.pdf?sfvrsn=6) - May 31, 2016 (PDF, kb)
- Notice of Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-1304-3-wg-53116.pdf?sfvrsn=8) - May 31, 2016 (PDF, 195kb)
- Notice of Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-2-1304-3-working-group.pdf?sfvrsn=2) - March 1, 2016 (PDF, 183kb)
- Preliminary Draft of Proposed Rule Language (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pdpr1304-3.pdf?sfvrsn=2) - February 26, 2016 (PDF, 498kb)
- Presentation (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/pr-1304-2-wg-3-presentation.pdf?sfvrsn=4) - April 22, 2015 (PDF, 3MB)
- Draft of Proposed Rule Language (/docs/default-source/rule-book/Proposed-Rules/pr1304.2/1304-3-draft-rule-4wgm3.pdf?sfvrsn=2) - April 22, 2015 (PDF, 363kb)

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Proposed Amended Rule 1401
New Source Review of Toxic Air Contaminants

- Working Group Meeting #4 (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_wg4carb_081617.pdf?sfvrsn=4) - August 16, 2017 (PDF, 581kb)
- Risk Assessment Procedures for Rules 1401, 1401.1, & 212 (Draft Version 8.1) (/docs/default-source/rule-book/Proposed-Rules/1401/riskassessmentprocedures_2017_080717.pdf?sfvrsn=4) - **REVISED** August 8, 2017 (PDF, 1Mb)
  - Permit Application Package "N" (Draft Version 8.1) (/docs/default-source/rule-book/Proposed-Rules/1401/attachmentn_080717.pdf?sfvrsn=4) - **REVISED** August 8, 2017 (PDF, 1Mb)

- Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_080217.pdf?sfvrsn=4) - August 2, 2017 (PDF, 180kb)
- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_dsr_080217.pdf?sfvrsn=4) - August 2, 2017 (PDF, 1Mb)

- Notice of Public Hearing (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_noph.pdf?sfvrsn=4) - August 2, 2017 (PDF, 90kb)
- Risk Assessment Procedures for Rules 1401, 1401.1, & 212 (Draft Version 8.1) (/docs/default-source/rule-book/Proposed-Rules/1401/riskassessmentprocedures_2017.pdf?sfvrsn=4) - July 26, 2017 (PDF, 2Mb)
  - Permit Application Package "N" (Draft Version 8.1) (/docs/default-source/rule-book/Proposed-Rules/1401/attachmentn_072617.pdf?sfvrsn=4) - July 26, 2017 (PDF, 1Mb)

- Working Group Meeting #3 - July 20, 2017 ***(no documents were produced for this meeting)***
- Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_pw_071217.pdf?sfvrsn=4) - July 12, 2017
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_wg2_070617.pdf?sfvrsn=4) - July 6, 2017 (PDF, 852kb)
- Proposed Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_061617.pdf?sfvrsn=4) - June 16, 2017 (PDF, 187kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_pdsr_061617.pdf?sfvrsn=4) - June 16, 2017 (PDF, 256kb)
- Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_nopw_061617.pdf?sfvrsn=8) - June 16, 2017 (PDF, 29kb)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1401/par1401_wg1_060117.pdf?sfvrsn=4) - June 1, 2017 (PDF, 1.2Mb)

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Proposed Amended Rule 1407
Control of Emissions of Arsenic, Cadmium and Nickel from Non-Ferrous Metal Melting Operations

- Working Group Meeting #3 (/docs/default-source/rule-book/Proposed-Rules/1407/par-1407-wg3.pdf?sfvrsn=12) - January 30, 2018 (PDF, 1.4 MB) **REVISED**
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1407/par-1407---working-group-2.pdf?sfvrsn=6) - November 9, 2017 (PDF, 2 MB)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1407/par-1407-wgm1.pdf?sfvrsn=6) - September 5, 2017 (PDF, 1 MB)

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Proposed Amended Rule 1410
Hydrogen Fluoride Storage and Use at Petroleum Refineries

- Proposed Rule 1410 Webpage (/home/rules-compliance/rules/proposed-rules/proposed-rule-1410)

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Proposed Amended Rule 1420
Emissions Standard for Lead

- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_dsr_110117.pdf?sfvrsn=4) - November 1, 2017 (PDF, 2Mb)
- Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_drl_110117.pdf?sfvrsn=4) - November 1, 2017 (PDF, 325kb)
- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_dsr_100317.pdf?sfvrsn=4) - October 3, 2017 (PDF, 1Mb)
- Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_drl_100317.pdf?sfvrsn=4) - October 3, 2017 (PDF, 450kb)
- Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_nopw_081817.pdf?sfvrsn=4) - August 18, 2017 (PDF, 379kb)
- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_pdrl_081817.pdf?sfvrsn=4) - August 18, 2017 (PDF, 447kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_pdsr_081817.pdf?sfvrsn=4) - August 18, 2017 (PDF, 1Mb)
- Working Group Meeting #3 (/docs/default-source/rule-book/Proposed-Rules/1420/par-1420-wgm3.pdf?sfvrsn=8) - July 6, 2017 (PDF, 376kb)
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1420/par-1420-wgm2.pdf?sfvrsn=8) - May 31, 2017 (PDF, 377kb)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1420/par1420_wg_030817.pdf?sfvrsn=6) - March 8, 2017 (PDF, 143kb)

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Proposed Rule 1430
Control of Emissions from Grinding Operations at Metal Forging Facilities

- Working Group Meeting #6 (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-wgm6.pdf?sfvrsn=6) - February 1, 2017 (PDF, 767kb)
- Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-draft-rule.pdf?sfvrsn=6) - February 1, 2017 (PDF, 462kb)
- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr-1430-dsr.pdf?sfvrsn=4) - February 1, 2017 (PDF, 9MB)
- Draft Socioeconomic Assessment (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430socio.pdf?sfvrsn=6) - February 1, 2017 (PDF, 462kb)
- Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-pw-presentation.pdf?sfvrsn=6) - January 19, 2017 (PDF, 1MB)
- Working Group Meeting #5 (/docs/default-source/rule-book/Proposed-Rules/1430.1/WGM5-PPT-011117.pdf?sfvrsn=4) - January 11, 2017 (PDF, 1MB)
- Proposed Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-dr.pdf?sfvrsn=4) - December 16, 2016 (PDF, 479kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-

pdsr.pdf?sfvrsn=9) - December 2016 (PDF, 1MB)

- Working Group Meeting #4 (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-wgm4-12-01-16.pdf?sfvrsn=4) - December 1, 2016 (PDF, 1MB)
  - Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430-drl-11-30-16.pdf?sfvrsn=4) - November 30, 2016 (PDF, 524kb)
    - *Comment Letter from Valley Forge (/docs/default-source/rule-book/Proposed-Rules/1430.1/valley-forge-comments.pdf?sfvrsn=2)* - December 29, 2016 (PDF, 381kb)
    - *Comment Letter from California Metals Coalition (/docs/default-source/rule-book/Proposed-Rules/1430.1/cmc-comments.pdf?sfvrsn=4)* - December 19, 2016 (PDF, 469kb)
    - *Comment Letter from ILMA* (/docs/default-source/rule-book/Proposed-Rules/1430.1/ilma_cl-121916.pdf?sfvrsn=4) - December 19, 2016 (PDF, 140kb)
    - *Comment Letter from Weber Metals* (/docs/default-source/rule-book/Proposed-Rules/1430.1/weber-metals-comments.pdf?sfvrsn=4) - December 13, 2016 (PDF, 318kb)
    - *Comment Letter from Solutions 4 Blast* (/docs/default-source/rule-book/Proposed-Rules/1430.1/solutions-4-blast-comments.pdf?sfvrsn=4) - December 10, 2016 (PDF, 146kb)
    - *Comment Letter from ILMA* (/docs/default-source/rule-book/Proposed-Rules/1430.1/ilma-comments.pdf?sfvrsn=2) - December 9, 2016 (PDF, 508kb)
    - *Comment Letter from Press Forge* (/docs/default-source/rule-book/Proposed-Rules/1430.1/pressforgeletter.pdf?sfvrsn=4) - December 5, 2016 (PDF, 49kb)

- Working Group Meeting #3 (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr1430_3rdwgm_presentation_10-26-16.pdf?sfvrsn=7) - October 26, 2016 (PDF, 1MB)
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1430.1/pr-1430-2ndwgm-paramountca-9-14-2016.pdf?sfvrsn=6) - September 14, 2016 (PDF, 4MB)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1430.1/1430-1st-wgm-10072015.pdf?sfvrsn=2) - October 7, 2015 (PDF, 1MB)

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Proposed Amended Rule 1466

Control of Particulate Emissions from Soils with Toxic Air Contaminants

- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1466/par-1466---draft-staff-report.pdf?sfvrsn=8) - October 31, 2017 (PDF, 959kb)
- Proposed Amended Rule 1466 (/docs/default-source/rule-book/Proposed-Rules/1466/par-1466---rule-language.pdf?sfvrsn=4) - October 31, 2017 (PDF, 401kb)
- Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1466/1466pwpres.pdf?sfvrsn=6) - September 19, 2017 (PDF, 1.9Mb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1466/par1466PDSR.pdf?sfvrsn=6) - September 2017 (PDF, 672kb)
- Proposed Amended Rule 1466 (/docs/default-source/rule-book/Proposed-Rules/1466/PAR1466DraftRule.pdf?sfvrsn=10) - September 15, 2017 (PDF, 400kb)
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1466/par-1466-

wgm-2.pdf?sfvrsn=7) - September 12, 2017 (PDF, 1Mb)
- Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/1466/1466publicworkshopnotice.pdf?sfvrsn=6) - September 19, 2017 (PDF, 45kb)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1466/par-1466-wgm-1.pdf?sfvrsn=6) - August 3, 2017 (PDF, 704kb)

Proposed Rule 1466
Control of Particulate Emissions from Soils with Toxic Air Contaminants

- Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1466/pr-1466-draft-staff-report.pdf?sfvrsn=6) - June 7, 2017, (PDF, 1MB)
- Proposed Rule 1466 (/docs/default-source/rule-book/Proposed-Rules/1466/proposed-rule-1466.pdf?sfvrsn=6) - June 7, 2017, (PDF, 361kb)
- Working Group Meeting #4 (/docs/default-source/rule-book/Proposed-Rules/1466/pr-1466-WG4-Draft-Rule-Language.pdf?sfvrsn=6) - May 18, 2017 (PDF, 295kb)
- Public Workshop - May 10, 2017
  - Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1466/1466---public-workshop-presentation.pdf?sfvrsn=6) (PDF,1Mb)
  - Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/1466/pr-1466-public-workshop-notice.pdf?sfvrsn=6) (PDF, 304kb)

- Working Group Meeting #3 (/docs/default-source/rule-book/Proposed-Rules/1466/1466---wg3-presentation.pdf?sfvrsn=6) - May 3, 2017 (PDF, 436kb)
- Proposed Draft Rule Langauge (/docs/default-source/rule-book/Proposed-Rules/1466/proposed-draft-rule-language-PR-1466.pdf?sfvrsn=12) - April 21, 2017 (PDF, 240kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1466/preliminary-draft-staff-report-PR-1466.pdf?sfvrsn=8) - April 21, 2017 (PDF, 468kb)
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1466/1466-WGM2.pdf?sfvrsn=9) - April 13, 2017 (PDF, 251kb)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1466/pr1466_wg_031617.pdf?sfvrsn=14) - March 16, 2017 (PDF, 1Mb)

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Proposed Amended Rule 1469
Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid Anodizing Operations

- Working Group Meeting #10 - February 6, 2018
- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pdrl_011918.pdf?sfvrsn=6) - January 19, 2018 (PDF, 976kb) ***NEW***
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pdsr_011918.pdf?sfvrsn=6) - January 19, 2018 (PDF, 926kb) ***NEW***
- Public Workshop - February 8, 2018
  - Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1469

/par1469_nopw_011918.pdf?sfvrsn=6) - January 19, 2018 (PDF, 225kb)

- Working Group Meeting #9 (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_wg9_010418.pdf?sfvrsn=6) - January 4, 2018 (PDF, 2Mb)
- Public Workshop - December 7, 2017
  - Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pw_120517.pdf?sfvrsn=8) (PDF, 1Mb)
  - Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_nopw_110917.pdf?sfvrsn=4) (PDF, 112kb) - November 9, 2017

- Working Group Meeting #8 (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_wg8_112917.pdf?sfvrsn=6) - November 29, 2017 (PDF, 813kb)
- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pdrl111717.pdf?sfvrsn=4) - November 17, 2017 (PDF, 1Mb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1469/par-1469_pdsr_111717.pdf?sfvrsn=8) - November 17, 2017 (PDF, 1Mb)

- Public Workshop - November 1, 2017
  - Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pw_110117.pdf?sfvrsn=4) (PDF, 1MB)
  - Notice of Public Workshop (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_nopw_101217.pdf?sfvrsn=6) - October 20, 2017 (PDF, 33kb)

- Working Group Meeting #7 (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_wg7_102517.pdf?sfvrsn=14) - October 26, 2017 (PDF, 2Mb)
  - CLEAN Preliminary Draft Rule Language (underline only) (/docs/default-source/rule-book/Proposed-Rules/1469/prelimdraft-par1469.pdf?sfvrsn=6) - November 1, 2017 (PDF, 771kb)
    (as requested by stakeholders at Working Group Meeting #7)

- Preliminary Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pdrl_102017.pdf?sfvrsn=4) - October 20, 2017 (PDF, 844kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/1469/par1469_pdsr_102017.pdf?sfvrsn=8) - October 20, 2017 (PDF, 1Mb)
- Working Group Meeting #6 (/docs/default-source/rule-book/Proposed-Rules/1469/1469workinggroup6pres.pdf?sfvrsn=6) - September 20, 2017 (PDF, 3Mb)
  - Preliminary Draft Rule Language for Working Group #6 (/docs/default-source/rule-book/Proposed-Rules/1469/rule-1469-preliminary-draft-rule-language-for-par-working-group-6.pdf?sfvrsn=6) (PDF, 976kb)

- Working Group Meeting #5 (/docs/default-source/rule-book/Proposed-Rules/1469/par-1469-1426-working-group-5-presentation.pdf?sfvrsn=4) - August 31, 2017 (PDF, 2Mb)
  - Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/1469/par1469-preliminary-draft-rule-language-up-to-subdivision-(g).pdf?sfvrsn=4) (PDF, 367kb)

- Working Group Meeting #4 (/docs/default-source/rule-book/Proposed-Rules/1469/par-1469-1426-

wgm-4.pdf?sfvrsn=6) - August 2, 2017 (PDF, 1Mb)

- Working Group Meeting #3 (/docs/default-source/rule-book/Proposed-Rules/1469/par-1469-1426-wgm-3.pdf?sfvrsn=7) - June 29, 2017 (PDF, 1Mb)
  - Standard Operating Procedures
    - EPA SOP (/docs/default-source/rule-book/Proposed-Rules/1469/epa-hexavalent-chromium-sop.pdf?sfvrsn=6) (PDF, 69kb)
    - EPA NATTS (/docs/default-source/rule-book/Proposed-Rules/1469/epa-natts-tad.pdf?sfvrsn=6) TAD (PDF, 1Mb)
    - CARB SOP (/docs/default-source/rule-book/Proposed-Rules/1469/carb-hexavalent-chromum-sop-mld.pdf?sfvrsn=10) (PDF, 136kb)
    - SCAQMD Draft SOP (/docs/default-source/rule-book/Proposed-Rules/1469/scaqmd-hexavalent-chromium-draft-sop.pdf?sfvrsn=6) (PDF, 958kb)

- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/1469/par-1469-1426-wgm-2.pdf?sfvrsn=6) - May 18, 2017 (PDF, 993kb)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/1469/pr-1469-1426-wgm-1.pdf?sfvrsn=6) - March 23, 2017 (PDF, 2Mb)
- Economic Impact Model (http://www.remi.com/products/pi) - March 30, 2017

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Regulation IX
Standards of Performance for New Stationary Sources

- Public Hearing - October 7, 2016
  - Public Hearing Notice (/docs/default-source/rule-book/Proposed-Rules/regulation-ix-and-x/081916-revised-clean-ph-notice-reg-ix.pdf?sfvrsn=2) - October 7, 2016 (PDF, 142kb)
  - Proposed Amended Regulation IX (/docs/default-source/rule-book/Proposed-Rules/regulation-ix-and-x/pareg-ix-072616-ats.pdf?sfvrsn=2) - August 19, 2016 (PDF, 299kb)
  - Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regulation-ix-and-x/080516-reg-ix-draft-staff-report-(1)ats.pdf?sfvrsn=2) - September 2016 (PDF, 350kb)
  - Notice of Exemption (/docs/default-source/rule-book/Proposed-Rules/regulation-ix-and-x/ix_noegeneral_20160816_final.pdf?sfvrsn=4) - August 17, 2016 (PDF, 247kb)

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Regulation XX
NOx RECLAIM

- Working Group Meeting January 11, 2018
  - Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim_wg_011118.pdf?sfvrsn=6) - January 11, 2018 (PDF, 197kb)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx

/reclaim_wg_011118_print.pdf?sfvrsn=6) - January 11, 2018 (PDF, 111kb)

- Working Group & Public Consultation Meeting November 8, 2017
  - Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-wgm-110817.pdf?sfvrsn=4) - November 8, 2017 (PDF, 472kb)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-wgm-110817-printer-friendly.pdf?sfvrsn=4) - November 8, 2017 (PDF, 260kb)
  - Public Consultation Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-pcm-111717-final.pdf?sfvrsn=4) - November 8, 2017 (PDF, 153kb)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-pcm-111717-printer-friendly.pdf?sfvrsn=4) - November 8, 2017 (PDF, 124kb)
  - Preliminary Draft Rule 2001 (/docs/default-source/rule-book/Proposed-Rules/regxx/preliminary-draft-r2001-11062017.pdf?sfvrsn=4) - November 8, 2017 (PDF, 2mb)
  - Preliminary Draft Rule 2002 (/docs/default-source/rule-book/Proposed-Rules/regxx/preliminary-draft-r2002-11062017.pdf?sfvrsn=4) - November 8, 2017 (PDF, 354kb)
  - Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regxx/regxx-pdsr---11082017-final.pdf?sfvrsn=4) - November 8, 2017 (PDF, 39kb)
- List of Facilities (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-fac-list-of-facility-assessment-10272017.pdf?sfvrsn=4) (Assessment by SCAQMD Staff) - October 27, 2017 (PDF, 335kb)
- Working Group Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaimwgm-101217-updated.pdf?sfvrsn=2) - October 12, 2017 (PDF, 128kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaimwgm-101217-updated-pf.pdf?sfvrsn=2) - October 12, 2017 (PDF, 153kb)
- Working Group Meeting Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaimwgm-091417-final.pdf?sfvrsn=8) - September 14, 2017 (PDF, 454kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaimwgm-091417-printer-friendly.pdf?sfvrsn=8) - September 14, 2017 (PDF, 360kb)
- List of Facilities (/docs/default-source/rule-book/Proposed-Rules/regxx/fac-list-of-initial-facility-assessment-7-13-17.pdf?sfvrsn=4) (initial assessment by SCAQMD staff/subject to change) - July 21, 2017 (PDF, 286kb)
- Working Group Meeting - July 13, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaimwgm-7-13-17.pdf?sfvrsn=6) - July 13, 2017 (PDF, 219kb)
    - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaimwgm-7-13-17-pf.pdf?sfvrsn=6) (PDF, 182kb)
- Working Group Meeting - June 8, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_wg_060817.pdf?sfvrsn=4) - June 6, 2017 (PDF, 134kb)
    - Printer-friendly version (/docs/default-source/rule-book/Proposed-Rules/regxx

/noxreclaim_wg_060817print.pdf?sfvrsn=4) (PDF, 142kb)

- Working Group Conference Call - April 26, 2017
  - Draft RECLAIM Initial Action Plan Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/draft-reclaim-initial-action-plan-working-group-pdf.pdf?sfvrsn=4) - April 26, 2017 (PDF, 1MB)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/draft-reclaim-initial-action-plan-working-group-printer-friendly-version.pdf?sfvrsn=4) - April 26, 2017 (PDF, 921kb)

- Working Group Meeting - April 19, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-wgm-041917.pdf?sfvrsn=4) - April 19, 2017 (PDF, 80kb)
  - Printer Friendly Version (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-wgm-041917-printer-friendly.pdf?sfvrsn=4) - April 19, 2017 (PDF, 92kb)

- Working Group Meeting- March 24, 2017
  - Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-wgm-032417.pdf?sfvrsn=4) - March 23, 2017 (PDF, 101kb)
  - Printer Friendly Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim-wgm-032417-(pf).pdf?sfvrsn=4) - March 23, 2017 (PDF, 94kb)

- Public Hearing - October 7, 2016
  - Proposed Draft Rule Language - Amended Regulation XX (/docs/default-source/rule-book/Proposed-Rules/regxx/1-regxx-rulelanguage.pdf?sfvrsn=6) - September 6, 2016 (PDF, 957kb)
  - Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regxx/2-regxx-dsr-final.pdf?sfvrsn=2)- September 6, 2016 (PDF, 6Mb)
  - Draft Addendum to December 2015 Final PEA (/docs/default-source/rule-book/Proposed-Rules/regxx/3-draftaddendum2016-sep6.pdf?sfvrsn=2) to December 2015 Final PEA (PDF, 289kb)
  - Comment Letters Received (http://www.aqmd.gov/home/regulations/rules/proposed-rules/NOxRECLAIM_ShutdownComments)
  - Reference Materials:
    - December 2015 Final Program Environmental Assessment for Amendments to Regulation XX (/docs/default-source/rule-book/Proposed-Rules/regxx/10_attachh1-regxxfinalpeaplusappendices.pdf?sfvrsn=2) - September 21, 2016 (PDF, 32MB)
    - Attachment 1 to the Resolution (December 2015) – Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan (/docs/default-source/rule-book/Proposed-Rules/regxx/11_attachh2-regxxfinalpea-attachment1toresolution.pdf?sfvrsn=2) - September 21, 2016 (PDF, 184kb)
    - Final Socioeconomic Report for the December 4, 2015 amendments to Regulation XX (/docs/default-source/rule-book/Proposed-Rules/regxx/12_attachh3-2015dec_reclaim_final_socioecon.pdf?sfvrsn=2) - September 21, 2016 (PDF, 2MB)

- Proposed Draft Rule Language (/docs/default-source/rule-book/Proposed-Rules/regxx/083016-draft-rule-language.pdf?sfvrsn=4) (Working Group Draft Language) - August 30, 2016 (PDF, 39kb)

- Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_wg_83016.pdf?sfvrsn=2) - August 30, 2016 (PDF, 3Mb)
  - Printer-friendly version (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_wg_083016print.pdf?sfvrsn=2) (PDF, 251kb)

- Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_wgm-080916-final.pdf?sfvrsn=2) - August 9, 2016 (PDF, 2Mb)
  - Printer-friendly version (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_wg_080916print.pdf?sfvrsn=2) (PDF, 130kb)

- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_pdsr_072216.pdf?sfvrsn=2) - July 22, 2016 (PDF, 624kb)
- Preliminary Draft Rule Language: Proposed Amended Rule 2002 (/docs/default-source/rule-book/Proposed-Rules/regxx/par2002_072216.pdf?sfvrsn=2) - July 22, 2016 (PDF, 1Mb)
- NOx RECLAIM Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/regxx/reg-xx-public-workshop-notice-2016-final.pdf?sfvrsn=4) - July 22, 2016 (PDF, 28kb)
- Preliminary Draft Rule Language: Facility Shutdown Provisions (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_pdrl_072116.pdf?sfvrsn=2) - July 21, 2016 (PDF, 276kb)
  [REVISED; Correction made to paragraph (i)(1)]

- Preliminary Draft Rule Language: Facility Shutdown Provisions (/docs/default-source/rule-book/Proposed-Rules/regxx/shutdown-prelimdraft-rule-language---july152016.pdf?sfvrsn=6) - July 15, 2016 (PDF, 274 kb)
- Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaimwgm-022516final.pdf?sfvrsn=2) - February 25, 2015 (PDF, 3.1 MB)
- Working Group Meeting (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaimwgm012116.pdf?sfvrsn=2) - January 21, 2016 (PDF, 1.5 MB)

- NOx RECLAIM Set Hearing Package (February 5, 2016)
  - Draft Board Letter (/docs/default-source/rule-book/Proposed-Rules/regxx/1_noxreclaim_bl_010516da2ba4efc2b66f27bf6fff00004a91a9.pdf?sfvrsn=2) - January 5, 2016 (PDF)
  - PAR 2011, Chapter 3 (/docs/default-source/rule-book/Proposed-Rules/regxx/4_noxreclaim_r2011ch3_010516.pdf?sfvrsn=2) - December 4, 2015 (PDF)
  - PAR 2012, Chapter 4 (/docs/default-source/rule-book/Proposed-Rules/regxx/5_noxreclaim_r2012ch4_010516.pdf?sfvrsn=2) - December 4, 2015 (PDF)
  - Notice of Exemption (/docs/default-source/rule-book/Proposed-Rules/regxx/6_noxreclaim_noe_010516.pdf?sfvrsn=2) - January 5, 2016 (PDF)

- NOx RECLAIM Governing Board Package (http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2015/2015-dec4-030.pdf?sfvrsn=5) - November 28, 2015 (PDF, **63.0Mb**)
- Addendum to Governing Board Package (http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2015/2015-dec4-030-a.pdf?sfvrsn=4) - November 30, 2015 (PDF, 12Mb)
- NOx RECLAIM Draft Rule Language - November 4, 2015
- PAR 2001 (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_par2001_110415.pdf?sfvrsn=2) (PDF, 70.4kb)

- PAR 2002 (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_par2002_110415.pdf?sfvrsn=4) (PDF, 405kb)
- *Minor correction made to PAR 2002;*
- *document replaced before 9am on 11/4/15*
- PAR 2005 (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_par2005_110415.pdf?sfvrsn=2) (PDF, 180kb)
- PAR 2011 (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_par2011_110415.pdf?sfvrsn=2) (PDF, 316kb)
- PAR 2012 (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_par2012_110415.pdf?sfvrsn=2) (PDF, 308kb)
- NOx RECLAIM Revised Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_dsr_110415.pdf?sfvrsn=4) - November 4, 2015 (PDF, 7.6MB)
- Revised DSR Attachment: Comment Letters 2-19 (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_appzattach_110415.pdf?sfvrsn=4) (PDF, 10.5MB)

****NOTE: due to large file size, documents could take longer to download****

- NOx RECLAIM Draft Final Socioeconomic Report (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaim_dfsocio_110415.pdf?sfvrsn=2) - November 4, 2015 (PDF,)
- Notice of Public Hearing (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_noph_102815.pdf?sfvrsn=6) - November 4, 2015 (PDF, 23kb)
- NOx RECLAIM Revised Draft Socioeconomic Report (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim_revisedsociodraft.pdf?sfvrsn=2) - October 6, 2015 (PDF)
- NOx RECLAIM Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regxx/dsr---100615---draftfinal-1.pdf?sfvrsn=2) - October 6, 2015 (PDF)
- NOx RECLAIM Draft Rule Language - October 6, 2015 (PDF)
- Rule 2002 (/docs/default-source/rule-book/Proposed-Rules/regxx/par2002_100615_-rev-9.pdf?sfvrsn=2)(PDF)
- Rule 2005 (/docs/default-source/rule-book/Proposed-Rules/regxx/par2005-100615.pdf?sfvrsn=2)(PDF)
- Rule 2011 (/docs/default-source/rule-book/Proposed-Rules/regxx/r2011combined.pdf?sfvrsn=2)(PDF)
- Rule 2012 (/docs/default-source/rule-book/Proposed-Rules/regxx/r2012combined.pdf?sfvrsn=2)(PDF)
- Public Hearing Notice (/docs/default-source/rule-book/Proposed-Rules/regxx /parxxphn110615.pdf?sfvrsn=2) - November 6, 2015 (PDF, 22kb) (/docs/default-source/rule-book/Proposed-Rules/regxx/reclaim_sociodraft_090915.pdf?sfvrsn=4)
- NOx RECLAIM Draft Socioeconomic Report (/docs/default-source/rule-book/Proposed-Rules/regxx /reclaim_sociodraft_090915.pdf?sfvrsn=4) - September 9, 2015 (PDF, 528kb)
- NOx RECLAIM Draft Program Environmental Assessment (/docs/default-source/ceqa/documents /aqmd-projects/2015/regxx-draftpea.pdf?sfvrsn=2) - August 13, 2015 (PDF, 9.1MB)
- Appendices to Draft PEA (/docs/default-source/ceqa/documents/aqmd-projects/2015/regxx-appendices.pdf?sfvrsn=6) - *Proposed Rules, Calculations, Responses to Comments* (PDF, 16.4MB) NOTE- Large file size could take longer to download
- Extension of Comment Period for Draft Program Environmental Assessment (/docs/default-source /ceqa/documents/aqmd-projects/2015/regxx--noc-extension.pdf?sfvrsn=2) (PDF, 322kb)
- Comment Letters Received on Draft PEA (/docs/default-source/ceqa/documents/aqmd-projects

/2015/draft-pea-comment-letters--combined.pdf?sfvrsn=2) (PDF, 4.4MB)
- CBE Comment Letter Attachment 1 (/docs/default-source/ceqa/documents/aqmd-projects /2015/CBE_comment_letter_attachment_1.xls?sfvrsn=4) (XLS, 229kb)
- CBE Comment Letter Attachment 2 (/docs/default-source/ceqa/documents/aqmd-projects /2015/CBE_comment_letter_attachment_2.xls?sfvrsn=4) (XLS, 135kb)
- NOx RECLAIM Public Workshop **WEBCAST** (https://www.youtube.com/watch?v=DxU_rqAAM3w)
- NOx RECLAIM Public Workshop Presentation (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_pw_072215.pdf?sfvrsn=2) - July 22, 2015 (PDF, 129kb)
- Draft Rule Language - July 22, 2015
- Rule 2002 (/docs/default-source/rule-book/Proposed-Rules/regxx /par2002-072015.pdf?sfvrsn=2) (PDF, 630kb)
- Rule 2005 (/docs/default-source/rule-book/Proposed-Rules/regxx /par2005-072015.pdf?sfvrsn=2) (PDF, 195kb)
- Rule 2011 (/docs/default-source/rule-book/Proposed-Rules/regxx/par2011-072115.pdf?sfvrsn=2) (PDF, 172kb)
- Rule 2012 (/docs/default-source/rule-book/Proposed-Rules/regxx/par2012-072115.pdf?sfvrsn=2) (PDF, 198kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/regxx/pdsr-072115.pdf?sfvrsn=2) - July 22, 2015 (PDF, 3.8MB)
- NOx RECLAIM Public Workshop Notice (/docs/default-source/rule-book/Proposed-Rules/regxx/reg-xx-public-workshop-notice-july-22-2015.pdf?sfvrsn=2) - July 17, 2015 (PDF, 95kb)
- Working Group Meeting #11 (/docs/default-source/rule-book/Proposed-Rules/regxx/nox-reclaim-wgm---07092015.pdf?sfvrsn=2) - July 9, 2015 (PDF, 325kb)
- Proposed Project Facility List (/docs/default-source/rule-book/Proposed-Rules/regxx /regxxfaclistomnibusc.pdf?sfvrsn=2) - (PDF, 308kb)
- Working Group Meeting #10 (/docs/default-source/rule-book/Proposed-Rules/regxx/nox-reclaim-wgm---06042015.pdf?sfvrsn=2) - June 4, 2015 (PDF, 386kb)
- RTC Allocation Shave Approaches (/docs/default-source/rule-book/reg-xx/nox-reclaim-shave-approaches-5-14-2015.pdf?sfvrsn=2) - May 15, 2015 (PDF, 614kb)

Per stakeholders' requests, the shave approaches presented at the April 29, 2015 Working Group Meeting are listed with detailed calculations and a list of affected facilities. These draft shave approaches are subject to further changes.

- Working Group Meeting #9 (/docs/default-source/rule-book/Proposed-Rules/regxx/nox-reclaim_wgm_042915b.pdf?sfvrsn=2) - April 29, 2015 (PDF, 187kB)

Consultant Non-Confidential Reports

- Refinery (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaimbarct-nonconf-refinery_112614.pdf?sfvrsn=2) - November 26, 2014 (PDF, 432kb)
- Non-Refinery (/docs/default-source/rule-book/Proposed-Rules/regxx/noxreclaimbarct-nonconf-nonrefinery_112614.pdf?sfvrsn=2) - November 26, 2014 (PDF, 436kb)

Preliminary Cost Effectiveness Summary

- Non-Refinery (/docs/default-source/rule-book/Proposed-Rules/regxx /prelimcesummary_nonrefinery_120314.pdf?sfvrsn=2) - December 3, 2014 (PDF, 61kb)
- Refinery Boilers and Heaters (/docs/default-source/rule-book/Proposed-Rules/regxx /prelimce_bh_102314.pdf?sfvrsn=2) - October 23, 2014 (PDF, 349kb)
- Coke Calciner (/docs/default-source/rule-book/Proposed-Rules/regxx /prelimce_cokecalciner_102314.pdf?sfvrsn=2) - October 23, 2014 (PDF, 153kb)
- Fluidized Catalytic Cracking Unit (FCCU) (/docs/default-source/rule-book/Proposed-Rules/regxx /prelimce_fccu_102314.pdf?sfvrsn=2) - October 23, 2014 (PDF, 203kb)
- Refinery Gas Turbines/FCCU (/docs/default-source/rule-book/Proposed-Rules/regxx /prelimce_gtandfccu_102314.pdf?sfvrsn=2) - October 23, 2014 (PDF, 229kb)
- Sulfur Recovery Unit/Tail Gas (SRU/TG) (/docs/default-source/rule-book/Proposed-Rules/regxx /prelimce_srutg_102314.pdf?sfvrsn=2) - October 23, 2014 (PDF,170kb)

CEQA Scoping Meeting - January 8, 2015

- CEQA (/docs/default-source/rule-book/Proposed-Rules/regxx /noxscope_ceqa_010815.pdf?sfvrsn=2) (PDF, 260kb)
- Socioeconomic (/docs/default-source/rule-book/Proposed-Rules/regxx /noxscope_socio_010815.pdf?sfvrsn=2) (60kb)
- Working Group Meeting #8 (/docs/default-source/rule-book/Proposed-Rules/regxx/nox-reclaim_wgm_010715.pdf?sfvrsn=2) - January 7, 2015 (PDF, 2.6 MB)
- Working Group Meeting #7 (/docs/default-source/rule-book/Proposed-Rules/regxx /noxreclaim_wgm_073114_final.pdf?sfvrsn=2) - July 31, 2014 (PDF, 230kb)
- Working Group Meeting #6 (/docs/default-source/rule-book/Proposed-Rules/regxx /reclaimwgm031814.pdf?sfvrsn=2) - March 18, 2014 (PDF, 495kb)
- Working Group Meeting #5 (/docs/default-source/rule-book/Proposed-Rules/regxx /reclaimwgm012214.pdf?sfvrsn=0) - January 22, 2014 (PDF, 759kb)
- Working Group Meeting #4 (/docs/default-source/rule-book/Proposed-Rules/regxx /wgm_091913.pdf?sfvrsn=2) - September 19, 2013 (PDF, 340kb)
- Draft Preliminary Assessment - Refinery Sector (/docs/default-source/rule-book/Proposed-Rules/regxx /refinery_total.pdf?sfvrsn=2) (PDF, 153kb)
- Draft Preliminary Assessment - Non-Refinery Sector (/docs/default-source/rule-book/Proposed-Rules/regxx/non-ref_summary.pdf?sfvrsn=2) (PDF, 164kb)
- Working Group Meeting #3 (/docs/default-source/rule-book/Proposed-Rules/regxx /reclaimwgm061313.pdf?sfvrsn=2) - June 13, 2013 (PDF, 306kb)
- Working Group Meeting #2 (/docs/default-source/rule-book/Proposed-Rules/regxx /reclaimwgm032013.pdf?sfvrsn=2) - March 20, 2013 (PDF, 513kb)
- Working Group Meeting #1 (/docs/default-source/rule-book/Proposed-Rules/regxx /reclaimwgm013113.pdf?sfvrsn=2) - January 31, 2013 (PDF, 4.6MB)

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Proposed Rule 2301

Control of Emissions from New or Redevelopment Projects

The purpose of *Proposed Rule 2301 - Control of Emissions from New or Redevelopment Projects* is to mitigate emission growth from new residential, commercial, industrial and institutional development, and redevelopment projects.

For more information visit the Proposed Rule 2301 (/home/rules-compliance/rules/proposed-rules/pr2301) web page.

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Proposed Rule 4001
Maintenance of AQMP Emission Reduction Targets at Commercial Marine Ports

- Comment Letters Received on PR 4001 (/docs/default-source/rule-book/Proposed-Rules/4001/pr4001-commentletters.pdf?sfvrsn=2) - January 2014 (PDF, 5MB)
- Comment Letters Received on CEQA Recirculated NOP/IS (http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2014/novnop-commentletters.pdf?sfvrsn=0)
- Notice of Public Workshop and CEQA Scoping Meeting (/docs/default-source/rule-book/Proposed-Rules/4001/pr4001-pwnotice-final.pdf?sfvrsn=2) - December 17, 2013 (PDF, 262kb)
- Proposed Rule 4001 (/docs/default-source/rule-book/Proposed-Rules/4001/pr4001-nov2013.pdf?sfvrsn=2) - November 2013 (PDF, 21kb)
- Preliminary Draft Staff Report (/docs/default-source/rule-book/Proposed-Rules/4001/pr4001-pdsr-dec2013.pdf?sfvrsn=2) - December 2013 (PDF, 127kb)

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Proposed Rule 4010
Emissions Inventory and Health Risk Assessment Submittal Requirements for the Port of Los Angeles and Port of Long Beach

- Proposed Rule 4010 (/docs/default-source/rule-book/Proposed-Rules/pr4010publicconsultationmtg2.pdf?sfvrsn=2) - April 15, 2010 (PDF, 69kb)
- Public Consultation Meeting Proposed Backstop Rules Presentation (/docs/default-source/rule-book/Proposed-Rules/050410backstoppublicconsultmtg.pdf?sfvrsn=2) - May 4, 2010 (PDF, 5.6MB)

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Proposed Rule 4020
Backstop Requirements for Emission Reductions and Health Risks at the San Pedro Bay Ports

- Proposed Rule 4020 (/docs/default-source/rule-book/Proposed-Rules/pr4020forpublicconsultationmeeting.pdf?sfvrsn=2) - April 15, 2010 (PDF, 78kb)

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Other Resources:
If you do not see an amendment or proposed rule listed, you may want to try following web pages:

- Calendar of Events (http://www.aqmd.gov/home/calendar_v2)
- Meetings and Agendas (/home/news-events/meeting-agendas-minutes)
- Public Workshops, Hearings, and Meetings (/home/about/public-notices)
- Rule and Control Measure Forecast Report - *See most recent Governing Board (/home/news-events /meeting-agendas-minutes) agenda.*

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APPENDEIX F CONSTRUCTION PHASE EMISSIONS

CalEEMod Run Representing Construction Activities

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Table F.1 Berm Construction Assumptions for CalEEMod Model

Berm Dimensions	Units
20	ft Wide
10	ft High
5614	ft Long
100	ft^2 Cross-sectional area
112280	ft^2 Total Footprint Area
2.6	Acres Total Footprint Area
Excavated Area for Construction	**Units**
50000	tons in berm
1.7	ton/$yard^3$
29412	$yard^3$ to be excavated
794118	ft^3 to be excavated
1	ft deep
794118	ft^2 Total Footprint Area
18	Acres

Vulcan Area Q Relocation Construction

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Annual

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblGrading	AcresOfGrading	1,162.50	179.00
tblLandUse	LotAcreage	0.00	179.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	OperationalYear	2018	2021

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.7363	7.4614	4.4067	7.7800e-003	1.6484	0.3788	2.0272	0.8997	0.3512	1.2509	0.0000	695.5933	695.5933	0.1946	0.0000	700.4585
2020	0.8706	9.5295	5.9170	0.0114	3.1491	0.4284	3.5775	1.6811	0.3941	2.0752	0.0000	1,001.5229	1,001.5229	0.3169	0.0000	1,009.4442
2021	0.3413	3.7273	2.5161	5.0800e-003	1.5068	0.1594	1.6662	0.7830	0.1467	0.9296	0.0000	447.0582	447.0582	0.1417	0.0000	450.6010
Maximum	**0.8706**	**9.5295**	**5.9170**	**0.0114**	**3.1491**	**0.4284**	**3.5775**	**1.6811**	**0.3941**	**2.0752**	**0.0000**	**1,001.5229**	**1,001.5229**	**0.3169**	**0.0000**	**1,009.4442**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.7363	7.4614	4.4067	7.7800e-003	0.7542	0.3788	1.1329	0.4082	0.3512	0.7594	0.0000	695.5925	695.5925	0.1946	0.0000	700.4577
2020	0.8706	9.5295	5.9170	0.0114	1.4325	0.4284	1.8609	0.7606	0.3941	1.1547	0.0000	1,001.5218	1,001.5218	0.3169	0.0000	1,009.4430
2021	0.3413	3.7273	2.5161	5.0800e-003	0.6845	0.1594	0.8439	0.3541	0.1467	0.5007	0.0000	447.0576	447.0576	0.1417	0.0000	450.6004
Maximum	**0.8706**	**9.5295**	**5.9170**	**0.0114**	**1.4325**	**0.4284**	**1.8609**	**0.7606**	**0.3941**	**1.1547**	**0.0000**	**1,001.5218**	**1,001.5218**	**0.3169**	**0.0000**	**1,009.4430**

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.46**	**0.00**	**47.22**	**54.73**	**0.00**	**43.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2019**	**3-31-2019**	1.8995	1.8995
2	**4-1-2019**	**6-30-2019**	1.9205	1.9205
3	**7-1-2019**	**9-30-2019**	1.9416	1.9416
4	**10-1-2019**	**12-31-2019**	2.4258	2.4258
5	**1-1-2020**	**3-31-2020**	2.3069	2.3069
6	**4-1-2020**	**6-30-2020**	2.6699	2.6699
7	**7-1-2020**	**9-30-2020**	2.6992	2.6992
8	**10-1-2020**	**12-31-2020**	2.6994	2.6994
9	**1-1-2021**	**3-31-2021**	2.4446	2.4446
10	**4-1-2021**	**6-30-2021**	1.6568	1.6568
		Highest	2.6994	2.6994

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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 Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	10/7/2019	5	200	
2	Grading	Grading	3/24/2020	5/31/2021	5	310	
3	Site Preparation	Site Preparation	10/8/2019	3/23/2020	5	120	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 179

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	12.00	81	0.73
Demolition	Excavators	3	12.00	158	0.38
Demolition	Rubber Tired Dozers	2	12.00	247	0.40
Grading	Excavators	2	12.00	158	0.38
Grading	Graders	1	12.00	187	0.41
Grading	Rubber Tired Dozers	1	12.00	247	0.40
Grading	Scrapers	2	12.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	12.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	12.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	12.00	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
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	0.5270	5.3675	3.3090	5.8200e-003		0.2692	0.2692		0.2505	0.2505	0.0000	519.3949	519.3949	0.1445	0.0000	523.0072
Total	**0.5270**	**5.3675**	**3.3090**	**5.8200e-003**		**0.2692**	**0.2692**		**0.2505**	**0.2505**	**0.0000**	**519.3949**	**519.3949**	**0.1445**	**0.0000**	**523.0072**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0400e-003	6.5600e-003	0.0646	1.6000e-004	0.0165	1.1000e-004	0.0166	4.3700e-003	1.0000e-004	4.4700e-003	0.0000	14.5510	14.5510	4.8000e-004	0.0000	14.5630
Total	**8.0400e-003**	**6.5600e-003**	**0.0646**	**1.6000e-004**	**0.0165**	**1.1000e-004**	**0.0166**	**4.3700e-003**	**1.0000e-004**	**4.4700e-003**	**0.0000**	**14.5510**	**14.5510**	**4.8000e-004**	**0.0000**	**14.5630**

3.2 Demolition - 2019

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	0.5270	5.3674	3.3090	5.8200e-003		0.2692	0.2692		0.2505	0.2505	0.0000	519.3943	519.3943	0.1445	0.0000	523.0066
Total	**0.5270**	**5.3674**	**3.3090**	**5.8200e-003**		**0.2692**	**0.2692**		**0.2505**	**0.2505**	**0.0000**	**519.3943**	**519.3943**	**0.1445**	**0.0000**	**523.0066**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0400e-003	6.5600e-003	0.0646	1.6000e-004	0.0165	1.1000e-004	0.0166	4.3700e-003	1.0000e-004	4.4700e-003	0.0000	14.5510	14.5510	4.8000e-004	0.0000	14.5630
Total	**8.0400e-003**	**6.5600e-003**	**0.0646**	**1.6000e-004**	**0.0165**	**1.1000e-004**	**0.0166**	**4.3700e-003**	**1.0000e-004**	**4.4700e-003**	**0.0000**	**14.5510**	**14.5510**	**4.8000e-004**	**0.0000**	**14.5630**

3.3 Grading - 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					
Fugitive Dust					1.4951	0.0000	1.4951	0.7799	0.0000	0.7799	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.6775	7.6426	4.8657	9.4400e-003		0.3310	0.3310		0.3045	0.3045	0.0000	829.5234	829.5234	0.2683	0.0000	836.2305
Total	**0.6775**	**7.6426**	**4.8657**	**9.4400e-003**	**1.4951**	**0.3310**	**1.8260**	**0.7799**	**0.3045**	**1.0844**	**0.0000**	**829.5234**	**829.5234**	**0.2683**	**0.0000**	**836.2305**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0100	7.8800e-003	0.0787	2.1000e-004	0.0223	1.5000e-004	0.0224	5.9100e-003	1.4000e-004	6.0500e-003	0.0000	19.0784	19.0784	5.7000e-004	0.0000	19.0927
Total	**0.0100**	**7.8800e-003**	**0.0787**	**2.1000e-004**	**0.0223**	**1.5000e-004**	**0.0224**	**5.9100e-003**	**1.4000e-004**	**6.0500e-003**	**0.0000**	**19.0784**	**19.0784**	**5.7000e-004**	**0.0000**	**19.0927**

3.3 Grading - 2020

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					0.6728	0.0000	0.6728	0.3509	0.0000	0.3509	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.6775	7.6426	4.8656	9.4400e-003		0.3310	0.3310		0.3045	0.3045	0.0000	829.5224	829.5224	0.2683	0.0000	836.2295
Total	**0.6775**	**7.6426**	**4.8656**	**9.4400e-003**	**0.6728**	**0.3310**	**1.0038**	**0.3509**	**0.3045**	**0.6554**	**0.0000**	**829.5224**	**829.5224**	**0.2683**	**0.0000**	**836.2295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0100	7.8800e-003	0.0787	2.1000e-004	0.0223	1.5000e-004	0.0224	5.9100e-003	1.4000e-004	6.0500e-003	0.0000	19.0784	19.0784	5.7000e-004	0.0000	19.0927
Total	**0.0100**	**7.8800e-003**	**0.0787**	**2.1000e-004**	**0.0223**	**1.5000e-004**	**0.0224**	**5.9100e-003**	**1.4000e-004**	**6.0500e-003**	**0.0000**	**19.0784**	**19.0784**	**5.7000e-004**	**0.0000**	**19.0927**

3.3 Grading - 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					
Fugitive Dust					1.4951	0.0000	1.4951	0.7799	0.0000	0.7799	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3363	3.7236	2.4780	4.9800e-003		0.1593	0.1593		0.1466	0.1466	0.0000	437.3222	437.3222	0.1414	0.0000	440.8582
Total	**0.3363**	**3.7236**	**2.4780**	**4.9800e-003**	**1.4951**	**0.1593**	**1.6544**	**0.7799**	**0.1466**	**0.9265**	**0.0000**	**437.3222**	**437.3222**	**0.1414**	**0.0000**	**440.8582**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9300e-003	3.7200e-003	0.0381	1.1000e-004	0.0117	8.0000e-005	0.0118	3.1200e-003	7.0000e-005	3.1900e-003	0.0000	9.7359	9.7359	2.7000e-004	0.0000	9.7428
Total	**4.9300e-003**	**3.7200e-003**	**0.0381**	**1.1000e-004**	**0.0117**	**8.0000e-005**	**0.0118**	**3.1200e-003**	**7.0000e-005**	**3.1900e-003**	**0.0000**	**9.7359**	**9.7359**	**2.7000e-004**	**0.0000**	**9.7428**

3.3 Grading - 2021

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					0.6728	0.0000	0.6728	0.3509	0.0000	0.3509	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3363	3.7236	2.4780	4.9800e-003		0.1593	0.1593		0.1466	0.1466	0.0000	437.3217	437.3217	0.1414	0.0000	440.8577
Total	**0.3363**	**3.7236**	**2.4780**	**4.9800e-003**	**0.6728**	**0.1593**	**0.8321**	**0.3509**	**0.1466**	**0.4975**	**0.0000**	**437.3217**	**437.3217**	**0.1414**	**0.0000**	**440.8577**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9300e-003	3.7200e-003	0.0381	1.1000e-004	0.0117	8.0000e-005	0.0118	3.1200e-003	7.0000e-005	3.1900e-003	0.0000	9.7359	9.7359	2.7000e-004	0.0000	9.7428
Total	**4.9300e-003**	**3.7200e-003**	**0.0381**	**1.1000e-004**	**0.0117**	**8.0000e-005**	**0.0118**	**3.1200e-003**	**7.0000e-005**	**3.1900e-003**	**0.0000**	**9.7359**	**9.7359**	**2.7000e-004**	**0.0000**	**9.7428**

3.4 Site Preparation - 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					1.6260	0.0000	1.6260	0.8938	0.0000	0.8938	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1983	2.0850	1.0094	1.7400e-003		0.1094	0.1094		0.1006	0.1006	0.0000	156.3217	156.3217	0.0495	0.0000	157.5582
Total	**0.1983**	**2.0850**	**1.0094**	**1.7400e-003**	**1.6260**	**0.1094**	**1.7353**	**0.8938**	**0.1006**	**0.9944**	**0.0000**	**156.3217**	**156.3217**	**0.0495**	**0.0000**	**157.5582**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9400e-003	2.4000e-003	0.0237	6.0000e-005	6.0200e-003	4.0000e-005	6.0600e-003	1.6000e-003	4.0000e-005	1.6400e-003	0.0000	5.3257	5.3257	1.8000e-004	0.0000	5.3301
Total	**2.9400e-003**	**2.4000e-003**	**0.0237**	**6.0000e-005**	**6.0200e-003**	**4.0000e-005**	**6.0600e-003**	**1.6000e-003**	**4.0000e-005**	**1.6400e-003**	**0.0000**	**5.3257**	**5.3257**	**1.8000e-004**	**0.0000**	**5.3301**

3.4 Site Preparation - 2019

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					0.7317	0.0000	0.7317	0.4022	0.0000	0.4022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1983	2.0850	1.0094	1.7400e-003		0.1094	0.1094		0.1006	0.1006	0.0000	156.3216	156.3216	0.0495	0.0000	157.5580
Total	**0.1983**	**2.0850**	**1.0094**	**1.7400e-003**	**0.7317**	**0.1094**	**0.8410**	**0.4022**	**0.1006**	**0.5028**	**0.0000**	**156.3216**	**156.3216**	**0.0495**	**0.0000**	**157.5580**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9400e-003	2.4000e-003	0.0237	6.0000e-005	6.0200e-003	4.0000e-005	6.0600e-003	1.6000e-003	4.0000e-005	1.6400e-003	0.0000	5.3257	5.3257	1.8000e-004	0.0000	5.3301
Total	**2.9400e-003**	**2.4000e-003**	**0.0237**	**6.0000e-005**	**6.0200e-003**	**4.0000e-005**	**6.0600e-003**	**1.6000e-003**	**4.0000e-005**	**1.6400e-003**	**0.0000**	**5.3257**	**5.3257**	**1.8000e-004**	**0.0000**	**5.3301**

3.4 Site Preparation - 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					
Fugitive Dust					1.6260	0.0000	1.6260	0.8938	0.0000	0.8938	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1804	1.8770	0.9520	1.6800e-003		0.0972	0.0972		0.0895	0.0895	0.0000	147.9308	147.9308	0.0478	0.0000	149.1269
Total	**0.1804**	**1.8770**	**0.9520**	**1.6800e-003**	**1.6260**	**0.0972**	**1.7232**	**0.8938**	**0.0895**	**0.9832**	**0.0000**	**147.9308**	**147.9308**	**0.0478**	**0.0000**	**149.1269**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6200e-003	2.0600e-003	0.0206	6.0000e-005	5.8200e-003	4.0000e-005	5.8600e-003	1.5500e-003	4.0000e-005	1.5800e-003	0.0000	4.9904	4.9904	1.5000e-004	0.0000	4.9942
Total	**2.6200e-003**	**2.0600e-003**	**0.0206**	**6.0000e-005**	**5.8200e-003**	**4.0000e-005**	**5.8600e-003**	**1.5500e-003**	**4.0000e-005**	**1.5800e-003**	**0.0000**	**4.9904**	**4.9904**	**1.5000e-004**	**0.0000**	**4.9942**

3.4 Site Preparation - 2020

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					0.7317	0.0000	0.7317	0.4022	0.0000	0.4022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1804	1.8770	0.9520	1.6800e-003		0.0972	0.0972		0.0895	0.0895	0.0000	147.9306	147.9306	0.0478	0.0000	149.1267
Total	**0.1804**	**1.8770**	**0.9520**	**1.6800e-003**	**0.7317**	**0.0972**	**0.8289**	**0.4022**	**0.0895**	**0.4917**	**0.0000**	**147.9306**	**147.9306**	**0.0478**	**0.0000**	**149.1267**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6200e-003	2.0600e-003	0.0206	6.0000e-005	5.8200e-003	4.0000e-005	5.8600e-003	1.5500e-003	4.0000e-005	1.5800e-003	0.0000	4.9904	4.9904	1.5000e-004	0.0000	4.9942
Total	**2.6200e-003**	**2.0600e-003**	**0.0206**	**6.0000e-005**	**5.8200e-003**	**4.0000e-005**	**5.8600e-003**	**1.5500e-003**	**4.0000e-005**	**1.5800e-003**	**0.0000**	**4.9904**	**4.9904**	**1.5000e-004**	**0.0000**	**4.9942**

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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.549952	0.037123	0.179649	0.119457	0.017229	0.005267	0.017877	0.062669	0.001348	0.001607	0.006000	0.000812	0.001010

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	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

6.2 Area by SubCategory

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Vulcan Area Q Relocation Construction

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Summer

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblGrading	AcresOfGrading	1,162.50	179.00
tblLandUse	LotAcreage	0.00	179.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	OperationalYear	2018	2021

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.6092	68.4301	33.9918	0.0600	27.3006	3.5869	30.8875	14.9494	3.2999	18.2493	0.0000	5,900.3115	5,900.3115	1.7945	0.0000	5,940.2767
2020	6.7843	75.3663	48.8369	0.0953	27.3006	3.2974	30.5980	14.9494	3.0336	17.9830	0.0000	9,234.8147	9,234.8147	2.9205	0.0000	9,307.8279
2021	6.3884	69.6626	47.1456	0.0952	9.8690	2.9794	12.8485	5.0908	2.7411	7.8318	0.0000	9,229.3813	9,229.3813	2.9204	0.0000	9,302.3919
Maximum	**6.7843**	**75.3663**	**48.8369**	**0.0953**	**27.3006**	**3.5869**	**30.8875**	**14.9494**	**3.2999**	**18.2493**	**0.0000**	**9,234.8147**	**9,234.8147**	**2.9205**	**0.0000**	**9,307.8279**

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	lb/day										lb/day					
2019	6.6092	68.4301	33.9918	0.0600	12.3959	3.5869	15.9828	6.7566	3.2999	10.0565	0.0000	5,900.3115	5,900.3115	1.7945	0.0000	5,940.2767
2020	6.7843	75.3663	48.8369	0.0953	12.3959	3.2974	15.6934	6.7566	3.0336	9.7902	0.0000	9,234.8147	9,234.8147	2.9205	0.0000	9,307.8279
2021	6.3884	69.6626	47.1456	0.0952	4.5640	2.9794	7.5435	2.3235	2.7411	5.0645	0.0000	9,229.3813	9,229.3813	2.9204	0.0000	9,302.3919
Maximum	**6.7843**	**75.3663**	**48.8369**	**0.0953**	**12.3959**	**3.5869**	**15.9828**	**6.7566**	**3.2999**	**10.0565**	**0.0000**	**9,234.8147**	**9,234.8147**	**2.9205**	**0.0000**	**9,307.8279**

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.47**	**0.00**	**47.24**	**54.74**	**0.00**	**43.47**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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 Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	10/7/2019	5	200	
2	Grading	Grading	3/24/2020	5/31/2021	5	310	
3	Site Preparation	Site Preparation	10/8/2019	3/23/2020	5	120	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 179

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	12.00	81	0.73
Demolition	Excavators	3	12.00	158	0.38
Demolition	Rubber Tired Dozers	2	12.00	247	0.40
Grading	Excavators	2	12.00	158	0.38
Grading	Graders	1	12.00	187	0.41
Grading	Rubber Tired Dozers	1	12.00	247	0.40
Grading	Scrapers	2	12.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	12.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	12.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	12.00	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
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045		5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**		**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

3.2 Demolition - 2019

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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045	0.0000	5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**	**0.0000**	**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

3.3 Grading - 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	lb/day										lb/day					
Fugitive Dust					9.6455	0.0000	9.6455	5.0315	0.0000	5.0315			0.0000			0.0000
Off-Road	6.6752	75.2963	47.9374	0.0930		3.2609	3.2609		3.0000	3.0000		9,008.7979	9,008.7979	2.9136		9,081.6386
Total	**6.6752**	**75.2963**	**47.9374**	**0.0930**	**9.6455**	**3.2609**	**12.9063**	**5.0315**	**3.0000**	**8.0314**		**9,008.7979**	**9,008.7979**	**2.9136**		**9,081.6386**

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	lb/day										lb/day					
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	0.1092	0.0701	0.8995	2.2700e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3500e-003	0.0606		226.0168	226.0168	6.9000e-003		226.1893
Total	**0.1092**	**0.0701**	**0.8995**	**2.2700e-003**	**0.2236**	**1.4600e-003**	**0.2250**	**0.0593**	**1.3500e-003**	**0.0606**		**226.0168**	**226.0168**	**6.9000e-003**		**226.1893**

3.3 Grading - 2020

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	lb/day										lb/day					
Fugitive Dust					4.3405	0.0000	4.3405	2.2642	0.0000	2.2642			0.0000			0.0000
Off-Road	6.6752	75.2963	47.9374	0.0930		3.2609	3.2609		3.0000	3.0000	0.0000	9,008.7979	9,008.7979	2.9136		9,081.6386
Total	**6.6752**	**75.2963**	**47.9374**	**0.0930**	**4.3405**	**3.2609**	**7.6013**	**2.2642**	**3.0000**	**5.2641**	**0.0000**	**9,008.7979**	**9,008.7979**	**2.9136**		**9,081.6386**

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	lb/day										lb/day					
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	0.1092	0.0701	0.8995	2.2700e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3500e-003	0.0606		226.0168	226.0168	6.9000e-003		226.1893
Total	**0.1092**	**0.0701**	**0.8995**	**2.2700e-003**	**0.2236**	**1.4600e-003**	**0.2250**	**0.0593**	**1.3500e-003**	**0.0606**		**226.0168**	**226.0168**	**6.9000e-003**		**226.1893**

3.3 Grading - 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	lb/day										lb/day					
Fugitive Dust					9.6455	0.0000	9.6455	5.0315	0.0000	5.0315			0.0000			0.0000
Off-Road	6.2868	69.5998	46.3177	0.0930		2.9780	2.9780		2.7398	2.7398		9,010.5652	9,010.5652	2.9142		9,083.4201
Total	**6.2868**	**69.5998**	**46.3177**	**0.0930**	**9.6455**	**2.9780**	**12.6235**	**5.0315**	**2.7398**	**7.7712**		**9,010.5652**	**9,010.5652**	**2.9142**		**9,083.4201**

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	lb/day										lb/day					
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	0.1016	0.0628	0.8280	2.2000e-003	0.2236	1.4300e-003	0.2250	0.0593	1.3200e-003	0.0606		218.8161	218.8161	6.2300e-003		218.9718
Total	**0.1016**	**0.0628**	**0.8280**	**2.2000e-003**	**0.2236**	**1.4300e-003**	**0.2250**	**0.0593**	**1.3200e-003**	**0.0606**		**218.8161**	**218.8161**	**6.2300e-003**		**218.9718**

3.3 Grading - 2021

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	lb/day										lb/day					
Fugitive Dust					4.3405	0.0000	4.3405	2.2642	0.0000	2.2642			0.0000			0.0000
Off-Road	6.2868	69.5998	46.3177	0.0930		2.9780	2.9780		2.7398	2.7398	0.0000	9,010.5652	9,010.5652	2.9142		9,083.4201
Total	**6.2868**	**69.5998**	**46.3177**	**0.0930**	**4.3405**	**2.9780**	**7.3185**	**2.2642**	**2.7398**	**5.0039**	**0.0000**	**9,010.5652**	**9,010.5652**	**2.9142**		**9,083.4201**

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	lb/day										lb/day					
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	0.1016	0.0628	0.8280	2.2000e-003	0.2236	1.4300e-003	0.2250	0.0593	1.3200e-003	0.0606		218.8161	218.8161	6.2300e-003		218.9718
Total	**0.1016**	**0.0628**	**0.8280**	**2.2000e-003**	**0.2236**	**1.4300e-003**	**0.2250**	**0.0593**	**1.3200e-003**	**0.0606**		**218.8161**	**218.8161**	**6.2300e-003**		**218.9718**

3.4 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					27.0994	0.0000	27.0994	14.8960	0.0000	14.8960			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987		5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**27.0994**	**3.5855**	**30.6849**	**14.8960**	**3.2987**	**18.1947**		**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1067	0.0710	0.8973	2.1100e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		209.9549	209.9549	7.0400e-003		210.1309
Total	**0.1067**	**0.0710**	**0.8973**	**2.1100e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**209.9549**	**209.9549**	**7.0400e-003**		**210.1309**

3.4 Site Preparation - 2019

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	lb/day										lb/day					
Fugitive Dust					12.1947	0.0000	12.1947	6.7032	0.0000	6.7032			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987	0.0000	5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**12.1947**	**3.5855**	**15.7803**	**6.7032**	**3.2987**	**10.0019**	**0.0000**	**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1067	0.0710	0.8973	2.1100e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		209.9549	209.9549	7.0400e-003		210.1309
Total	**0.1067**	**0.0710**	**0.8973**	**2.1100e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**209.9549**	**209.9549**	**7.0400e-003**		**210.1309**

3.4 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					27.0994	0.0000	27.0994	14.8960	0.0000	14.8960			0.0000			0.0000
Off-Road	6.1147	63.6260	32.2704	0.0570		3.2961	3.2961		3.0324	3.0324		5,527.6523	5,527.6523	1.7878		5,572.3462
Total	**6.1147**	**63.6260**	**32.2704**	**0.0570**	**27.0994**	**3.2961**	**30.3955**	**14.8960**	**3.0324**	**17.9285**		**5,527.6523**	**5,527.6523**	**1.7878**		**5,572.3462**

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	lb/day										lb/day					
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	0.0982	0.0631	0.8095	2.0400e-003	0.2012	1.3200e-003	0.2025	0.0534	1.2100e-003	0.0546		203.4151	203.4151	6.2100e-003		203.5704
Total	**0.0982**	**0.0631**	**0.8095**	**2.0400e-003**	**0.2012**	**1.3200e-003**	**0.2025**	**0.0534**	**1.2100e-003**	**0.0546**		**203.4151**	**203.4151**	**6.2100e-003**		**203.5704**

3.4 Site Preparation - 2020

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	lb/day										lb/day					
Fugitive Dust					12.1947	0.0000	12.1947	6.7032	0.0000	6.7032			0.0000			0.0000
Off-Road	6.1147	63.6260	32.2704	0.0570		3.2961	3.2961		3.0324	3.0324	0.0000	5,527.6523	5,527.6523	1.7878		5,572.3462
Total	**6.1147**	**63.6260**	**32.2704**	**0.0570**	**12.1947**	**3.2961**	**15.4908**	**6.7032**	**3.0324**	**9.7356**	**0.0000**	**5,527.6523**	**5,527.6523**	**1.7878**		**5,572.3462**

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	lb/day										lb/day					
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	0.0982	0.0631	0.8095	2.0400e-003	0.2012	1.3200e-003	0.2025	0.0534	1.2100e-003	0.0546		203.4151	203.4151	6.2100e-003		203.5704
Total	**0.0982**	**0.0631**	**0.8095**	**2.0400e-003**	**0.2012**	**1.3200e-003**	**0.2025**	**0.0534**	**1.2100e-003**	**0.0546**		**203.4151**	**203.4151**	**6.2100e-003**		**203.5704**

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	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.549952	0.037123	0.179649	0.119457	0.017229	0.005267	0.017877	0.062669	0.001348	0.001607	0.006000	0.000812	0.001010

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	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Vulcan Area Q Relocation Construction

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Winter

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblGrading	AcresOfGrading	1,162.50	179.00
tblLandUse	LotAcreage	0.00	179.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	OperationalYear	2018	2021

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.6091	68.4338	33.8333	0.0598	27.3006	3.5869	30.8875	14.9494	3.2999	18.2493	0.0000	5,882.3062	5,882.3062	1.7937	0.0000	5,922.2534
2020	6.7844	75.3700	48.6767	0.0950	27.3006	3.2974	30.5980	14.9494	3.0336	17.9830	0.0000	9,211.5479	9,211.5479	2.9197	0.0000	9,284.5399
2021	6.3886	69.6658	46.9968	0.0950	9.8690	2.9794	12.8485	5.0908	2.7411	7.8318	0.0000	9,206.8647	9,206.8647	2.9197	0.0000	9,279.8563
Maximum	**6.7844**	**75.3700**	**48.6767**	**0.0950**	**27.3006**	**3.5869**	**30.8875**	**14.9494**	**3.2999**	**18.2493**	**0.0000**	**9,211.5479**	**9,211.5479**	**2.9197**	**0.0000**	**9,284.5399**

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	lb/day										lb/day					
2019	6.6091	68.4338	33.8333	0.0598	12.3959	3.5869	15.9828	6.7566	3.2999	10.0565	0.0000	5,882.3061	5,882.3061	1.7937	0.0000	5,922.2534
2020	6.7844	75.3700	48.6767	0.0950	12.3959	3.2974	15.6934	6.7566	3.0336	9.7902	0.0000	9,211.5479	9,211.5479	2.9197	0.0000	9,284.5399
2021	6.3886	69.6658	46.9968	0.0950	4.5640	2.9794	7.5435	2.3235	2.7411	5.0645	0.0000	9,206.8647	9,206.8647	2.9197	0.0000	9,279.8563
Maximum	**6.7844**	**75.3700**	**48.6767**	**0.0950**	**12.3959**	**3.5869**	**15.9828**	**6.7566**	**3.2999**	**10.0565**	**0.0000**	**9,211.5479**	**9,211.5479**	**2.9197**	**0.0000**	**9,284.5399**

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.47**	**0.00**	**47.24**	**54.74**	**0.00**	**43.47**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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 Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	10/7/2019	5	200	
2	Grading	Grading	3/24/2020	5/31/2021	5	310	
3	Site Preparation	Site Preparation	10/8/2019	3/23/2020	5	120	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 179

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	12.00	81	0.73
Demolition	Excavators	3	12.00	158	0.38
Demolition	Rubber Tired Dozers	2	12.00	247	0.40
Grading	Excavators	2	12.00	158	0.38
Grading	Graders	1	12.00	187	0.41
Grading	Rubber Tired Dozers	1	12.00	247	0.40
Grading	Scrapers	2	12.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	12.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	12.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	12.00	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
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045		5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**		**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

3.2 Demolition - 2019

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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045	0.0000	5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**	**0.0000**	**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

3.3 Grading - 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	lb/day										lb/day					
Fugitive Dust					9.6455	0.0000	9.6455	5.0315	0.0000	5.0315			0.0000			0.0000
Off-Road	6.6752	75.2963	47.9374	0.0930		3.2609	3.2609		3.0000	3.0000		9,008.7979	9,008.7979	2.9136		9,081.6386
Total	**6.6752**	**75.2963**	**47.9374**	**0.0930**	**9.6455**	**3.2609**	**12.9063**	**5.0315**	**3.0000**	**8.0314**		**9,008.7979**	**9,008.7979**	**2.9136**		**9,081.6386**

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	lb/day										lb/day					
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	0.1092	0.0737	0.7393	2.0400e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3500e-003	0.0606		202.7500	202.7500	6.0500e-003		202.9013
Total	**0.1092**	**0.0737**	**0.7393**	**2.0400e-003**	**0.2236**	**1.4600e-003**	**0.2250**	**0.0593**	**1.3500e-003**	**0.0606**		**202.7500**	**202.7500**	**6.0500e-003**		**202.9013**

3.3 Grading - 2020

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	lb/day										lb/day					
Fugitive Dust					4.3405	0.0000	4.3405	2.2642	0.0000	2.2642			0.0000			0.0000
Off-Road	6.6752	75.2963	47.9374	0.0930		3.2609	3.2609		3.0000	3.0000	0.0000	9,008.7979	9,008.7979	2.9136		9,081.6386
Total	**6.6752**	**75.2963**	**47.9374**	**0.0930**	**4.3405**	**3.2609**	**7.6013**	**2.2642**	**3.0000**	**5.2641**	**0.0000**	**9,008.7979**	**9,008.7979**	**2.9136**		**9,081.6386**

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	lb/day										lb/day					
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	0.1092	0.0737	0.7393	2.0400e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3500e-003	0.0606		202.7500	202.7500	6.0500e-003		202.9013
Total	**0.1092**	**0.0737**	**0.7393**	**2.0400e-003**	**0.2236**	**1.4600e-003**	**0.2250**	**0.0593**	**1.3500e-003**	**0.0606**		**202.7500**	**202.7500**	**6.0500e-003**		**202.9013**

3.3 Grading - 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	lb/day										lb/day					
Fugitive Dust					9.6455	0.0000	9.6455	5.0315	0.0000	5.0315			0.0000			0.0000
Off-Road	6.2868	69.5998	46.3177	0.0930		2.9780	2.9780		2.7398	2.7398		9,010.5652	9,010.5652	2.9142		9,083.4201
Total	**6.2868**	**69.5998**	**46.3177**	**0.0930**	**9.6455**	**2.9780**	**12.6235**	**5.0315**	**2.7398**	**7.7712**		**9,010.5652**	**9,010.5652**	**2.9142**		**9,083.4201**

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	lb/day										lb/day					
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	0.1018	0.0661	0.6791	1.9700e-003	0.2236	1.4300e-003	0.2250	0.0593	1.3200e-003	0.0606		196.2995	196.2995	5.4600e-003		196.4361
Total	**0.1018**	**0.0661**	**0.6791**	**1.9700e-003**	**0.2236**	**1.4300e-003**	**0.2250**	**0.0593**	**1.3200e-003**	**0.0606**		**196.2995**	**196.2995**	**5.4600e-003**		**196.4361**

3.3 Grading - 2021

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	lb/day										lb/day					
Fugitive Dust					4.3405	0.0000	4.3405	2.2642	0.0000	2.2642			0.0000			0.0000
Off-Road	6.2868	69.5998	46.3177	0.0930		2.9780	2.9780		2.7398	2.7398	0.0000	9,010.5652	9,010.5652	2.9142		9,083.4201
Total	**6.2868**	**69.5998**	**46.3177**	**0.0930**	**4.3405**	**2.9780**	**7.3185**	**2.2642**	**2.7398**	**5.0039**	**0.0000**	**9,010.5652**	**9,010.5652**	**2.9142**		**9,083.4201**

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	lb/day										lb/day					
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	0.1018	0.0661	0.6791	1.9700e-003	0.2236	1.4300e-003	0.2250	0.0593	1.3200e-003	0.0606		196.2995	196.2995	5.4600e-003		196.4361
Total	**0.1018**	**0.0661**	**0.6791**	**1.9700e-003**	**0.2236**	**1.4300e-003**	**0.2250**	**0.0593**	**1.3200e-003**	**0.0606**		**196.2995**	**196.2995**	**5.4600e-003**		**196.4361**

3.4 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					27.0994	0.0000	27.0994	14.8960	0.0000	14.8960			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987		5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**27.0994**	**3.5855**	**30.6849**	**14.8960**	**3.2987**	**18.1947**		**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1066	0.0747	0.7388	1.8900e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		188.3485	188.3485	6.1800e-003		188.5030
Total	**0.1066**	**0.0747**	**0.7388**	**1.8900e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**188.3485**	**188.3485**	**6.1800e-003**		**188.5030**

3.4 Site Preparation - 2019

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	lb/day										lb/day					
Fugitive Dust					12.1947	0.0000	12.1947	6.7032	0.0000	6.7032			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987	0.0000	5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**12.1947**	**3.5855**	**15.7803**	**6.7032**	**3.2987**	**10.0019**	**0.0000**	**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1066	0.0747	0.7388	1.8900e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		188.3485	188.3485	6.1800e-003		188.5030
Total	**0.1066**	**0.0747**	**0.7388**	**1.8900e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**188.3485**	**188.3485**	**6.1800e-003**		**188.5030**

3.4 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					27.0994	0.0000	27.0994	14.8960	0.0000	14.8960			0.0000			0.0000
Off-Road	6.1147	63.6260	32.2704	0.0570		3.2961	3.2961		3.0324	3.0324		5,527.6523	5,527.6523	1.7878		5,572.3462
Total	**6.1147**	**63.6260**	**32.2704**	**0.0570**	**27.0994**	**3.2961**	**30.3955**	**14.8960**	**3.0324**	**17.9285**		**5,527.6523**	**5,527.6523**	**1.7878**		**5,572.3462**

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	lb/day										lb/day					
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	0.0983	0.0663	0.6653	1.8300e-003	0.2012	1.3200e-003	0.2025	0.0534	1.2100e-003	0.0546		182.4750	182.4750	5.4500e-003		182.6112
Total	**0.0983**	**0.0663**	**0.6653**	**1.8300e-003**	**0.2012**	**1.3200e-003**	**0.2025**	**0.0534**	**1.2100e-003**	**0.0546**		**182.4750**	**182.4750**	**5.4500e-003**		**182.6112**

3.4 Site Preparation - 2020

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	lb/day										lb/day					
Fugitive Dust					12.1947	0.0000	12.1947	6.7032	0.0000	6.7032			0.0000			0.0000
Off-Road	6.1147	63.6260	32.2704	0.0570		3.2961	3.2961		3.0324	3.0324	0.0000	5,527.6523	5,527.6523	1.7878		5,572.3462
Total	**6.1147**	**63.6260**	**32.2704**	**0.0570**	**12.1947**	**3.2961**	**15.4908**	**6.7032**	**3.0324**	**9.7356**	**0.0000**	**5,527.6523**	**5,527.6523**	**1.7878**		**5,572.3462**

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	lb/day										lb/day					
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	0.0983	0.0663	0.6653	1.8300e-003	0.2012	1.3200e-003	0.2025	0.0534	1.2100e-003	0.0546		182.4750	182.4750	5.4500e-003		182.6112
Total	**0.0983**	**0.0663**	**0.6653**	**1.8300e-003**	**0.2012**	**1.3200e-003**	**0.2025**	**0.0534**	**1.2100e-003**	**0.0546**		**182.4750**	**182.4750**	**5.4500e-003**		**182.6112**

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	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.549952	0.037123	0.179649	0.119457	0.017229	0.005267	0.017877	0.062669	0.001348	0.001607	0.006000	0.000812	0.001010

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	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Vulcan Area Q Relocation Construction

San Bernardino-South Coast, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments

Only CalEEMod defaults were used.

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

Peak Daily Construction Emissions

Vulcan Area Q Relocation Construction - San Bernardino-South Coast County, Summary Report

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2019	Demolition	5.3590 S	53.7368 W	33.8378 S	0.0600 S	2.8611 S	2.5500 S	5.3590 S	53.7368 W	33.8378 S	0.0600 S	2.8611 S	2.5500 S
2020	Grading	6.7844 W	75.3700 W	48.8369 S	0.0953 S	13.1314 S	8.0921 S	6.7844 W	75.3700 W	48.8369 S	0.0953 S	7.8263 S	5.3248 S
2021	Grading	6.3886 W	69.6658 W	47.1456 S	0.0952 S	12.8485 S	7.8318 S	6.3886 W	69.6658 W	47.1456 S	0.0952 S	7.5435 S	5.0645 S
2019	Site Preparation	6.6092 S	68.4338 W	33.9918 S	0.0591 S	30.8875 S	18.2493 S	6.6092 S	68.4338 W	33.9918 S	0.0591 S	15.9828 S	10.0565 S
2020	Site Preparation	6.2130 W	63.6923 W	33.0799 S	0.0591 S	30.5980 S	17.9830 S	6.2130 W	63.6923 W	33.0799 S	0.0591 S	15.6934 S	9.7902 S
	Peak Daily Total	6.7844 W	75.3700 W	48.8369 S	0.0953 S	30.8875 S	18.2493 S	6.7844 W	75.3700 W	48.8369 S	0.0953 S	15.9828 S	10.0565 S
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S
On-Site	Energy	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S
Off-Site	Mobile	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S
	Peak Daily Total	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S
	Air District Threshold												
	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2019	695.5933	0.1946	0.0000	700.4585	695.5925	0.1946	0.0000	700.4577
Construction	2020	1,001.5229	0.3169	0.0000	1,009.4442	1,001.5217	0.3169	0.0000	1,009.4431
Construction	2021	447.0582	0.1417	0.0000	450.6009	447.0576	0.1417	0.0000	450.6004
Operational	2021	2.7216e-005	0.0000	0.0000	2.7216e-005	2.7216e-005	0.0000	0.0000	2.7216e-005
	Total								
	Significance Threshold								
	Exceed Significance?								

Vulcan Area Q Relocation Construction

San Bernardino-South Coast County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Demolition	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Concrete/Industrial Saws	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	5	No Change	0.00
Graders	Diesel	No Change	0	1	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	6	No Change	0.00
Scrapers	Diesel	No Change	0	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	6	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Concrete/Industrial Saws	6.93000E-002	5.38280E-001	5.55330E-001	9.40000E-004	3.44100E-002	3.44100E-002	0.00000E+000	8.06486E+001	8.06486E+001	5.68000E-003	0.00000E+000	8.07905E+001
Excavators	2.28710E-001	2.28711E+000	2.98862E+000	4.73000E-003	1.10550E-001	1.01700E-001	0.00000E+000	4.19640E+002	4.19640E+002	1.34250E-001	0.00000E+000	4.22996E+002
Graders	1.08800E-001	1.43851E+000	4.18070E-001	1.54000E-003	4.58500E-002	4.21800E-002	0.00000E+000	1.35487E+002	1.35487E+002	4.38200E-002	0.00000E+000	1.36583E+002
Rubber Tired Dozers	8.87720E-001	9.38968E+000	3.37476E+000	6.84000E-003	4.58320E-001	4.21660E-001	0.00000E+000	6.09493E+002	6.09493E+002	1.94760E-001	0.00000E+000	6.14362E+002
Scrapers	4.51520E-001	5.29630E+000	3.39540E+000	7.04000E-003	2.06400E-001	1.89890E-001	0.00000E+000	6.18978E+002	6.18978E+002	2.00190E-001	0.00000E+000	6.23982E+002
Tractors/Loaders/Backhoes	1.73540E-001	1.74564E+000	1.88183E+000	2.56000E-003	1.10590E-001	1.01740E-001	0.00000E+000	2.26247E+002	2.26247E+002	7.28100E-002	0.00000E+000	2.28067E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Concrete/Industrial Saws	6.93000E-002	5.38280E-001	5.55330E-001	9.40000E-004	3.44100E-002	3.44100E-002	0.00000E+000	8.06485E+001	8.06485E+001	5.68000E-003	0.00000E+000	8.07904E+001
Excavators	2.28710E-001	2.28711E+000	2.98861E+000	4.73000E-003	1.10550E-001	1.01700E-001	0.00000E+000	4.19639E+002	4.19639E+002	1.34250E-001	0.00000E+000	4.22995E+002
Graders	1.08800E-001	1.43851E+000	4.18070E-001	1.54000E-003	4.58500E-002	4.21800E-002	0.00000E+000	1.35487E+002	1.35487E+002	4.38200E-002	0.00000E+000	1.36583E+002
Rubber Tired Dozers	8.87720E-001	9.38966E+000	3.37476E+000	6.84000E-003	4.58320E-001	4.21660E-001	0.00000E+000	6.09492E+002	6.09492E+002	1.94760E-001	0.00000E+000	6.14362E+002
Scrapers	4.51520E-001	5.29630E+000	3.39539E+000	7.04000E-003	2.06400E-001	1.89890E-001	0.00000E+000	6.18977E+002	6.18977E+002	2.00190E-001	0.00000E+000	6.23982E+002
Tractors/Loaders/Backhoes	1.73540E-001	1.74564E+000	1.88183E+000	2.56000E-003	1.10590E-001	1.01740E-001	0.00000E+000	2.26247E+002	2.26247E+002	7.28100E-002	0.00000E+000	2.28067E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Concrete/Industrial Saws	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.23995E-006	1.23995E-006	0.00000E+000	0.00000E+000	1.11399E-006
Excavators	0.00000E+000	0.00000E+000	3.34603E-006	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19150E-006	1.19150E-006	0.00000E+000	0.00000E+000	1.18204E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.25473E-006	1.25473E-006	0.00000E+000	0.00000E+000	1.17145E-006
Rubber Tired Dozers	0.00000E+000	2.13000E-006	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19772E-006	1.19772E-006	0.00000E+000	0.00000E+000	1.18822E-006
Scrapers	0.00000E+000	0.00000E+000	2.94516E-006	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17936E-006	1.17936E-006	0.00000E+000	0.00000E+000	1.18593E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19339E-006	1.19339E-006	0.00000E+000	0.00000E+000	1.22771E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Demolition	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Demolition	Roads	0.02	0.00	0.02	0.00	0.00	0.00
Grading	Fugitive Dust	2.99	1.56	1.35	0.70	0.55	0.55
Grading	Roads	0.03	0.01	0.03	0.01	0.00	0.00
Site Preparation	Fugitive Dust	3.25	1.79	1.46	0.80	0.55	0.55
Site Preparation	Roads	0.01	0.00	0.01	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value 3
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.00	0.15		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				

No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00
No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	

No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		

No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

Vulcan Area Q Relocation Construction (Expected)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

Vulcan Area Q Relocation Construction (Expected) - San Bernardino-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	200.00	20.00
tblConstructionPhase	NumDays	310.00	20.00
tblConstructionPhase	NumDays	120.00	10.00
tblGrading	AcresOfGrading	75.00	179.00
tblLandUse	LotAcreage	0.00	179.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	OperationalYear	2018	2021

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1587	1.6983	1.0160	1.8400e-003	0.3256	0.0806	0.4062	0.1357	0.0745	0.2101	0.0000	165.3863	165.3863	0.0491	0.0000	166.6146
Maximum	**0.1587**	**1.6983**	**1.0160**	**1.8400e-003**	**0.3256**	**0.0806**	**0.4062**	**0.1357**	**0.0745**	**0.2101**	**0.0000**	**165.3863**	**165.3863**	**0.0491**	**0.0000**	**166.6146**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1587	1.6983	1.0160	1.8400e-003	0.1492	0.0806	0.2298	0.0618	0.0745	0.1362	0.0000	165.3861	165.3861	0.0491	0.0000	166.6144
Maximum	**0.1587**	**1.6983**	**1.0160**	**1.8400e-003**	**0.1492**	**0.0806**	**0.2298**	**0.0618**	**0.0745**	**0.1362**	**0.0000**	**165.3861**	**165.3861**	**0.0491**	**0.0000**	**166.6144**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.18**	**0.00**	**43.43**	**54.48**	**0.00**	**35.18**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2019**	**3-31-2019**	1.8571	1.8571
		Highest	1.8571	1.8571

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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 Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	1/28/2019	5	20	
2	Site Preparation	Site Preparation	1/29/2019	2/11/2019	5	10	
3	Grading	Grading	2/12/2019	3/11/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 179

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	12.00	81	0.73
Demolition	Excavators	3	12.00	158	0.38
Demolition	Rubber Tired Dozers	2	12.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	12.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	12.00	97	0.37
Grading	Excavators	2	12.00	158	0.38
Grading	Graders	1	12.00	187	0.41
Grading	Rubber Tired Dozers	1	12.00	247	0.40
Grading	Scrapers	2	12.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	12.00	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
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	0.0527	0.5367	0.3309	5.8000e-004		0.0269	0.0269		0.0250	0.0250	0.0000	51.9395	51.9395	0.0145	0.0000	52.3007
Total	**0.0527**	**0.5367**	**0.3309**	**5.8000e-004**		**0.0269**	**0.0269**		**0.0250**	**0.0250**	**0.0000**	**51.9395**	**51.9395**	**0.0145**	**0.0000**	**52.3007**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-004	6.6000e-004	6.4600e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4551	1.4551	5.0000e-005	0.0000	1.4563
Total	**8.0000e-004**	**6.6000e-004**	**6.4600e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4551**	**1.4551**	**5.0000e-005**	**0.0000**	**1.4563**

3.2 Demolition - 2019

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	0.0527	0.5367	0.3309	5.8000e-004		0.0269	0.0269		0.0250	0.0250	0.0000	51.9394	51.9394	0.0145	0.0000	52.3007
Total	**0.0527**	**0.5367**	**0.3309**	**5.8000e-004**		**0.0269**	**0.0269**		**0.0250**	**0.0250**	**0.0000**	**51.9394**	**51.9394**	**0.0145**	**0.0000**	**52.3007**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-004	6.6000e-004	6.4600e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.4551	1.4551	5.0000e-005	0.0000	1.4563
Total	**8.0000e-004**	**6.6000e-004**	**6.4600e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.4551**	**1.4551**	**5.0000e-005**	**0.0000**	**1.4563**

3.3 Site Preparation - 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					0.1355	0.0000	0.1355	0.0745	0.0000	0.0745	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0325	0.3418	0.1655	2.8000e-004		0.0179	0.0179		0.0165	0.0165	0.0000	25.6265	25.6265	8.1100e-003	0.0000	25.8292
Total	**0.0325**	**0.3418**	**0.1655**	**2.8000e-004**	**0.1355**	**0.0179**	**0.1534**	**0.0745**	**0.0165**	**0.0910**	**0.0000**	**25.6265**	**25.6265**	**8.1100e-003**	**0.0000**	**25.8292**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**4.8000e-004**	**3.9000e-004**	**3.8800e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8731**	**0.8731**	**3.0000e-005**	**0.0000**	**0.8738**

3.3 Site Preparation - 2019

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					0.0610	0.0000	0.0610	0.0335	0.0000	0.0335	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0325	0.3418	0.1655	2.8000e-004		0.0179	0.0179		0.0165	0.0165	0.0000	25.6265	25.6265	8.1100e-003	0.0000	25.8292
Total	**0.0325**	**0.3418**	**0.1655**	**2.8000e-004**	**0.0610**	**0.0179**	**0.0789**	**0.0335**	**0.0165**	**0.0500**	**0.0000**	**25.6265**	**25.6265**	**8.1100e-003**	**0.0000**	**25.8292**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.9000e-004	3.8800e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8731	0.8731	3.0000e-005	0.0000	0.8738
Total	**4.8000e-004**	**3.9000e-004**	**3.8800e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8731**	**0.8731**	**3.0000e-005**	**0.0000**	**0.8738**

3.4 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					0.1853	0.0000	0.1853	0.0599	0.0000	0.0599	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0711	0.8178	0.5007	9.3000e-004		0.0357	0.0357		0.0329	0.0329	0.0000	83.5520	83.5520	0.0264	0.0000	84.2129
Total	**0.0711**	**0.8178**	**0.5007**	**9.3000e-004**	**0.1853**	**0.0357**	**0.2210**	**0.0599**	**0.0329**	**0.0928**	**0.0000**	**83.5520**	**83.5520**	**0.0264**	**0.0000**	**84.2129**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0700e-003	8.7000e-004	8.6200e-003	2.0000e-005	2.1900e-003	2.0000e-005	2.2100e-003	5.8000e-004	1.0000e-005	6.0000e-004	0.0000	1.9401	1.9401	6.0000e-005	0.0000	1.9417
Total	**1.0700e-003**	**8.7000e-004**	**8.6200e-003**	**2.0000e-005**	**2.1900e-003**	**2.0000e-005**	**2.2100e-003**	**5.8000e-004**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**1.9401**	**1.9401**	**6.0000e-005**	**0.0000**	**1.9417**

3.4 Grading - 2019

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					0.0834	0.0000	0.0834	0.0270	0.0000	0.0270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0711	0.8178	0.5007	9.3000e-004		0.0357	0.0357		0.0329	0.0329	0.0000	83.5519	83.5519	0.0264	0.0000	84.2128
Total	**0.0711**	**0.8178**	**0.5007**	**9.3000e-004**	**0.0834**	**0.0357**	**0.1191**	**0.0270**	**0.0329**	**0.0598**	**0.0000**	**83.5519**	**83.5519**	**0.0264**	**0.0000**	**84.2128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0700e-003	8.7000e-004	8.6200e-003	2.0000e-005	2.1900e-003	2.0000e-005	2.2100e-003	5.8000e-004	1.0000e-005	6.0000e-004	0.0000	1.9401	1.9401	6.0000e-005	0.0000	1.9417
Total	**1.0700e-003**	**8.7000e-004**	**8.6200e-003**	**2.0000e-005**	**2.1900e-003**	**2.0000e-005**	**2.2100e-003**	**5.8000e-004**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**1.9401**	**1.9401**	**6.0000e-005**	**0.0000**	**1.9417**

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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.549952	0.037123	0.179649	0.119457	0.017229	0.005267	0.017877	0.062669	0.001348	0.001607	0.006000	0.000812	0.001010

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	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

6.2 Area by SubCategory

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	3.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**3.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Vulcan Area Q Relocation Construction (Expected)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Vulcan Area Q Relocation Construction (Expected) - San Bernardino-South Coast County, Summer

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

Vulcan Area Q Relocation Construction (Expected) - San Bernardino-South Coast County, Summer

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	200.00	20.00
tblConstructionPhase	NumDays	310.00	20.00
tblConstructionPhase	NumDays	120.00	10.00
tblGrading	AcresOfGrading	75.00	179.00
tblLandUse	LotAcreage	0.00	179.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	OperationalYear	2018	2021

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	7.2269	81.8591	51.0621	0.0953	27.3006	3.5869	30.8875	14.9494	3.2999	18.2493	0.0000	9,443.3124	9,443.3124	2.9218	0.0000	9,516.3569
Maximum	**7.2269**	**81.8591**	**51.0621**	**0.0953**	**27.3006**	**3.5869**	**30.8875**	**14.9494**	**3.2999**	**18.2493**	**0.0000**	**9,443.3124**	**9,443.3124**	**2.9218**	**0.0000**	**9,516.3569**

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	lb/day										lb/day					
2019	7.2269	81.8591	51.0621	0.0953	12.3959	3.5869	15.9828	6.7566	3.2999	10.0565	0.0000	9,443.3124	9,443.3124	2.9218	0.0000	9,516.3568
Maximum	**7.2269**	**81.8591**	**51.0621**	**0.0953**	**12.3959**	**3.5869**	**15.9828**	**6.7566**	**3.2999**	**10.0565**	**0.0000**	**9,443.3124**	**9,443.3124**	**2.9218**	**0.0000**	**9,516.3568**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.59**	**0.00**	**48.25**	**54.80**	**0.00**	**44.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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 Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	1/28/2019	5	20	
2	Site Preparation	Site Preparation	1/29/2019	2/11/2019	5	10	
3	Grading	Grading	2/12/2019	3/11/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 179

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	12.00	81	0.73
Demolition	Excavators	3	12.00	158	0.38
Demolition	Rubber Tired Dozers	2	12.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	12.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	12.00	97	0.37
Grading	Excavators	2	12.00	158	0.38
Grading	Graders	1	12.00	187	0.41
Grading	Rubber Tired Dozers	1	12.00	247	0.40
Grading	Scrapers	2	12.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	12.00	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
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045		5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**		**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

3.2 Demolition - 2019

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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045	0.0000	5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**	**0.0000**	**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0889	0.0592	0.7477	1.7600e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		174.9624	174.9624	5.8700e-003		175.1091
Total	**0.0889**	**0.0592**	**0.7477**	**1.7600e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**174.9624**	**174.9624**	**5.8700e-003**		**175.1091**

3.3 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					27.0994	0.0000	27.0994	14.8960	0.0000	14.8960			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987		5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**27.0994**	**3.5855**	**30.6849**	**14.8960**	**3.2987**	**18.1947**		**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1067	0.0710	0.8973	2.1100e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		209.9549	209.9549	7.0400e-003		210.1309
Total	**0.1067**	**0.0710**	**0.8973**	**2.1100e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**209.9549**	**209.9549**	**7.0400e-003**		**210.1309**

3.3 Site Preparation - 2019

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	lb/day										lb/day					
Fugitive Dust					12.1947	0.0000	12.1947	6.7032	0.0000	6.7032			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987	0.0000	5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**12.1947**	**3.5855**	**15.7803**	**6.7032**	**3.2987**	**10.0019**	**0.0000**	**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1067	0.0710	0.8973	2.1100e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		209.9549	209.9549	7.0400e-003		210.1309
Total	**0.1067**	**0.0710**	**0.8973**	**2.1100e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**209.9549**	**209.9549**	**7.0400e-003**		**210.1309**

3.4 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	lb/day										lb/day					
Fugitive Dust					18.5246	0.0000	18.5246	5.9902	0.0000	5.9902			0.0000			0.0000
Off-Road	7.1084	81.7803	50.0652	0.0930		3.5740	3.5740		3.2881	3.2881		9,210.0292	9,210.0292	2.9140		9,282.8781
Total	**7.1084**	**81.7803**	**50.0652**	**0.0930**	**18.5246**	**3.5740**	**22.0986**	**5.9902**	**3.2881**	**9.2783**		**9,210.0292**	**9,210.0292**	**2.9140**		**9,282.8781**

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	lb/day										lb/day					
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	0.1186	0.0789	0.9970	2.3400e-003	0.2236	1.5000e-003	0.2251	0.0593	1.3800e-003	0.0607		233.2832	233.2832	7.8200e-003		233.4787
Total	**0.1186**	**0.0789**	**0.9970**	**2.3400e-003**	**0.2236**	**1.5000e-003**	**0.2251**	**0.0593**	**1.3800e-003**	**0.0607**		**233.2832**	**233.2832**	**7.8200e-003**		**233.4787**

3.4 Grading - 2019

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	lb/day										lb/day					
Fugitive Dust					8.3361	0.0000	8.3361	2.6956	0.0000	2.6956			0.0000			0.0000
Off-Road	7.1084	81.7803	50.0652	0.0930		3.5740	3.5740		3.2881	3.2881	0.0000	9,210.0292	9,210.0292	2.9140		9,282.8781
Total	**7.1084**	**81.7803**	**50.0652**	**0.0930**	**8.3361**	**3.5740**	**11.9100**	**2.6956**	**3.2881**	**5.9836**	**0.0000**	**9,210.0292**	**9,210.0292**	**2.9140**		**9,282.8781**

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	lb/day										lb/day					
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	0.1186	0.0789	0.9970	2.3400e-003	0.2236	1.5000e-003	0.2251	0.0593	1.3800e-003	0.0607		233.2832	233.2832	7.8200e-003		233.4787
Total	**0.1186**	**0.0789**	**0.9970**	**2.3400e-003**	**0.2236**	**1.5000e-003**	**0.2251**	**0.0593**	**1.3800e-003**	**0.0607**		**233.2832**	**233.2832**	**7.8200e-003**		**233.4787**

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	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.549952	0.037123	0.179649	0.119457	0.017229	0.005267	0.017877	0.062669	0.001348	0.001607	0.006000	0.000812	0.001010

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	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Vulcan Area Q Relocation Construction (Expected)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Vulcan Area Q Relocation Construction (Expected) - San Bernardino-South Coast County, Winter

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	200.00	20.00
tblConstructionPhase	NumDays	310.00	20.00
tblConstructionPhase	NumDays	120.00	10.00
tblGrading	AcresOfGrading	75.00	179.00
tblLandUse	LotAcreage	0.00	179.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblProjectCharacteristics	OperationalYear	2018	2021

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	7.2268	81.8633	50.8861	0.0951	27.3006	3.5869	30.8875	14.9494	3.2999	18.2493	0.0000	9,419.3053	9,419.3053	2.9208	0.0000	9,492.3259
Maximum	**7.2268**	**81.8633**	**50.8861**	**0.0951**	**27.3006**	**3.5869**	**30.8875**	**14.9494**	**3.2999**	**18.2493**	**0.0000**	**9,419.3053**	**9,419.3053**	**2.9208**	**0.0000**	**9,492.3259**

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	lb/day										lb/day					
2019	7.2268	81.8633	50.8861	0.0951	12.3959	3.5869	15.9828	6.7566	3.2999	10.0565	0.0000	9,419.3053	9,419.3053	2.9208	0.0000	9,492.3259
Maximum	**7.2268**	**81.8633**	**50.8861**	**0.0951**	**12.3959**	**3.5869**	**15.9828**	**6.7566**	**3.2999**	**10.0565**	**0.0000**	**9,419.3053**	**9,419.3053**	**2.9208**	**0.0000**	**9,492.3259**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.59**	**0.00**	**48.25**	**54.80**	**0.00**	**44.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

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	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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 Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2019	1/28/2019	5	20	
2	Site Preparation	Site Preparation	1/29/2019	2/11/2019	5	10	
3	Grading	Grading	2/12/2019	3/11/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 179

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	12.00	81	0.73
Demolition	Excavators	3	12.00	158	0.38
Demolition	Rubber Tired Dozers	2	12.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	12.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	12.00	97	0.37
Grading	Excavators	2	12.00	158	0.38
Grading	Graders	1	12.00	187	0.41
Grading	Rubber Tired Dozers	1	12.00	247	0.40
Grading	Scrapers	2	12.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	12.00	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
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045		5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**		**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

3.2 Demolition - 2019

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	lb/day										lb/day					
Off-Road	5.2700	53.6745	33.0900	0.0582		2.6924	2.6924		2.5045	2.5045	0.0000	5,725.3491	5,725.3491	1.5927		5,765.1676
Total	**5.2700**	**53.6745**	**33.0900**	**0.0582**		**2.6924**	**2.6924**		**2.5045**	**2.5045**	**0.0000**	**5,725.3491**	**5,725.3491**	**1.5927**		**5,765.1676**

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	lb/day										lb/day					
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	0.0888	0.0623	0.6157	1.5800e-003	0.1677	1.1300e-003	0.1688	0.0445	1.0400e-003	0.0455		156.9571	156.9571	5.1500e-003		157.0858
Total	**0.0888**	**0.0623**	**0.6157**	**1.5800e-003**	**0.1677**	**1.1300e-003**	**0.1688**	**0.0445**	**1.0400e-003**	**0.0455**		**156.9571**	**156.9571**	**5.1500e-003**		**157.0858**

3.3 Site Preparation - 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	lb/day										lb/day					
Fugitive Dust					27.0994	0.0000	27.0994	14.8960	0.0000	14.8960			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987		5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**27.0994**	**3.5855**	**30.6849**	**14.8960**	**3.2987**	**18.1947**		**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1066	0.0747	0.7388	1.8900e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		188.3485	188.3485	6.1800e-003		188.5030
Total	**0.1066**	**0.0747**	**0.7388**	**1.8900e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**188.3485**	**188.3485**	**6.1800e-003**		**188.5030**

3.3 Site Preparation - 2019

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	lb/day										lb/day					
Fugitive Dust					12.1947	0.0000	12.1947	6.7032	0.0000	6.7032			0.0000			0.0000
Off-Road	6.5025	68.3591	33.0945	0.0570		3.5855	3.5855		3.2987	3.2987	0.0000	5,649.6793	5,649.6793	1.7875		5,694.3668
Total	**6.5025**	**68.3591**	**33.0945**	**0.0570**	**12.1947**	**3.5855**	**15.7803**	**6.7032**	**3.2987**	**10.0019**	**0.0000**	**5,649.6793**	**5,649.6793**	**1.7875**		**5,694.3668**

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	lb/day										lb/day					
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	0.1066	0.0747	0.7388	1.8900e-003	0.2012	1.3500e-003	0.2026	0.0534	1.2500e-003	0.0546		188.3485	188.3485	6.1800e-003		188.5030
Total	**0.1066**	**0.0747**	**0.7388**	**1.8900e-003**	**0.2012**	**1.3500e-003**	**0.2026**	**0.0534**	**1.2500e-003**	**0.0546**		**188.3485**	**188.3485**	**6.1800e-003**		**188.5030**

3.4 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	lb/day										lb/day					
Fugitive Dust					18.5246	0.0000	18.5246	5.9902	0.0000	5.9902			0.0000			0.0000
Off-Road	7.1084	81.7803	50.0652	0.0930		3.5740	3.5740		3.2881	3.2881		9,210.0292	9,210.0292	2.9140		9,282.8781
Total	**7.1084**	**81.7803**	**50.0652**	**0.0930**	**18.5246**	**3.5740**	**22.0986**	**5.9902**	**3.2881**	**9.2783**		**9,210.0292**	**9,210.0292**	**2.9140**		**9,282.8781**

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	lb/day										lb/day					
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	0.1184	0.0830	0.8209	2.1000e-003	0.2236	1.5000e-003	0.2251	0.0593	1.3800e-003	0.0607		209.2761	209.2761	6.8700e-003		209.4478
Total	**0.1184**	**0.0830**	**0.8209**	**2.1000e-003**	**0.2236**	**1.5000e-003**	**0.2251**	**0.0593**	**1.3800e-003**	**0.0607**		**209.2761**	**209.2761**	**6.8700e-003**		**209.4478**

3.4 Grading - 2019

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	lb/day										lb/day					
Fugitive Dust					8.3361	0.0000	8.3361	2.6956	0.0000	2.6956			0.0000			0.0000
Off-Road	7.1084	81.7803	50.0652	0.0930		3.5740	3.5740		3.2881	3.2881	0.0000	9,210.0292	9,210.0292	2.9140		9,282.8781
Total	**7.1084**	**81.7803**	**50.0652**	**0.0930**	**8.3361**	**3.5740**	**11.9100**	**2.6956**	**3.2881**	**5.9836**	**0.0000**	**9,210.0292**	**9,210.0292**	**2.9140**		**9,282.8781**

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	lb/day										lb/day					
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	0.1184	0.0830	0.8209	2.1000e-003	0.2236	1.5000e-003	0.2251	0.0593	1.3800e-003	0.0607		209.2761	209.2761	6.8700e-003		209.4478
Total	**0.1184**	**0.0830**	**0.8209**	**2.1000e-003**	**0.2236**	**1.5000e-003**	**0.2251**	**0.0593**	**1.3800e-003**	**0.0607**		**209.2761**	**209.2761**	**6.8700e-003**		**209.4478**

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	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.549952	0.037123	0.179649	0.119457	0.017229	0.005267	0.017877	0.062669	0.001348	0.001607	0.006000	0.000812	0.001010

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	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Vulcan Area Q Relocation Construction (Expected)

San Bernardino-South Coast County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Demolition	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Concrete/Industrial Saws	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	5	No Change	0.00
Graders	Diesel	No Change	0	1	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	6	No Change	0.00
Scrapers	Diesel	No Change	0	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	6	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Concrete/Industrial Saws	6.93000E-003	5.38300E-002	5.55300E-002	9.00000E-005	3.44000E-003	3.44000E-003	0.00000E+000	8.06486E+000	8.06486E+000	5.70000E-004	0.00000E+000	8.07905E+000
Excavators	1.95500E-002	2.01140E-001	2.44740E-001	3.90000E-004	9.70000E-003	8.92000E-003	0.00000E+000	3.47764E+001	3.47764E+001	1.10000E-002	0.00000E+000	3.50515E+001
Graders	7.30000E-003	9.86900E-002	2.75700E-002	1.00000E-004	3.17000E-003	2.91000E-003	0.00000E+000	8.94884E+000	8.94884E+000	2.83000E-003	0.00000E+000	9.01962E+000
Rubber Tired Dozers	7.65800E-002	8.15020E-001	2.89180E-001	5.80000E-004	3.97400E-002	3.65600E-002	0.00000E+000	5.17698E+001	5.17698E+001	1.63800E-002	0.00000E+000	5.21793E+001
Scrapers	3.19600E-002	3.87420E-001	2.41840E-001	4.50000E-004	1.51800E-002	1.39700E-002	0.00000E+000	4.08183E+001	4.08183E+001	1.29100E-002	0.00000E+000	4.11411E+001
Tractors/Loaders/Backhoes	1.39700E-002	1.40240E-001	1.38160E-001	1.90000E-004	9.36000E-003	8.61000E-003	0.00000E+000	1.67398E+001	1.67398E+001	5.30000E-003	0.00000E+000	1.68722E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Concrete/Industrial Saws	6.93000E-003	5.38300E-002	5.55300E-002	9.00000E-005	3.44000E-003	3.44000E-003	0.00000E+000	8.06485E+000	8.06485E+000	5.70000E-004	0.00000E+000	8.07904E+000
Excavators	1.95500E-002	2.01140E-001	2.44740E-001	3.90000E-004	9.70000E-003	8.92000E-003	0.00000E+000	3.47764E+001	3.47764E+001	1.10000E-002	0.00000E+000	3.50514E+001
Graders	7.30000E-003	9.86900E-002	2.75700E-002	1.00000E-004	3.17000E-003	2.91000E-003	0.00000E+000	8.94883E+000	8.94883E+000	2.83000E-003	0.00000E+000	9.01961E+000
Rubber Tired Dozers	7.65800E-002	8.15020E-001	2.89180E-001	5.80000E-004	3.97400E-002	3.65600E-002	0.00000E+000	5.17697E+001	5.17697E+001	1.63800E-002	0.00000E+000	5.21792E+001
Scrapers	3.19600E-002	3.87410E-001	2.41840E-001	4.50000E-004	1.51800E-002	1.39700E-002	0.00000E+000	4.08182E+001	4.08182E+001	1.29100E-002	0.00000E+000	4.11411E+001
Tractors/Loaders/Backhoes	1.39700E-002	1.40240E-001	1.38160E-001	1.90000E-004	9.36000E-003	8.61000E-003	0.00000E+000	1.67398E+001	1.67398E+001	5.30000E-003	0.00000E+000	1.68722E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Concrete/Industrial Saws	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.23995E-006	1.23995E-006	0.00000E+000	0.00000E+000	1.23777E-006
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15021E-006	1.15021E-006	0.00000E+000	0.00000E+000	1.14118E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.11746E-006	1.11746E-006	0.00000E+000	0.00000E+000	1.10869E-006
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15898E-006	1.15898E-006	0.00000E+000	0.00000E+000	1.14988E-006
Scrapers	0.00000E+000	2.58118E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	9.79954E-007	9.79954E-007	0.00000E+000	0.00000E+000	1.21533E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19475E-006	1.19475E-006	0.00000E+000	0.00000E+000	1.18538E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Demolition	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Demolition	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Grading	Fugitive Dust	0.19	0.06	0.08	0.03	0.55	0.55
Grading	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	Fugitive Dust	0.14	0.07	0.06	0.03	0.55	0.55
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value 3
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.00	0.15		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				

No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00
No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	

No	% Electric Chainsaw		

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		

No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

Vulcan Area Q Relocation Construction (Expected)

San Bernardino-South Coast, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	179.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2021
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments

Only CalEEMod defaults were used.

Project Characteristics - No utility company is selected as construction is the only relevant element of this analysis.

Land Use - Land use type: Aggregate Mining

Population is not a relevant factor

Construction Phase - Site preperation consists of demolition of existing houses, clearing of vegitation, and the creation of a berm.

Off-road Equipment - Tweleve (12) hour workdays are assumed.

Off-road Equipment - Based on site topography it is assumed no excavators will be necessary. Twelve (12) hour workdays are assumed.

Off-road Equipment - Twelve (12) hour workdays are assumed.

Grading - Conservatively, it is assumed the entire site will be graded in order to create berms.

Energy Use -

Construction Off-road Equipment Mitigation - It is assumed that exposed areas/vehicle paths will be watered two (2) times per day as a dust abatement measure.

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

Peak Daily Construction Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2019	Demolition	5.3590 S	53.7368 W	33.8378 S	0.0600 S	2.8611 S	2.5500 S	5.3590 S	53.7368 W	33.8378 S	0.0600 S	2.8611 S	2.5500 S
2019	Site Preparation	6.6092 S	68.4338 W	33.9918 S	0.0591 S	30.8875 S	18.2493 S	6.6092 S	68.4338 W	33.9918 S	0.0591 S	15.9828 S	10.0565 S
2019	Grading	7.2269 S	81.8633 W	51.0621 S	0.0953 S	22.3236 S	9.3389 S	7.2269 S	81.8633 W	51.0621 S	0.0953 S	12.1351 S	6.0443 S
	Peak Daily Total	7.2269 S	81.8633 W	51.0621 S	0.0953 S	30.8875 S	18.2493 S	7.2269 S	81.8633 W	51.0621 S	0.0953 S	15.9828 S	10.0565 S
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S
On-Site	Energy	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S
Off-Site	Mobile	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S	0.0000 S
	Peak Daily Total	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S	1.0000e-005 S	0.0000 S	1.0000e-004 S	0.0000 S	0.0000 S	0.0000 S
	Air District Threshold												
	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2019	165.3863	0.0491	0.0000	166.6146	165.3861	0.0491	0.0000	166.6144
Operational	2021	2.7216e-005	0.0000	0.0000	2.7216e-005	2.7216e-005	0.0000	0.0000	2.7216e-005
	Total								
	Significance Threshold								
	Exceed Significance?								

APPENDEIX G OPERATION PHASE EMISSIONS

Operation Phase Conditions and Project Increment

G.1 – Fugitive Dust Emissions
G.2 – Future PM10 Emissions
G.3 – Baseline and Project Emissions
G.4 – Summary of Baseline and Project Emissions
G.5 – Fugitive Dust Speciation
G.6 – Green House Gas CO_2e Calculations

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Dataset G.1 - Fugitive Dust Emissions Calculations - Bulldozing and Material Drops

This spreadsheet addresses drops from mobile equipment.

Emission Factors

Material Drop Emission Factor from AP42 13.2.4:

PM10 E.F. (lb/ton) = $k(0.0032)(U/5)^{1.3}/(M/2)^{1.4}$

k = particle size multiplier =	0.35
U = mean wind speed[1] =	5.0
M = material moisture content =	3
PM10 EF (lb/ton) =	0.00063
PM2.5 EF[2] (lb/ton) =	0.00019

Bulldozing Emission Factor from CalEEMod User's Guide

PM_{10} E.F. (lb/hr) = $(s^{1.5}/7.9)*0.75$

$PM_{2.5}$ E.F. (lb/hr) $=5.7*(s^{1.2}/7.9)*0.105$

s = Silt Content =	6.9
Control =	80%
PM_{10} E.F. (lb/hr) =	0.3441421
$PM_{2.5}$ E.F. (lb/hr) =	0.15384591
Annual Maximum Dozer Hours =	3210.09751

Notes:

[1] Mean wind speed based on data for San Bernardino (South Coast) in Table 1 of CalEEMod User Manual Appendix D which states 2.2 m/s (5 mph).

[2] PM2.5 emission factor assumed to be 29.2% of PM10 for material drops based on SCAQMD's *Updated CEIDARS Table with PM2.5 Fractions* for mineral products - loading

Baseline	Throughput			PM10 Emissions			PM2.5 Emissions		
Activity	**Peak Hour (tph)**	**Peak Day (tpd)**	**Peak Annual (tpy)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**
Excavation to Pile	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Loader Drop to Outbound Conveyor	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Bulldozing				0.3441	4.130	1,105	0.15	1.85	494
			Total:	**3.86**	**46.36**	**5,085.05**	**1.18**	**14.18**	**1,656.11**

Future	Throughput			PM10 Emissions			PM2.5 Emissions		
Activity	**Peak Hour (tph)**	**Peak Day (tpd)**	**Peak Annual (tpy)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**
Excavation to Pile	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Loader Drop to Outbound Conveyor	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Bulldozing				0.34	4.1	1,105	0.15	1.85	494
			Total:	**3.86**	**46.36**	**5,085.05**	**1.18**	**14.18**	**1,656.11**

Table G.2 - Future PM10 Emissions

	Loader	Dozer	Grader	Water Truck	Water Truck
Max Fuel Use Expected for Project (gal/year)*	49159	29461	2367	31490	5037
	PM10 Emissions (g/hp-hr)				
2017	0.060	0.060	0.112	0.119	0.075
2018	0.053	0.053	0.098	0.104	0.066
2019	0.047	0.047	0.084	0.090	0.058
2020	0.041	0.041	0.070	0.075	0.049
2021	0.034	0.034	0.057	0.060	0.041
2022	0.028	0.028	0.043	0.045	0.032
2023	0.021	0.021	0.029	0.030	0.024
2024	0.015	0.015	0.015	0.015	0.015
2025	0.015	0.015	0.015	0.015	0.015
2026	0.015	0.015	0.015	0.015	0.015
2027	0.015	0.015	0.015	0.015	0.015
2028	0.015	0.015	0.015	0.015	0.015
2029	0.015	0.015	0.015	0.015	0.015
2030	0.015	0.015	0.015	0.015	0.015
2031	0.015	0.015	0.015	0.015	0.015
2032	0.015	0.015	0.015	0.015	0.015
	PM10 Emissions (lbs/yr)				
2017	124.20	74.43	11.21	159.12	15.91
2018	110.92	66.47	9.83	139.25	14.09
2019	97.64	58.51	8.44	119.37	12.28
2020	84.36	50.55	7.05	99.50	10.46
2021	71.07	42.59	5.66	79.63	8.65
2022	57.79	34.63	4.28	59.75	6.83
2023	44.51	26.68	2.89	39.88	5.02
2024	31.23	18.72	1.50	20.00	3.20
2025	31.23	18.72	1.50	20.00	3.20
2026	31.23	18.72	1.50	20.00	3.20
2027	31.23	18.72	1.50	20.00	3.20
2028	31.23	18.72	1.50	20.00	3.20
2029	31.23	18.72	1.50	20.00	3.20
2030	31.23	18.72	1.50	20.00	3.20
2031	31.23	18.72	1.50	20.00	3.20
2032	31.23	18.72	1.50	20.00	3.20

*Based on maximum engine fuel use in baseline period.

Dataset G.3 - Baseline and Project Emissions Calculations

Row Labels	Total Production (tons)	Fuel Use (gal)	Tons per Gallon	HC (lb)	CO (lb)	NOx (lb)	PM (lb)
2006	3,134,709	ND	ND	ND	ND	ND	ND
2007	2,606,441	88,374	29	1,040	7,450	16,216	890
2008	1,419,995	125,270	11	753	10,940	14,008	658
2009	1,193,053	16,817	71	126	1,380	2,171	104
2010	1,024,248	57,976	18	335	4,981	6,357	284
2011	1,108,172	76,961	14	525	5,113	9,983	314
2012	1,163,743	81,713	14	612	4,426	11,622	290
2013	1,246,914	88,122	14	678	4,468	12,876	302
2014	1,504,023	115,880	13	914	5,455	17,367	379
2015	1,612,226	112,353	14	886	5,290	16,841	368
2016	1,545,567	101,842	15	800	4,815	15,205	332
2017	1,908,111	106,287	18	843	4,914	16,024	345
Total	19,467,202	971,595	20.0	7,513	59,232	138,669	4,268
Total Without 2009	18,274,149	954,778	19.1	7,386	57,853	136,498	4,164
Total Without Outliers	**12,532,999**	**866,404**	**14.5**	**6,346**	**50,403**	**120,282**	**3,274**
Total 2012 - 2017	**8,980,584**	**606,197**	**14.8**	**4,733**	**29,369**	**89,935**	**2,017**

*Shaded rows represent statistical outliers which have been removed from the dataset

	Tons Produced	Fuel (gal)	HC (lb)	CO (lb)	NOx (lb)	PM (lb)	PM2.5	Sox (lb)	CO2 (lb)	CH4 (lb)	N20 (lb)
Peak Hour Basline	2,772	82	1	5	11	0	0	0.009	1840.3	0.3	0.0
Peak Hour Project	2,772	82	1	4	12	0	0	0.009	1840.3	0.3	0.0
Peak Day Basline	33,258	2,299	16.8	133.8	319.2	8.7	9	0.243	51447.2	7.6	0.5
Peak Day Project	33,258	2,245	17.5	108.8	333.1	7.5	7	0.237	50234.9	7.4	0.5
Max Year Baseline	3,134,709	216701.88	1587.3	12606.6	30084.6	818.8	819	22.916	4849120.5	716.6	47.8
Max Year Project	3,134,709	211595.50	1652.23	10251.27	31392.28	704.03	704	22.376	4734855.6	699.7	46.6

Project emissions calculated based on historical maximum tonnages and emissions per gallon averages from the 2012 to 2017 period.

Peak Hours calculated based on daily tonnage records and assume a 16 hour work day (average hour in peak day) conservatively producing a lower value than the true peak for the baseline condition.

*Baseline Tons per Gallon Statistical Analysis	
Quartile 1:	14.20
Quartile 3:	17.81
Interquartile Range:	3.61
Lower Bound	8.78
Upper Bound	23.23

C02 Content of Diesel Fuel (kg/gal)	10.15	(based on California Climate Action Registry General Reporting Protocol 3.1 Appendix C)
CH4 Content of Diesel Fuel (kg/gal)	0.0015	(based on California Climate Action Registry General Reporting Protocol 3.1 Appendix C)
NO2 Content of Diesel Fuel (kg/gal)	0.0001	(based on California Climate Action Registry General Reporting Protocol 3.1 Appendix C)
Diesel Sulfur Content (ppm)	15	(CARB Ultra Low Diesel Standard)
lb fuel/hp-hr	0.367	(Offroad 2011)
lb fuel/gal	7.05	(AP-42 Appendix A)

G.4 - Summary of Basline and Project Emissions

Baseline	**lb/hr**									**lb/day**								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	0.60	4.78	11.42	0.31	0.31	0.01	1840.28	0.27	0.02	16.8	133.8	319.2	8.7	8.7	0.2	51447.2	7.6	0.5
Quarry/Drops	--	--	--	3.86	1.18	--	--	--	--	--	--	--	46	14	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	1.93	0.59	--	--	--	--	--	--	--	23	7	--	--	--	--
Future	**lb/hr**									**lb/day**								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	0.64	3.98	12.20	0.27	0.27	0.01	1840.28	0.27	0.02	17.5	108.8	333.1	7.5	7.5	0.2	50234.9	7.4	0.5
Quarry/Drops	--	--	--	3.86	1.18	--	--	--	--	--	--	--	46	14	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	1.93	0.59	--	--	--	--	--	--	--	23	7	--	--	--	--
Project	**lb/hr**									**lb/day**								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	0.04	-0.80	0.78	-0.04	-0.04	0.00	0.00	0.00	0.00	0.69	-24.99	13.87	-1.22	-1.22	-0.01	-1212.30	-0.18	-0.01
Quarry/Drops	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--

Baseline	**lb/yr**									**Metric Ton/Year**								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	1587	12607	30085	819	819	23	4849120	717	47.8	0.7	5.6	13.4	0.4	0.4	0.01	2164.8	0.3	0.0
Quarry/Drops	--	--	--	5085	1656	--	--	--	--	--	--	--	2.3	0.7	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	2543	828	--	--	--	--	--	--	--	1.1	0.4	--	--	--	--
Future	**lb/yr**									**Metric Ton/Year**								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	1652	10251	31392	704	704	22	4734856	700	46.6	0.7	4.6	14.0	0.31	0.31	0.01	2113.8	0.3	0.0
Quarry/Drops	--	--	--	5085	1656	--	--	--	--	--	--	--	2.3	0.7	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	2543	828	--	--	--	--	--	--	--	1.1	0.4	--	--	--	--
Project	**lb/yr**									**Metric Ton/Year**								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	65	-2355	1308	-115	-115	-1	-114265	-17	-1.1	0.029	-1.1	0.58	-0.05	-0.05	-0.0002	-51	-0.008	-0.0005
Quarry/Drops	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--

Table G.5 Fugitive Dust Speciation

CAS Identification Number	Chemcial Name	Fraction of PM10 Composition
7440382	arsenic	0.000002
7440439	cadmium	0.000039
7440473	chromium	0.000261
7440508	copper	0.000101
7782505	chlorine	0.001452
7439921	lead	0.000942
7439965	manganese	0.001051
7440020	nickel	0.000002
7439976	mercury	0.000019
7782492	selenium	0.000001
7440622	vanadium (fume or dust)	0.000338
1175	Silica, Crystln	0.04

Based on the Terracon lab report dated June 21st, 2018, all arsenic and nickel samples returned Non Detect levels when 100g soil samples were processed with 2 liters of water based solution. Conservatively assuming Nickel and Arsenic are both present in the leachate at the detection level of 0.1 ppm or 0.1 mg/liter, 0.2 mg would have been present in the 100 g soil sample, meaning the soil contained 2ppm of both arsenic and nickel, or 0.000002 as a composition fraction.

Table G.6 - GHG Carbon Dioxide Equivalent

	Metric Ton/Year			
	CO2	CH4	N2O	**C02E**
Baseline	2164.8	0.3199	0.02133	**2178.457**
Future	2113.8	0.3124	0.02083	**2127.124**
Project	-51.01	-0.0075	-0.00050	**-51.333**

CO_2 Equivalent of CH_4 = 23

CO_2 Equivalent of N_20 = 296

Source: California Climate Action Registry General Reporting Protocol, Version 3.1, January 2009

APPENDEIX H MODEL INPUT AND HRA RESULTS

H.1 – 2018 to 2019 Emissions Allocation
H.2 – 2020 to 2032 Emissions Allocation
H.3 – Project Cancer Risk by Receptor
H.4 – Project Chronic Risk by Receptor
H.5 – Project Acute Risk by Receptor
H.6 – Project Worker Cancer Risk by Receptor
H.7 – Project Worker Chronic Risk by Receptor
H.8 – Project Worker Acute Risk by Receptor

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Table H.1 - 2018 to 2019 Emissions Allocation

	Timeframe	Baseline						Future					
Emissions Per Model Object	Representing	VOL1		PAREA2		PAREA3		PAREA1		VOL3		VOL2	
	Model Object Multiplier	-1		-1		-1		1		1		1	
	Contributing Source(s), % of Source in Model Object	Quarry/Drop 33%		Stockpiles 66% Offroad Engine Emissions 66% Quarry/Drop 33%		Stockpiles 33% Offroad Engine Emissions 33% Quarry/Drop 33%		Stockpiles 33% Offroad Engine Emissions 100%		Stockpiles 33% Quarry/Drop 50%		Stockpiles 33% Quarry/Drop 50%	
	Annual or Hourly	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
	diesel PM10	N/A	N/A	-540.400	-0.205	-270.200	-0.103	318.39791	0.27363	N/A	N/A	N/A	N/A
	dust PM10	-1,678.1	-1.275	-3,356.130	-2.550	-2,517.097	-1.912	839	0.637	3,381.555	2.569	3,381.555	2.569
	arsenic	0.0	0.00000	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	cadmium	-0.1	-0.00005	-0.1	0.000	-0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0
	chromium	-0.4	-0.00033	-0.9	-0.001	-0.7	0.0	0.2	0.0	0.9	0.0	0.9	0.0
	copper	-0.2	-0.00013	-0.3	0.000	-0.3	0.0	0.1	0.0	0.3	0.0	0.3	0.0
	chlorine	-2.4	-0.00185	-4.9	-0.004	-3.7	0.0	1.2	0.0	4.9	0.0	4.9	0.0
	lead	-1.6	-0.00120	-3.2	-0.002	-2.4	0.0	0.8	0.0	3.2	0.0	3.2	0.0
	manganese	-1.8	-0.00134	-3.5	-0.003	-2.6	0.0	0.9	0.0	3.6	0.0	3.6	0.0
	nickel	0.0	0.00000	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	mercury	0.0	-0.00002	-0.1	0.000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0
	selenium	0.0	0.00000	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	vanadium (fume or dust)	-0.6	-0.00043	-1.1	-0.001	-0.9	0.0	0.3	0.0	1.1	0.0	1.1	0.0
	Silica, Crystln	-67.1	-0.1	-134.2	-0.102	-100.7	-0.1	33.6	0.0	135.3	0.1	135.3	0.1

Table H.2 - 2020 to 2032 Emissions Allocation

	Timeframe	Baseline						Future					
Emissions Per Model Object	Representing	VOL1		PAREA2		PAREA3		PAREA1		VOL3		VOL2	
	Model Object Multiplier	-1		-1		-1		1		1		1	
	Contributing Source(s), % of Source in Model Object	Quarry/Drop	33%	Stockpiles	66%	Stockpiles	33%	Stockpiles	33%	Stockpiles	33%	Stockpiles	33%
				Offroad Engine Emissions	66%	Offroad Engine Emissions	33%	Offroad Engine Emissions	100%	Quarry/Drop	50%	Quarry/Drop	50%
				Quarry/Drop	33%	Quarry/Drop	33%						
	Annual or Hourly	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
	diesel PM10	N/A	N/A	-540.400	-0.205	-270.200	-0.103	108.74219	0.27363	N/A	N/A	N/A	N/A
	dust PM10	-1,678.1	-1.275	-3,356.130	-2.550	-2,517.097	-1.912	839	0.637	3,381.555	2.569	3,381.555	2.569
	arsenic	0.0	0.00000	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	cadmium	-0.1	-0.00005	-0.1	0.000	-0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0
	chromium	-0.4	-0.00033	-0.9	-0.001	-0.7	0.0	0.2	0.0	0.9	0.0	0.9	0.0
	copper	-0.2	-0.00013	-0.3	0.000	-0.3	0.0	0.1	0.0	0.3	0.0	0.3	0.0
	chlorine	-2.4	-0.00185	-4.9	-0.004	-3.7	0.0	1.2	0.0	4.9	0.0	4.9	0.0
	lead	-1.6	-0.00120	-3.2	-0.002	-2.4	0.0	0.8	0.0	3.2	0.0	3.2	0.0
	manganese	-1.8	-0.00134	-3.5	-0.003	-2.6	0.0	0.9	0.0	3.6	0.0	3.6	0.0
	nickel	0.0	0.00000	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	mercury	0.0	-0.00002	-0.1	0.000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0
	selenium	0.0	0.00000	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	vanadium (fume or dust)	-0.6	-0.00043	-1.1	-0.001	-0.9	0.0	0.3	0.0	1.1	0.0	1.1	0.0
	Silica, Crystln	-67.1	-0.1	-134.2	-0.102	-100.7	-0.1	33.6	0.0	135.3	0.1	135.3	0.1

Table H.3 - Project Residential Risk by Receptor

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1	463000	3777400	-1.16E-07	7.16E-05	0.0001714
2	463400	3777400	-1.12E-07	8.22E-05	0.00016015
3	463800	3777400	-1.06E-07	9.39E-05	0.00014821
4	464200	3777400	-1.01E-07	0.00010458	0.0001598
5	464600	3777400	-9.93E-08	0.00011328	0.00014518
6	465000	3777400	-1.04E-07	0.00011889	0.00014122
7	465400	3777400	-1.16E-07	0.00012109	0.0001168
8	465800	3777400	-1.28E-07	0.00012213	0.00012359
9	466200	3777400	-1.36E-07	0.00012254	0.00014205
10	466600	3777400	-1.41E-07	0.00011968	0.00014956
11	467000	3777400	-1.48E-07	0.00011427	0.00012451
12	467400	3777400	-1.59E-07	0.00010543	0.00012277
13	467800	3777400	-1.72E-07	9.45E-05	9.79E-05
14	468200	3777400	-1.82E-07	8.47E-05	0.00013909
15	468600	3777400	-1.93E-07	7.57E-05	0.0001259
16	469000	3777400	-2.05E-07	6.61E-05	0.0001287
17	469400	3777400	-2.18E-07	5.68E-05	0.00014835
18	469800	3777400	-2.26E-07	4.85E-05	0.00011444
19	470200	3777400	-2.31E-07	4.12E-05	8.32E-05
20	470600	3777400	-2.33E-07	3.44E-05	0.0001114
21	463000	3777800	-1.33E-07	7.35E-05	0.00016145
22	463400	3777800	-1.28E-07	8.72E-05	0.00018159
23	463800	3777800	-1.22E-07	0.00010173	0.00018492
24	464200	3777800	-1.15E-07	0.00011719	0.00017494
25	464600	3777800	-1.10E-07	0.00013056	0.00018208
26	465000	3777800	-1.12E-07	0.00013992	0.00017778
27	465400	3777800	-1.24E-07	0.00014467	0.00013833
28	465800	3777800	-1.39E-07	0.000147	0.00014043
29	466200	3777800	-1.49E-07	0.0001479	0.00014407
30	466600	3777800	-1.55E-07	0.00014611	0.00016653
31	467000	3777800	-1.64E-07	0.00013992	0.00014181
32	467400	3777800	-1.77E-07	0.00012887	0.00013467
33	467800	3777800	-1.92E-07	0.00011434	0.00011645
34	468200	3777800	-2.05E-07	9.93E-05	0.0001531
35	468600	3777800	-2.19E-07	8.72E-05	9.99E-05
36	469000	3777800	-2.34E-07	7.47E-05	0.00014354
37	469400	3777800	-2.47E-07	6.34E-05	0.00013178
38	469800	3777800	-2.53E-07	5.34E-05	0.0001035
39	470200	3777800	-2.56E-07	4.44E-05	0.0001232
40	470600	3777800	-2.59E-07	3.62E-05	9.46E-05
41	463000	3778200	-1.57E-07	7.14E-05	0.00014093
42	463400	3778200	-1.49E-07	8.97E-05	0.0001872
43	463800	3778200	-1.42E-07	0.00010912	0.00019165

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
44	464200	3778200	-1.33E-07	0.00012991	0.00021668
45	464600	3778200	-1.25E-07	0.00015073	0.00019072
46	465000	3778200	-1.22E-07	0.00016691	0.000205
47	465400	3778200	-1.32E-07	0.00017604	0.00019859
48	465800	3778200	-1.50E-07	0.00018034	0.00015887
49	466200	3778200	-1.63E-07	0.00018274	0.00015069
50	466600	3778200	-1.74E-07	0.00018419	0.00019888
51	467000	3778200	-1.85E-07	0.00017682	0.00016853
52	467400	3778200	-2.01E-07	0.00016264	0.00014037
53	467800	3778200	-2.18E-07	0.00014317	0.00013559
54	468200	3778200	-2.34E-07	0.00012068	0.00016569
55	468600	3778200	-2.52E-07	0.00010182	0.00017194
56	469000	3778200	-2.69E-07	8.55E-05	0.00015792
57	469400	3778200	-2.79E-07	7.14E-05	0.0001387
58	469800	3778200	-2.84E-07	5.89E-05	0.00014466
59	470200	3778200	-2.87E-07	4.78E-05	0.00010507
60	470600	3778200	-2.92E-07	3.75E-05	0.00011588
61	463000	3778600	-1.91E-07	6.20E-05	0.00019198
62	463400	3778600	-1.80E-07	8.38E-05	0.00016627
63	463800	3778600	-1.69E-07	0.0001122	0.00021901
64	464200	3778600	-1.59E-07	0.00014145	0.00020413
65	464600	3778600	-1.46E-07	0.00017256	0.00025755
66	465000	3778600	-1.36E-07	0.00020016	0.00023524
67	465400	3778600	-1.40E-07	0.00021822	0.00025065
68	465800	3778600	-1.62E-07	0.0002273	0.00019951
69	466200	3778600	-1.82E-07	0.0002363	0.00017517
70	466600	3778600	-1.96E-07	0.00024097	0.00025146
71	467000	3778600	-2.09E-07	0.0002329	0.000203
72	467400	3778600	-2.29E-07	0.00021401	0.00014604
73	467800	3778600	-2.49E-07	0.00018502	0.00019958
74	468200	3778600	-2.70E-07	0.00015126	0.00015086
75	468600	3778600	-2.93E-07	0.0001208	0.00018903
76	469000	3778600	-3.09E-07	9.95E-05	0.00018027
77	469400	3778600	-3.16E-07	8.11E-05	0.00017637
78	469800	3778600	-3.21E-07	6.51E-05	0.00011719
79	470200	3778600	-3.28E-07	5.07E-05	0.00014588
80	470600	3778600	-3.39E-07	3.78E-05	0.0001152
81	463000	3779000	-2.28E-07	5.28E-05	0.00026578
82	463400	3779000	-2.22E-07	7.19E-05	0.00025243
83	463800	3779000	-2.10E-07	9.88E-05	0.00023077
84	464200	3779000	-1.94E-07	0.00014544	0.00026243
85	464600	3779000	-1.76E-07	0.00019217	0.0002508
86	465000	3779000	-1.56E-07	0.00023869	0.00029566
87	465400	3779000	-1.51E-07	0.00027652	0.00031235

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
88	465800	3779000	-1.73E-07	0.00029876	0.00030653
89	466200	3779000	-2.04E-07	0.00032026	0.0002277
90	466600	3779000	-2.22E-07	0.00033301	0.00034572
91	467000	3779000	-2.38E-07	0.00032635	0.00025451
92	467400	3779000	-2.62E-07	0.00029612	0.00015883
93	467800	3779000	-2.88E-07	0.00024887	0.00023172
94	468200	3779000	-3.16E-07	0.00019631	0.00021689
95	468600	3779000	-3.41E-07	0.0001466	0.00024146
96	469000	3779000	-3.53E-07	0.00011723	0.00022378
97	469400	3779000	-3.61E-07	9.26E-05	0.00014815
98	469800	3779000	-3.73E-07	7.10E-05	0.00017452
99	470200	3779000	-3.88E-07	5.22E-05	0.00013074
100	470600	3779000	-4.03E-07	3.61E-05	0.00014454
101	463000	3779400	-2.56E-07	4.23E-05	0.00040149
102	463400	3779400	-2.64E-07	6.24E-05	0.00035369
103	463800	3779400	-2.58E-07	9.01E-05	0.00030343
104	464200	3779400	-2.45E-07	0.00013848	0.00021442
105	464600	3779400	-2.21E-07	0.00020093	0.00030583
106	465000	3779400	-1.90E-07	0.00027671	0.00032838
107	465400	3779400	-1.67E-07	0.00035464	0.00036654
108	465800	3779400	-1.80E-07	0.00041358	0.00043057
109	466200	3779400	-2.24E-07	0.00046019	0.00034705
110	466600	3779400	-2.52E-07	0.00049945	0.00046515
111	467000	3779400	-2.68E-07	0.00049654	0.00032657
112	467400	3779400	-2.96E-07	0.00044076	0.00027614
113	467800	3779400	-3.32E-07	0.00035519	0.00026631
114	468200	3779400	-3.68E-07	0.0002679	0.00034726
115	468600	3779400	-3.92E-07	0.00019369	0.00029771
116	469000	3779400	-4.07E-07	0.00014029	0.00020517
117	469400	3779400	-4.27E-07	0.00010532	0.00019201
118	469800	3779400	-4.51E-07	7.59E-05	0.00016175
119	470200	3779400	-4.73E-07	5.17E-05	0.00014586
120	470600	3779400	-4.88E-07	3.30E-05	0.00012755
121	463000	3779800	-2.79E-07	3.96E-05	0.00051431
122	463400	3779800	-2.92E-07	5.32E-05	0.00046601
123	463800	3779800	-3.02E-07	8.27E-05	0.00035812
124	464200	3779800	-3.01E-07	0.00012447	0.00033216
125	464600	3779800	-2.86E-07	0.00019721	0.00032015
126	465000	3779800	-2.49E-07	0.0002996	0.00035808
127	465400	3779800	-1.99E-07	0.00043916	0.00047883
128	465800	3779800	-1.77E-07	0.00059849	0.00056991
129	466200	3779800	-2.28E-07	0.00072957	0.00065577
130	466600	3779800	-2.67E-07	0.00085052	0.00062314
131	467000	3779800	-2.71E-07	0.0008714	0.00043062

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132	467400	3779800	-3.08E-07	0.0007371	0.00042865
133	467800	3779800	-3.63E-07	0.00055452	0.0004885
134	468200	3779800	-4.14E-07	0.00039169	0.00040632
135	468600	3779800	-4.50E-07	0.00026915	0.00026672
136	469000	3779800	-4.91E-07	0.00017043	0.00021544
137	469400	3779800	-5.33E-07	0.00011741	0.00021332
138	469800	3779800	-5.71E-07	7.83E-05	0.00019675
139	470200	3779800	-6.14E-07	5.44E-05	0.00028323
140	470600	3779800	-6.19E-07	1.15E-05	0.00056361
141	463000	3780200	-3.14E-07	3.51E-05	0.00047128
142	463400	3780200	-3.25E-07	4.60E-05	0.00057606
143	463800	3780200	-3.27E-07	8.02E-05	0.00037733
144	464200	3780200	-3.41E-07	0.00011057	0.00042054
145	464600	3780200	-3.42E-07	0.00019009	0.00030266
146	465000	3780200	-3.18E-07	0.00031179	0.0004396
147	465400	3780200	-2.46E-07	0.00051661	0.00057212
148	465800	3780200	-1.55E-07	0.00083462	0.00074921
149	466200	3780200	-1.06E-07	0.0013103	0.0011049
150	466600	3780200	-6.18E-08	0.0018835	0.0010235
151	467000	3780200	-2.45E-09	0.0020529	0.00066795
152	467400	3780200	-1.49E-07	0.0015055	0.00096626
153	467800	3780200	-3.17E-07	0.00097625	0.00054402
154	468200	3780200	-4.45E-07	0.00062384	0.00043738
155	468600	3780200	-5.51E-07	0.00037537	0.00035658
156	469000	3780200	-6.41E-07	0.00019824	0.00031663
157	469400	3780200	-7.08E-07	0.00012418	0.00025115
158	469800	3780200	-7.65E-07	6.60E-05	0.00077634
159	470200	3780200	-7.45E-07	2.16E-05	0.00057576
160	470600	3780200	-7.21E-07	1.63E-05	0.00018301
161	463000	3780600	-3.74E-07	2.40E-05	0.00055248
162	463400	3780600	-3.87E-07	3.79E-05	0.00059511
163	463800	3780600	-3.90E-07	5.51E-05	0.00056569
164	464200	3780600	-3.67E-07	0.00010321	0.00047962
165	464600	3780600	-3.42E-07	0.00019462	0.00050336
166	465000	3780600	-2.91E-07	0.00035044	0.00046657
167	465400	3780600	-1.37E-07	0.00063898	0.00058095
168	465800	3780600	2.90E-07	0.0012707	0.00096115
169	466200	3780600	1.83E-06	0.0030117	0.0016718
170	467000	3780600	2.35E-06	0.010093	0.003293
171	467400	3780600	5.80E-07	0.0040997	0.0013774
172	467800	3780600	-1.61E-07	0.0019052	0.0010457
173	468200	3780600	-5.60E-07	0.00094249	0.00051829
174	468600	3780600	-7.98E-07	0.00044423	0.00042073
175	469000	3780600	-9.11E-07	0.00020434	0.00036152

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176	469400	3780600	-9.56E-07	0.00010849	0.00033449
177	469800	3780600	-9.58E-07	7.91E-05	0.00036411
178	470200	3780600	-9.19E-07	3.49E-05	0.0002689
179	470600	3780600	-8.80E-07	2.26E-05	0.00035296
180	463000	3781000	-4.15E-07	4.94E-05	0.0005343
181	463400	3781000	-4.35E-07	6.52E-05	0.00056017
182	463800	3781000	-4.38E-07	8.84E-05	0.00059991
183	464200	3781000	-3.88E-07	0.0001742	0.00067007
184	464600	3781000	-2.69E-07	0.00034256	0.00058755
185	465000	3781000	-7.84E-08	0.00060273	0.00072929
186	465400	3781000	3.36E-07	0.0010929	0.00094402
187	465800	3781000	1.38E-06	0.002178	0.0013921
188	467400	3781000	1.66E-06	0.0057441	0.0026501
189	467800	3781000	-4.68E-07	0.0020638	0.0010088
190	468200	3781000	-1.20E-06	0.00075208	0.00085306
191	468600	3781000	-1.40E-06	0.00026494	0.00056247
192	469000	3781000	-1.39E-06	0.00011	0.00040235
193	469400	3781000	-1.30E-06	3.49E-05	0.00031049
194	469800	3781000	-1.20E-06	9.44E-07	0.00025574
195	470200	3781000	-1.08E-06	0	0.00020889
196	470600	3781000	-9.81E-07	0	0.00017308
197	463000	3781400	-4.61E-07	0.00010178	0.00068991
198	463400	3781400	-4.74E-07	0.00017912	0.00071561
199	463800	3781400	-5.15E-07	0.00025382	0.00070842
200	464200	3781400	-5.11E-07	0.00037088	0.00075375
201	464600	3781400	-4.53E-07	0.00055773	0.00089814
202	465000	3781400	-3.42E-07	0.00085094	0.0011355
203	465400	3781400	-1.56E-07	0.0012013	0.0014847
204	465800	3781400	2.09E-07	0.0015733	0.0018198
205	467800	3781400	-3.16E-06	0.00048711	0.0010937
206	468200	3781400	-3.05E-06	5.08E-05	0.00068019
207	468600	3781400	-2.53E-06	0	0.00048322
208	469000	3781400	-2.09E-06	0	0.00038875
209	469400	3781400	-1.75E-06	0	0.00031953
210	469800	3781400	-1.48E-06	0	0.00026343
211	470200	3781400	-1.28E-06	0	0.00020943
212	470600	3781400	-1.11E-06	0	0.00017478
213	463000	3781800	-6.87E-07	0.00012914	0.00055279
214	463400	3781800	-8.14E-07	0.00015912	0.00067267
215	463800	3781800	-1.04E-06	0.00016242	0.00074556
216	464200	3781800	-1.42E-06	0.00012297	0.00082901
217	464600	3781800	-2.06E-06	4.52E-05	0.0010317
218	465000	3781800	-3.30E-06	0	0.0011249
219	465400	3781800	-6.10E-06	0	0.0015993

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
220	465800	3781800	-1.65E-05	0	0.0019217
221	467400	3781800	-1.77E-05	0	0.001271
222	467800	3781800	-8.41E-06	0	0.0010476
223	468200	3781800	-5.10E-06	0	0.00070301
224	468600	3781800	-3.50E-06	0	0.00045789
225	469000	3781800	-2.60E-06	0	0.00034406
226	469400	3781800	-2.04E-06	0	0.00026205
227	469800	3781800	-1.65E-06	0	0.00022457
228	470200	3781800	-1.38E-06	0	0.00019815
229	470600	3781800	-1.18E-06	0	0.00017895
230	463000	3782200	-1.50E-06	0	0.00054222
231	463400	3782200	-2.01E-06	0	0.00065931
232	463800	3782200	-2.72E-06	0	0.00068076
233	464200	3782200	-3.32E-06	0	0.00070657
234	464600	3782200	-6.04E-06	0	0.00098983
235	465000	3782200	-9.47E-06	0	0.0011686
236	465400	3782200	-1.51E-05	0	0.0012327
237	465800	3782200	-2.56E-05	0	0.0016472
238	467400	3782200	-1.01E-05	0	0.00087365
239	467800	3782200	-6.03E-06	0	0.0013976
240	468200	3782200	-4.10E-06	0	0.00078711
241	468600	3782200	-3.00E-06	0	0.00049364
242	469000	3782200	-2.38E-06	0	0.0008815
243	469400	3782200	-1.86E-06	0	0.00026352
244	469800	3782200	-1.53E-06	0	0.00021824
245	470200	3782200	-1.29E-06	0	0.00018049
246	470600	3782200	-1.11E-06	0	0.00015856
247	463000	3782600	-2.64E-06	0	0.00051825
248	463400	3782600	-3.30E-06	0	0.00057307
249	463800	3782600	-3.18E-06	0	0.00051461
250	464200	3782600	-5.16E-06	0	0.00068225
251	464600	3782600	-7.19E-06	0	0.00090761
252	465000	3782600	-8.50E-06	0	0.00095008
253	465400	3782600	-9.14E-06	0	0.0014029
254	465800	3782600	-8.30E-06	0	0.0012778
255	466200	3782600	-6.76E-06	0	0.0014353
256	466600	3782600	-5.33E-06	0	0.0014402
257	467000	3782600	-4.03E-06	0	0.0013144
258	467400	3782600	-3.14E-06	0	0.0012023
259	467800	3782600	-2.64E-06	0	0.00102
260	468200	3782600	-2.21E-06	0	0.00082144
261	468600	3782600	-1.89E-06	0	0.00079895
262	469000	3782600	-1.60E-06	0	0.00040141
263	469400	3782600	-1.38E-06	0	0.00027557

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
264	469800	3782600	-1.20E-06	0	0.00019545
265	470200	3782600	-1.05E-06	0	0.00016788
266	470600	3782600	-9.34E-07	0	0.00014055
267	463000	3783000	-2.90E-06	0	0.0005251
268	463400	3783000	-3.16E-06	0	0.00048524
269	463800	3783000	-2.85E-06	0	0.00049067
270	464200	3783000	-4.03E-06	0	0.00072271
271	464600	3783000	-4.08E-06	0	0.00084317
272	465000	3783000	-3.68E-06	0	0.00094815
273	465400	3783000	-3.14E-06	0	0.001038
274	465800	3783000	-2.71E-06	0	0.0010769
275	466200	3783000	-2.46E-06	0	0.00096594
276	466600	3783000	-2.07E-06	0	0.0010917
277	467000	3783000	-1.63E-06	0	0.0011165
278	467400	3783000	-1.49E-06	0	0.0011034
279	467800	3783000	-1.36E-06	0	0.00093844
280	468200	3783000	-1.24E-06	0	0.00084672
281	468600	3783000	-1.14E-06	0	0.00072576
282	469000	3783000	-1.05E-06	0	0.00055159
283	469400	3783000	-9.73E-07	0	0.00049253
284	469800	3783000	-8.94E-07	0	0.0003662
285	470200	3783000	-8.21E-07	0	0.00030007
286	470600	3783000	-7.52E-07	0	0.0004737
287	463000	3783400	-1.77E-06	0	0.00037662
288	463400	3783400	-1.90E-06	0	0.00041817
289	463800	3783400	-1.92E-06	0	0.00046027
290	464200	3783400	-2.24E-06	0	0.00057613
291	464600	3783400	-1.95E-06	0	0.00065703
292	465000	3783400	-1.76E-06	0	0.00086736
293	465400	3783400	-1.61E-06	0	0.00075673
294	465800	3783400	-1.46E-06	0	0.00091597
295	466200	3783400	-1.35E-06	0	0.00084153
296	466600	3783400	-1.19E-06	0	0.0009079
297	467000	3783400	-1.12E-06	0	0.00097121
298	467400	3783400	-9.18E-07	0	0.00091036
299	467800	3783400	-8.68E-07	0	0.00086747
300	468200	3783400	-8.15E-07	0	0.0009204
301	468600	3783400	-7.53E-07	0	0.00086162
302	469000	3783400	-7.04E-07	0	0.00063333
303	469400	3783400	-6.73E-07	0	0.00061668
304	469800	3783400	-6.53E-07	0	0.00054616
305	470200	3783400	-6.15E-07	0	0.00048176
306	470600	3783400	-5.79E-07	0	0.0004527
307	463000	3783800	-1.26E-06	0	0.00035584

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
308	463400	3783800	-1.21E-06	0	0.0004147
309	463800	3783800	-1.30E-06	0	0.00044987
310	464200	3783800	-1.21E-06	0	0.00045208
311	464600	3783800	-1.16E-06	0	0.00062308
312	465000	3783800	-1.07E-06	0	0.00065631
313	465400	3783800	-1.03E-06	0	0.00068372
314	465800	3783800	-8.94E-07	0	0.00064859
315	466200	3783800	-8.66E-07	0	0.00073812
316	466600	3783800	-8.46E-07	0	0.00070396
317	467000	3783800	-7.74E-07	0	0.00080624
318	467400	3783800	-6.45E-07	0	0.00079462
319	467800	3783800	-5.98E-07	0	0.00073366
320	468200	3783800	-5.99E-07	0	0.00060871
321	468600	3783800	-5.59E-07	0	0.00064014
322	469000	3783800	-5.12E-07	0	0.00063128
323	469400	3783800	-4.96E-07	0	0.00064259
324	469800	3783800	-4.73E-07	0	0.00062785
325	470200	3783800	-4.41E-07	0	0.00046136
326	470600	3783800	-3.88E-07	0	0.00039317
327	463000	3784200	-8.77E-07	0	0.00034262
328	463400	3784200	-9.23E-07	0	0.00045155
329	463800	3784200	-7.89E-07	0	0.00036335
330	464200	3784200	-8.51E-07	0	0.00050424
331	464600	3784200	-7.98E-07	0	0.00054071
332	465000	3784200	-7.59E-07	0	0.00054005
333	465400	3784200	-6.86E-07	0	0.00065967
334	465800	3784200	-6.53E-07	0	0.00067418
335	466200	3784200	-6.31E-07	0	0.00066709
336	466600	3784200	-6.13E-07	0	0.00062996
337	467000	3784200	-5.51E-07	0	0.00063738
338	467400	3784200	-4.78E-07	8.18E-07	0.00063397
339	467800	3784200	-4.27E-07	4.11E-06	0.00057679
340	468200	3784200	-4.24E-07	0	0.00057089
341	468600	3784200	-4.13E-07	0	0.00050916
342	469000	3784200	-3.95E-07	0	0.00049014
343	469400	3784200	-3.73E-07	0	0.00048331
344	469800	3784200	-3.39E-07	0	0.00054164
345	470200	3784200	-3.09E-07	0	0.00037168
346	470600	3784200	-2.72E-07	0	0.0003446
347	463000	3784600	-6.75E-07	0	0.00032559
348	463400	3784600	-6.07E-07	0	0.0003508
349	463800	3784600	-6.16E-07	0	0.00038537
350	464200	3784600	-6.19E-07	0	0.00044849
351	464600	3784600	-5.93E-07	0	0.00049393

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
352	465000	3784600	-5.53E-07	0	0.00043427
353	465400	3784600	-5.17E-07	0	0.00050822
354	465800	3784600	-5.17E-07	0	0.00055245
355	466200	3784600	-4.69E-07	0	0.00054773
356	466600	3784600	-4.58E-07	0	0.00049116
357	467000	3784600	-4.14E-07	0	0.00051631
358	467400	3784600	-3.77E-07	4.94E-06	0.00051451
359	467800	3784600	-3.19E-07	1.49E-05	0.00051351
360	468200	3784600	-3.07E-07	5.67E-06	0.00049575
361	468600	3784600	-3.08E-07	3.26E-06	0.00041695
362	469000	3784600	-3.05E-07	1.98E-06	0.00049848
363	469400	3784600	-2.78E-07	4.92E-06	0.00045397
364	469800	3784600	-2.48E-07	5.44E-06	0.00037846
365	470200	3784600	-2.42E-07	0	0.00034815
366	470600	3784600	-2.05E-07	0	0.00026545
367	463000	3785000	-5.39E-07	0	0.00029198
368	463400	3785000	-5.08E-07	0	0.00034406
369	463800	3785000	-5.03E-07	0	0.00038677
370	464200	3785000	-4.83E-07	0	0.00038866
371	464600	3785000	-4.62E-07	0	0.00046145
372	465000	3785000	-4.21E-07	0	0.00049121
373	465400	3785000	-4.19E-07	0	0.00048077
374	465800	3785000	-3.94E-07	0	0.00046602
375	466200	3785000	-3.58E-07	0	0.0004475
376	466600	3785000	-3.43E-07	8.54E-07	0.00040061
377	467000	3785000	-3.28E-07	4.26E-06	0.00044233
378	467400	3785000	-3.01E-07	8.50E-06	0.00042411
379	467800	3785000	-2.59E-07	1.60E-05	0.00045084
380	468200	3785000	-2.49E-07	1.13E-05	0.00039356
381	468600	3785000	-2.42E-07	9.21E-06	0.00042366
382	469000	3785000	-2.48E-07	4.63E-06	0.00034189
383	469400	3785000	-2.28E-07	7.33E-06	0.00036234
384	469800	3785000	-1.88E-07	8.75E-07	0.00031675
385	470200	3785000	-1.53E-07	2.43E-07	0.0002628
386	470600	3785000	-1.72E-07	0	0.0002544
387	466580	3780314	4.75E-07	0.0026707	0.0015745
388	466686	3780436	2.25E-06	0.0049806	0.0020686
389	466722	3780485	3.02E-06	0.0063441	0.0024559
390	466771	3780558	4.17E-06	0.009358	0.0037458
391	466838	3780637	5.10E-06	0.016112	0.0057863
392	466989	3780761	5.46E-06	0.038177	0.0099872
393	467040	3780807	5.33E-06	0.037048	0.0082
394	467081	3780858	5.25E-06	0.029541	0.0070365
395	467102	3780880	5.09E-06	0.024587	0.0066587

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
396	467117	3780893	4.93E-06	0.021617	0.0060774
397	467127	3780906	4.90E-06	0.019618	0.0059692
398	467141	3780921	4.80E-06	0.01734	0.0054884
399	467151	3780934	4.76E-06	0.015822	0.0049618
400	467166	3780946	4.59E-06	0.014223	0.0045266
401	467169	3780961	4.74E-06	0.013433	0.0041438
402	467186	3780979	4.61E-06	0.011953	0.0036788
403	467200	3780990	4.45E-06	0.011053	0.0034798
404	467214	3781002	4.30E-06	0.010258	0.003462
405	467226	3781016	4.22E-06	0.0096095	0.0035143
406	467237	3781029	4.14E-06	0.0090939	0.0035314
407	467250	3781042	4.02E-06	0.0085867	0.0034802
408	467263	3781057	3.91E-06	0.0081296	0.0033676
409	467281	3781070	3.67E-06	0.0076153	0.0031714
410	467291	3781086	3.61E-06	0.0073327	0.0031905
411	467316	3781096	3.19E-06	0.0067613	0.0031083
412	467334	3781100	2.89E-06	0.0063877	0.0029454
413	467351	3781107	2.63E-06	0.0060547	0.0027309
414	467341	3781127	2.93E-06	0.0062465	0.0025941
415	467345	3781149	2.99E-06	0.0062043	0.0023915
416	467359	3781165	2.79E-06	0.0059672	0.0020417
417	467374	3781184	2.57E-06	0.0057348	0.0017545
418	467388	3781197	2.34E-06	0.0055095	0.001812
419	467400	3781212	2.13E-06	0.0053344	0.0018673
420	467411	3781226	1.94E-06	0.0051756	0.0018513
421	467423	3781241	1.71E-06	0.0049992	0.0018919
422	467437	3781256	1.43E-06	0.0047799	0.0019427
423	467451	3781269	1.14E-06	0.0045501	0.00196
424	467467	3781279	8.12E-07	0.0042764	0.0019356
425	467476	3781297	5.83E-07	0.0041302	0.0019765
426	467489	3781313	2.73E-07	0.0038975	0.0019444
427	467501	3781326	-1.28E-08	0.0036737	0.0019797
428	467518	3781339	-3.88E-07	0.0033583	0.0019628
429	467528	3781355	-6.75E-07	0.0031424	0.0019577
430	467541	3781368	-9.93E-07	0.0028777	0.001909
431	467557	3781382	-1.37E-06	0.002556	0.0018174
432	467566	3781398	-1.67E-06	0.0023165	0.0017456
433	467580	3781408	-1.98E-06	0.0020404	0.0016998
434	467598	3781426	-2.45E-06	0.0016403	0.0016221
435	467620	3781436	-2.84E-06	0.0012769	0.0015045
436	467497	3780282	-1.20E-07	0.0016066	0.0010716
437	468461	3781430	-2.83E-06	0	0.00053933
438	468467	3782387	-2.65E-06	0	0.00055724
439	466986	3783844	-7.47E-07	0	0.00078092

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
440	467261.4	3784344	-4.64E-07	0	0.00057476
441	466273.7	3784551	-4.76E-07	0	0.00054736
442	464383.9	3778064	-1.23E-07	0.00013422	0.00018939
443	465013.8	3777989	-1.17E-07	0.00015206	0.00018706
444	462990.3	3778641	-1.95E-07	6.02E-05	0.00020801
445	464324.9	3781923	-2.36E-06	0	0.00077222
446	466381.3	3780215	-1.09E-07	0.0016034	0.001171
447	467591	3781534	-4.46E-06	0.0002768	0.0015094
448	466739.4	3782632	-4.50E-06	0	0.0013237
449	466047.6	3782368	-2.36E-05	0	0.0017994
450	465898.3	3781805	-2.57E-05	0	0.0022382
451	466388.1	3780222	-1.00E-07	0.0016392	0.0011871
452	466394.9	3780230	-8.98E-08	0.0016766	0.0012034
453	466401.6	3780237	-7.85E-08	0.0017154	0.0012194
454	466408.4	3780245	-6.58E-08	0.0017562	0.0012372
455	466415.1	3780252	-5.15E-08	0.0017987	0.0012562
456	466421.9	3780259	-3.51E-08	0.0018435	0.0012751
457	466428.7	3780267	-1.61E-08	0.0018909	0.0012949
458	466435.4	3780274	6.23E-09	0.0019412	0.0013149
459	466442.2	3780281	3.24E-08	0.0019949	0.0013356
460	466448.9	3780289	6.35E-08	0.0020527	0.001357
461	466455.7	3780296	1.01E-07	0.0021153	0.0013786
462	466462.4	3780303	1.49E-07	0.0021842	0.0014087
463	466469.2	3780311	2.10E-07	0.0022618	0.0014413
464	466476	3780318	2.90E-07	0.0023504	0.0014748
465	466482.7	3780326	3.96E-07	0.0024536	0.0015091
466	466489.5	3780333	5.32E-07	0.0025742	0.0015444
467	466496.2	3780340	7.02E-07	0.0027132	0.0015796
468	466503	3780348	9.05E-07	0.0028716	0.0016176
469	466509.7	3780355	1.14E-06	0.0030457	0.0016567
470	466516.5	3780362	1.38E-06	0.0032313	0.0016957
471	466523.3	3780370	1.64E-06	0.0034254	0.0017364
472	466530	3780377	1.91E-06	0.0036243	0.0017774
473	466536.8	3780385	2.17E-06	0.0038258	0.0018193
474	466543.5	3780392	2.42E-06	0.004028	0.001859
475	466550.3	3780399	2.67E-06	0.0042306	0.0018969
476	466557.1	3780407	2.92E-06	0.0044339	0.0019363
477	466563.8	3780414	3.15E-06	0.0046356	0.0019748
478	466570.6	3780421	3.37E-06	0.004838	0.0020143
479	466577.3	3780429	3.59E-06	0.0050406	0.0020542
480	466584.1	3780436	3.79E-06	0.0052421	0.0020932
481	466590.8	3780443	3.98E-06	0.0054457	0.0021488
482	466597.6	3780451	4.18E-06	0.0056542	0.0022121
483	466604.4	3780458	4.36E-06	0.0058637	0.002276

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
484	466611.1	3780466	4.53E-06	0.006075	0.0023406
485	466617.9	3780473	4.70E-06	0.0062928	0.0024089
486	466624.6	3780480	4.86E-06	0.0065157	0.0024797
487	466631.4	3780488	5.01E-06	0.0067431	0.0025515
488	466638.2	3780495	5.16E-06	0.0069776	0.0026296
489	466644.9	3780502	5.31E-06	0.0072225	0.0027298
490	466651.7	3780510	5.44E-06	0.0074727	0.0028297
491	466658.4	3780517	5.57E-06	0.0077344	0.0029343
492	466665.2	3780525	5.70E-06	0.0080094	0.0030441
493	466671.9	3780532	5.83E-06	0.0082952	0.0031546
494	466678.7	3780539	5.94E-06	0.0085969	0.0032694
495	466685.5	3780547	6.06E-06	0.0089142	0.0033859
496	466692.2	3780554	6.17E-06	0.0092524	0.0035074
497	466699	3780561	6.28E-06	0.0096106	0.00363
498	466705.7	3780569	6.38E-06	0.0099915	0.0037531
499	466712.5	3780576	6.48E-06	0.010398	0.0038759
500	466719.3	3780584	6.58E-06	0.010839	0.0040035
501	466726	3780591	6.68E-06	0.011313	0.0041291
502	466732.8	3780598	6.77E-06	0.011827	0.0042735
503	466739.5	3780606	6.87E-06	0.012388	0.0044311
504	466746.3	3780613	6.96E-06	0.013001	0.0045877
505	466753	3780620	7.04E-06	0.01367	0.0047387
506	466759.8	3780628	7.13E-06	0.014408	0.0048877
507	466766.6	3780635	7.22E-06	0.015226	0.0050305
508	466773.3	3780642	7.31E-06	0.016133	0.00516
509	466780.1	3780650	7.39E-06	0.017149	0.0052961
510	466786.8	3780657	7.48E-06	0.018286	0.0057548
511	466793.6	3780665	7.57E-06	0.019569	0.00623
512	466800.3	3780672	7.66E-06	0.021023	0.0067244
513	466807.1	3780679	7.75E-06	0.022677	0.0072296
514	466813.9	3780687	7.85E-06	0.02458	0.007771
515	466820.6	3780694	7.96E-06	0.02677	0.0083085
516	466827.4	3780701	8.07E-06	0.029298	0.0088231
517	466834.1	3780709	8.18E-06	0.032234	0.0092958
518	466840.9	3780716	8.31E-06	0.035677	0.0099337
519	466847.7	3780724	8.45E-06	0.039711	0.010828
520	466854.4	3780731	8.61E-06	0.044434	0.011507
521	466861.2	3780738	8.79E-06	0.050005	0.012457
522	466867.9	3780746	8.99E-06	0.056543	0.013456
523	466874.7	3780753	9.22E-06	0.064173	0.013862
524	466881.4	3780760	9.47E-06	0.073001	0.013447
525	466888.2	3780768	9.76E-06	0.083012	0.016162
526	466895	3780775	1.01E-05	0.09407	0.018872
527	466901.7	3780782	1.04E-05	0.10581	0.019939

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528	466908.5	3780790	1.07E-05	0.11742	0.018838
529	466915.2	3780797	1.10E-05	0.12785	0.021795
530	466922	3780805	1.12E-05	0.13578	0.024424
531	466928.8	3780812	1.13E-05	0.14007	0.023756
532	466935.5	3780819	1.14E-05	0.14025	0.019672
533	466942.3	3780827	1.13E-05	0.13651	0.021981
534	466949	3780834	1.11E-05	0.1295	0.021264
535	466955.8	3780841	1.09E-05	0.12022	0.019492
536	466962.5	3780849	1.06E-05	0.10971	0.018281
537	466969.3	3780856	1.03E-05	0.098847	0.018251
538	466976.1	3780864	1.00E-05	0.088219	0.01739
539	466982.8	3780871	9.79E-06	0.078281	0.015334
540	466989.6	3780878	9.55E-06	0.069275	0.014317
541	466996.3	3780886	9.34E-06	0.061278	0.013295
542	467003.1	3780893	9.15E-06	0.054278	0.011965
543	467009.8	3780900	8.99E-06	0.048237	0.010564
544	467016.6	3780908	8.84E-06	0.043041	0.0094956
545	467023.4	3780915	8.72E-06	0.03859	0.0085336
546	467030.1	3780923	8.60E-06	0.034788	0.0081272
547	467036.9	3780930	8.50E-06	0.031542	0.0078811
548	467043.6	3780937	8.41E-06	0.028767	0.0076394
549	467050.4	3780945	8.33E-06	0.026382	0.0073658
550	467057.2	3780952	8.25E-06	0.024331	0.0070686
551	467063.9	3780959	8.18E-06	0.022561	0.0067496
552	467070.7	3780967	8.12E-06	0.021029	0.0064232
553	467077.4	3780974	8.05E-06	0.019693	0.0060831
554	467084.2	3780981	7.99E-06	0.018525	0.005769
555	467090.9	3780989	7.93E-06	0.017501	0.0055507
556	467097.7	3780996	7.88E-06	0.016598	0.0053741
557	467104.5	3781004	7.82E-06	0.015798	0.00519
558	467111.2	3781011	7.76E-06	0.015086	0.005001
559	467118	3781018	7.70E-06	0.014451	0.0048084
560	467124.7	3781026	7.63E-06	0.013881	0.0046132
561	467131.5	3781033	7.57E-06	0.013369	0.0044171
562	467138.3	3781040	7.51E-06	0.012907	0.0042209
563	467145	3781048	7.45E-06	0.012487	0.0040413
564	467151.8	3781055	7.38E-06	0.012107	0.003917
565	467158.5	3781063	7.31E-06	0.011758	0.0038059
566	467165.3	3781070	7.25E-06	0.01144	0.0038508
567	467172	3781077	7.17E-06	0.011146	0.0038762
568	467178.8	3781085	7.10E-06	0.010875	0.0038927
569	467185.6	3781092	7.02E-06	0.010623	0.0038944
570	467192.3	3781099	6.93E-06	0.010385	0.0038759
571	467199.1	3781107	6.86E-06	0.010176	0.0038501

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572	467205.8	3781114	6.78E-06	0.0099762	0.0037981
573	467212.6	3781121	6.70E-06	0.0097862	0.0037211
574	467219.3	3781129	6.60E-06	0.0096059	0.0036234
575	467226.1	3781136	6.51E-06	0.009436	0.0036787
576	467232.9	3781144	6.41E-06	0.0092745	0.00371
577	467239.6	3781151	6.31E-06	0.0091198	0.0037119
578	467246.4	3781158	6.21E-06	0.0089716	0.0036819
579	467253.1	3781166	6.10E-06	0.0088291	0.0036187
580	467259.9	3781173	5.99E-06	0.008692	0.0035239
581	467266.7	3781180	5.88E-06	0.0085599	0.0033587
582	467273.4	3781188	5.76E-06	0.0084315	0.0031618
583	467280.2	3781195	5.63E-06	0.0083068	0.0029468
584	467286.9	3781203	5.51E-06	0.0081857	0.0027214
585	467293.7	3781210	5.37E-06	0.0080666	0.002493
586	467300.4	3781217	5.24E-06	0.00795	0.0022692
587	467307.2	3781225	5.10E-06	0.0078348	0.0021529
588	467314	3781232	4.95E-06	0.0077197	0.0021868
589	467320.7	3781239	4.80E-06	0.0076046	0.0022176
590	467327.5	3781247	4.65E-06	0.0074904	0.0022436
591	467334.2	3781254	4.49E-06	0.0073746	0.0022619
592	467341	3781262	4.33E-06	0.0072568	0.002304
593	467347.8	3781269	4.16E-06	0.0071365	0.0023757
594	467354.5	3781276	3.99E-06	0.0070145	0.0023983
595	467361.3	3781284	3.82E-06	0.0068892	0.0024015
596	467368	3781291	3.63E-06	0.0067595	0.0023918
597	467374.8	3781298	3.45E-06	0.0066269	0.0023706
598	467381.5	3781306	3.26E-06	0.0064899	0.0023527
599	467388.3	3781313	3.06E-06	0.0063469	0.002329
600	467395.1	3781320	2.86E-06	0.0061995	0.0022895
601	467401.8	3781328	2.67E-06	0.0060506	0.0022364
602	467408.6	3781335	2.46E-06	0.0058965	0.0021757
603	467415.3	3781343	2.26E-06	0.0057371	0.002183
604	467422.1	3781350	2.05E-06	0.0055727	0.0021789
605	467428.9	3781357	1.84E-06	0.0054031	0.002163
606	467435.6	3781365	1.62E-06	0.0052291	0.0021355
607	467442.4	3781372	1.41E-06	0.0050507	0.0021379
608	467449.1	3781379	1.19E-06	0.0048678	0.0021685
609	467455.9	3781387	9.65E-07	0.0046805	0.0021846
610	467462.6	3781394	7.43E-07	0.00449	0.0021793
611	467469.4	3781402	5.20E-07	0.0042959	0.0021068
612	467476.2	3781409	2.94E-07	0.0040977	0.0020384
613	467482.9	3781416	6.71E-08	0.0038966	0.0019991
614	467489.7	3781424	-1.62E-07	0.0036922	0.001958
615	467496.4	3781431	-3.93E-07	0.0034844	0.0019089

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
616	467503.2	3781438	-6.28E-07	0.0032738	0.0018533
617	467509.9	3781446	-8.66E-07	0.0030597	0.0017923
618	467516.7	3781453	-1.11E-06	0.0028415	0.0017417
619	467523.5	3781460	-1.36E-06	0.002619	0.001702
620	467530.2	3781468	-1.62E-06	0.0023918	0.001657
621	467537	3781475	-1.90E-06	0.0021584	0.0016071
622	467543.7	3781483	-2.18E-06	0.0019193	0.0015536
623	467550.5	3781490	-2.48E-06	0.0016664	0.0015911
624	467557.3	3781497	-2.79E-06	0.0014141	0.0015646
625	467564	3781505	-3.11E-06	0.0011576	0.0015505
626	467570.8	3781512	-3.45E-06	0.00089794	0.0015459
627	467577.5	3781519	-3.78E-06	0.00063717	0.0015388
628	467584.3	3781527	-4.12E-06	0.00037968	0.0015256
629	467584.9	3781542	-4.59E-06	0.00022957	0.0014779
630	467578.8	3781550	-4.74E-06	0.000178	0.0014396
631	467572.7	3781558	-4.90E-06	0.0001198	0.0014025
632	467566.5	3781566	-5.09E-06	5.54E-05	0.001472
633	467560.4	3781574	-5.31E-06	0	0.0015963
634	467554.3	3781582	-5.56E-06	0	0.0016478
635	467548.2	3781589	-5.84E-06	0	0.0016935
636	467542	3781597	-6.17E-06	0	0.001728
637	467535.9	3781605	-6.53E-06	0	0.0017559
638	467529.8	3781613	-6.94E-06	0	0.0017805
639	467523.6	3781621	-7.37E-06	0	0.0017768
640	467517.5	3781629	-7.84E-06	0	0.0017274
641	467511.4	3781637	-8.32E-06	0	0.0016463
642	467505.3	3781645	-8.83E-06	0	0.0015473
643	467499.1	3781653	-9.35E-06	0	0.0014877
644	467493	3781661	-9.90E-06	0	0.0015086
645	467486.9	3781668	-1.05E-05	0	0.0015425
646	467480.8	3781676	-1.10E-05	0	0.0015698
647	467474.6	3781684	-1.16E-05	0	0.0015852
648	467468.5	3781692	-1.22E-05	0	0.0016088
649	467462.4	3781700	-1.27E-05	0	0.0016124
650	467456.3	3781708	-1.33E-05	0	0.0016138
651	467450.1	3781716	-1.38E-05	0	0.0016761
652	467444	3781724	-1.43E-05	0	0.0017098
653	467437.9	3781732	-1.48E-05	0	0.0016989
654	467431.7	3781739	-1.53E-05	0	0.0017051
655	467425.6	3781747	-1.57E-05	0	0.0017009
656	467419.5	3781755	-1.61E-05	0	0.0016802
657	467413.4	3781763	-1.65E-05	0	0.0016189
658	467407.2	3781771	-1.69E-05	0	0.0015158
659	467401.1	3781779	-1.73E-05	0	0.0013869

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
660	467395	3781787	-1.77E-05	0	0.0012857
661	467388.9	3781795	-1.81E-05	0	0.0013135
662	467382.7	3781803	-1.85E-05	0	0.0013858
663	467376.6	3781811	-1.88E-05	0	0.0014483
664	467370.5	3781818	-1.92E-05	0	0.0014776
665	467364.3	3781826	-1.95E-05	0	0.0014653
666	467358.2	3781834	-1.98E-05	0	0.0015226
667	467352.1	3781842	-2.01E-05	0	0.001572
668	467346	3781850	-2.04E-05	0	0.001612
669	467339.8	3781858	-2.07E-05	0	0.0016411
670	467333.7	3781866	-2.10E-05	0	0.0016589
671	467327.6	3781874	-2.13E-05	0	0.0016603
672	467321.5	3781882	-2.16E-05	0	0.0016051
673	467315.3	3781889	-2.18E-05	0	0.001539
674	467309.2	3781897	-2.21E-05	0	0.0014638
675	467303.1	3781905	-2.23E-05	0	0.0013476
676	467297	3781913	-2.25E-05	0	0.0012163
677	467290.8	3781921	-2.27E-05	0	0.0010805
678	467284.7	3781929	-2.29E-05	0	0.0010337
679	467278.6	3781937	-2.30E-05	0	0.0010795
680	467272.4	3781945	-2.32E-05	0	0.0011193
681	467266.3	3781953	-2.33E-05	0	0.0011617
682	467260.2	3781961	-2.35E-05	0	0.0012071
683	467254.1	3781968	-2.36E-05	0	0.0012534
684	467247.9	3781976	-2.37E-05	0	0.0012496
685	467241.8	3781984	-2.38E-05	0	0.0013411
686	467235.7	3781992	-2.39E-05	0	0.0015191
687	467229.6	3782000	-2.39E-05	0	0.001638
688	467223.4	3782008	-2.39E-05	0	0.0015762
689	467217.3	3782016	-2.39E-05	0	0.0014852
690	467211.2	3782024	-2.39E-05	0	0.0013903
691	467205	3782032	-2.39E-05	0	0.0012924
692	467198.9	3782040	-2.38E-05	0	0.001304
693	467192.8	3782047	-2.37E-05	0	0.0014678
694	467186.7	3782055	-2.36E-05	0	0.0016355
695	467180.5	3782063	-2.35E-05	0	0.001824
696	467174.4	3782071	-2.34E-05	0	0.0020176
697	467168.3	3782079	-2.33E-05	0	0.0020896
698	467162.2	3782087	-2.32E-05	0	0.0021448
699	467156	3782095	-2.31E-05	0	0.0022057
700	467149.9	3782103	-2.29E-05	0	0.002223
701	467143.8	3782111	-2.28E-05	0	0.0021922
702	467137.7	3782118	-2.26E-05	0	0.0021361
703	467131.5	3782126	-2.24E-05	0	0.0020662

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
704	467125.4	3782134	-2.22E-05	0	0.0020608
705	467119.3	3782142	-2.20E-05	0	0.0020669
706	467113.1	3782150	-2.18E-05	0	0.0020392
707	467107	3782158	-2.16E-05	0	0.0020094
708	467100.9	3782166	-2.14E-05	0	0.0019582
709	467094.8	3782174	-2.12E-05	0	0.0018902
710	467088.6	3782182	-2.10E-05	0	0.0018095
711	467082.5	3782190	-2.07E-05	0	0.0017203
712	467076.4	3782197	-2.05E-05	0	0.0016577
713	467070.3	3782205	-2.02E-05	0	0.0015948
714	467064.1	3782213	-1.99E-05	0	0.0015339
715	467058	3782221	-1.96E-05	0	0.0014741
716	467051.9	3782229	-1.93E-05	0	0.0013674
717	467045.8	3782237	-1.89E-05	0	0.001197
718	467039.6	3782245	-1.86E-05	0	0.0011659
719	467033.5	3782253	-1.82E-05	0	0.0012455
720	467027.4	3782261	-1.78E-05	0	0.0013321
721	467021.2	3782268	-1.73E-05	0	0.0014241
722	467015.1	3782276	-1.69E-05	0	0.0015297
723	467009	3782284	-1.64E-05	0	0.0016586
724	467002.9	3782292	-1.59E-05	0	0.0017824
725	466996.7	3782300	-1.54E-05	0	0.0018981
726	466990.6	3782308	-1.49E-05	0	0.0018503
727	466984.5	3782316	-1.43E-05	0	0.0017721
728	466978.4	3782324	-1.38E-05	0	0.0016872
729	466972.2	3782332	-1.33E-05	0	0.001609
730	466966.1	3782340	-1.28E-05	0	0.0015259
731	466960	3782347	-1.23E-05	0	0.00144
732	466953.8	3782355	-1.18E-05	0	0.0013695
733	466947.7	3782363	-1.13E-05	0	0.0013006
734	466941.6	3782371	-1.09E-05	0	0.0012335
735	466935.5	3782379	-1.05E-05	0	0.0012712
736	466929.3	3782387	-1.01E-05	0	0.0013202
737	466923.2	3782395	-9.72E-06	0	0.0013798
738	466917.1	3782403	-9.39E-06	0	0.0014325
739	466911	3782411	-9.06E-06	0	0.0014283
740	466904.8	3782419	-8.74E-06	0	0.0014188
741	466898.7	3782426	-8.45E-06	0	0.0014258
742	466892.6	3782434	-8.18E-06	0	0.0014482
743	466886.5	3782442	-7.93E-06	0	0.001493
744	466880.3	3782450	-7.70E-06	0	0.0015535
745	466874.2	3782458	-7.48E-06	0	0.0015986
746	466868.1	3782466	-7.27E-06	0	0.0016217
747	466861.9	3782474	-7.07E-06	0	0.0016222

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
748	466855.8	3782482	-6.88E-06	0	0.0016264
749	466849.7	3782490	-6.70E-06	0	0.00163
750	466843.6	3782497	-6.53E-06	0	0.0016283
751	466837.4	3782505	-6.37E-06	0	0.0016212
752	466831.3	3782513	-6.23E-06	0	0.001605
753	466825.2	3782521	-6.09E-06	0	0.0015678
754	466819.1	3782529	-5.95E-06	0	0.0015635
755	466812.9	3782537	-5.82E-06	0	0.0015455
756	466806.8	3782545	-5.69E-06	0	0.0015255
757	466800.7	3782553	-5.56E-06	0	0.0015068
758	466794.5	3782561	-5.43E-06	0	0.0014933
759	466788.4	3782569	-5.32E-06	0	0.001472
760	466782.3	3782576	-5.20E-06	0	0.0014465
761	466776.2	3782584	-5.09E-06	0	0.0014286
762	466770	3782592	-4.99E-06	0	0.0014082
763	466763.9	3782600	-4.88E-06	0	0.0013841
764	466757.8	3782608	-4.78E-06	0	0.0013565
765	466751.7	3782616	-4.69E-06	0	0.0013259
766	466745.5	3782624	-4.59E-06	0	0.0013165
767	466730.2	3782628	-4.57E-06	0	0.0013528
768	466721	3782625	-4.65E-06	0	0.0013758
769	466711.7	3782621	-4.72E-06	0	0.0013735
770	466702.5	3782618	-4.80E-06	0	0.0013583
771	466693.3	3782614	-4.87E-06	0	0.0013188
772	466684.1	3782611	-4.95E-06	0	0.0012768
773	466674.8	3782607	-5.03E-06	0	0.0013138
774	466665.6	3782604	-5.11E-06	0	0.0013936
775	466656.4	3782600	-5.19E-06	0	0.0014355
776	466647.2	3782596	-5.28E-06	0	0.0014843
777	466637.9	3782593	-5.36E-06	0	0.0015219
778	466628.7	3782589	-5.45E-06	0	0.0015236
779	466619.5	3782586	-5.55E-06	0	0.001498
780	466610.3	3782582	-5.64E-06	0	0.0014601
781	466601	3782579	-5.74E-06	0	0.0014483
782	466591.8	3782575	-5.84E-06	0	0.0014264
783	466582.6	3782572	-5.94E-06	0	0.0014021
784	466573.4	3782568	-6.05E-06	0	0.0013411
785	466564.1	3782565	-6.16E-06	0	0.0013388
786	466554.9	3782561	-6.27E-06	0	0.0013475
787	466545.7	3782558	-6.39E-06	0	0.0013678
788	466536.5	3782554	-6.51E-06	0	0.0013799
789	466527.2	3782551	-6.63E-06	0	0.001395
790	466518	3782547	-6.76E-06	0	0.0014783
791	466508.8	3782544	-6.90E-06	0	0.0015161

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
792	466499.6	3782540	-7.03E-06	0	0.0014314
793	466490.3	3782537	-7.18E-06	0	0.0013588
794	466481.1	3782533	-7.33E-06	0	0.001366
795	466471.9	3782530	-7.49E-06	0	0.0013856
796	466462.7	3782526	-7.66E-06	0	0.0014277
797	466453.4	3782523	-7.83E-06	0	0.00146
798	466444.2	3782519	-8.01E-06	0	0.0014806
799	466435	3782515	-8.20E-06	0	0.0014883
800	466425.8	3782512	-8.40E-06	0	0.0014979
801	466416.5	3782508	-8.61E-06	0	0.0014258
802	466407.3	3782505	-8.82E-06	0	0.0012985
803	466398.1	3782501	-9.05E-06	0	0.0012899
804	466388.9	3782498	-9.29E-06	0	0.001358
805	466379.6	3782494	-9.54E-06	0	0.0014972
806	466370.4	3782491	-9.81E-06	0	0.0016298
807	466361.2	3782487	-1.01E-05	0	0.0017246
808	466352	3782484	-1.04E-05	0	0.0017404
809	466342.7	3782480	-1.07E-05	0	0.0017357
810	466333.5	3782477	-1.10E-05	0	0.0017574
811	466324.3	3782473	-1.13E-05	0	0.0017613
812	466315.1	3782470	-1.16E-05	0	0.0017442
813	466305.8	3782466	-1.19E-05	0	0.0016188
814	466296.6	3782463	-1.22E-05	0	0.0014696
815	466287.4	3782459	-1.26E-05	0	0.0014665
816	466278.2	3782456	-1.30E-05	0	0.0015509
817	466268.9	3782452	-1.33E-05	0	0.0016374
818	466259.7	3782449	-1.37E-05	0	0.0017299
819	466250.5	3782445	-1.41E-05	0	0.001803
820	466241.3	3782442	-1.45E-05	0	0.0018534
821	466232	3782438	-1.49E-05	0	0.0018794
822	466222.8	3782434	-1.53E-05	0	0.0018518
823	466213.6	3782431	-1.57E-05	0	0.0017956
824	466204.4	3782427	-1.60E-05	0	0.0018065
825	466195.1	3782424	-1.64E-05	0	0.001796
826	466185.9	3782420	-1.68E-05	0	0.0017645
827	466176.7	3782417	-1.73E-05	0	0.0017338
828	466167.5	3782413	-1.77E-05	0	0.0017228
829	466158.3	3782410	-1.82E-05	0	0.0016977
830	466149	3782406	-1.86E-05	0	0.0016959
831	466139.8	3782403	-1.91E-05	0	0.0017715
832	466130.6	3782399	-1.96E-05	0	0.0018153
833	466121.4	3782396	-2.01E-05	0	0.001831
834	466112.1	3782392	-2.05E-05	0	0.0018561
835	466102.9	3782389	-2.10E-05	0	0.0018785

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
836	466093.7	3782385	-2.15E-05	0	0.0019181
837	466084.5	3782382	-2.19E-05	0	0.0019423
838	466075.2	3782378	-2.24E-05	0	0.0019419
839	466066	3782375	-2.28E-05	0	0.0019169
840	466056.8	3782371	-2.32E-05	0	0.0018688
841	466045	3782358	-2.50E-05	0	0.001817
842	466042.5	3782349	-2.64E-05	0	0.001828
843	466040	3782339	-2.79E-05	0	0.001815
844	466037.4	3782329	-2.93E-05	0	0.0017917
845	466034.9	3782320	-3.07E-05	0	0.0017574
846	466032.4	3782310	-3.19E-05	0	0.0017135
847	466029.8	3782301	-3.31E-05	0	0.0016607
848	466027.3	3782291	-3.41E-05	0	0.0016527
849	466024.8	3782282	-3.49E-05	0	0.0016493
850	466022.3	3782272	-3.57E-05	0	0.0016363
851	466019.7	3782263	-3.63E-05	0	0.0016008
852	466017.2	3782253	-3.70E-05	0	0.0015988
853	466014.7	3782244	-3.76E-05	0	0.0016185
854	466012.1	3782234	-3.81E-05	0	0.0016417
855	466009.6	3782225	-3.86E-05	0	0.0016553
856	466007.1	3782215	-3.90E-05	0	0.00174
857	466004.5	3782205	-3.95E-05	0	0.0018392
858	466002	3782196	-3.98E-05	0	0.001925
859	465999.5	3782186	-4.02E-05	0	0.0019693
860	465997	3782177	-4.05E-05	0	0.0019695
861	465994.4	3782167	-4.07E-05	0	0.0019543
862	465991.9	3782158	-4.09E-05	0	0.0019227
863	465989.4	3782148	-4.11E-05	0	0.0018676
864	465986.8	3782139	-4.13E-05	0	0.0017852
865	465984.3	3782129	-4.15E-05	0	0.0018094
866	465981.8	3782120	-4.16E-05	0	0.0018987
867	465979.2	3782110	-4.16E-05	0	0.0019671
868	465976.7	3782101	-4.17E-05	0	0.0020204
869	465974.2	3782091	-4.17E-05	0	0.0020564
870	465971.7	3782081	-4.17E-05	0	0.0020742
871	465969.1	3782072	-4.17E-05	0	0.0020726
872	465966.6	3782062	-4.16E-05	0	0.0020215
873	465964.1	3782053	-4.15E-05	0	0.0019165
874	465961.5	3782043	-4.14E-05	0	0.0017986
875	465959	3782034	-4.13E-05	0	0.0016712
876	465956.5	3782024	-4.11E-05	0	0.0016673
877	465953.9	3782015	-4.09E-05	0	0.001802
878	465951.4	3782005	-4.07E-05	0	0.001929
879	465948.9	3781996	-4.04E-05	0	0.0020276

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
880	465946.4	3781986	-4.01E-05	0	0.0020773
881	465943.8	3781977	-3.98E-05	0	0.0021071
882	465941.3	3781967	-3.95E-05	0	0.0021164
883	465938.8	3781958	-3.91E-05	0	0.0021049
884	465936.2	3781948	-3.87E-05	0	0.0021106
885	465933.7	3781938	-3.82E-05	0	0.0021799
886	465931.2	3781929	-3.77E-05	0	0.0022272
887	465928.6	3781919	-3.72E-05	0	0.002249
888	465926.1	3781910	-3.66E-05	0	0.0022386
889	465923.6	3781900	-3.60E-05	0	0.0021865
890	465921.1	3781891	-3.54E-05	0	0.0021117
891	465918.5	3781881	-3.46E-05	0	0.0020449
892	465916	3781872	-3.38E-05	0	0.0020749
893	465913.5	3781862	-3.29E-05	0	0.0021634
894	465910.9	3781853	-3.19E-05	0	0.002227
895	465908.4	3781843	-3.09E-05	0	0.0022663
896	465905.9	3781834	-2.97E-05	0	0.0022592
897	465903.3	3781824	-2.84E-05	0	0.0022156
898	465900.8	3781814	-2.71E-05	0	0.0022017
899	465901.2	3781795	-2.50E-05	0	0.0022618
900	465904.1	3781786	-2.42E-05	0	0.0022721
901	465907	3781776	-2.33E-05	0	0.0022696
902	465909.9	3781767	-2.24E-05	0	0.0022541
903	465912.7	3781757	-2.14E-05	0	0.0022253
904	465915.6	3781748	-2.03E-05	0	0.0021784
905	465918.5	3781738	-1.92E-05	0	0.0021346
906	465921.4	3781729	-1.80E-05	0	0.002095
907	465924.3	3781719	-1.68E-05	0	0.0021134
908	465927.2	3781710	-1.56E-05	0	0.0021369
909	465930.1	3781700	-1.44E-05	0	0.0021509
910	465933	3781691	-1.31E-05	0	0.002151
911	465935.9	3781681	-1.19E-05	0	0.0021494
912	465938.8	3781672	-1.08E-05	0	0.0021546
913	465941.7	3781662	-9.74E-06	0	0.0021465
914	465944.6	3781653	-8.77E-06	0	0.0021196
915	465947.5	3781643	-7.88E-06	0	0.0020636
916	465950.4	3781634	-7.09E-06	0	0.0021022
917	465953.2	3781624	-6.37E-06	0	0.0021956
918	465956.1	3781615	-5.73E-06	0	0.0022771
919	465959	3781605	-5.15E-06	0	0.0023433
920	465961.9	3781595	-4.63E-06	0	0.002447
921	465964.8	3781586	-4.15E-06	0	0.0024692
922	465967.7	3781576	-3.70E-06	0	0.0024654
923	465970.6	3781567	-3.30E-06	0	0.0024485

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
924	465973.5	3781557	-2.92E-06	0	0.0024387
925	465976.4	3781548	-2.57E-06	0	0.0024325
926	465979.3	3781538	-2.25E-06	0.00014128	0.0024069
927	465982.2	3781529	-1.94E-06	0.00028356	0.0023748
928	465985.1	3781519	-1.66E-06	0.00042238	0.0023389
929	465988	3781510	-1.40E-06	0.00055043	0.0022719
930	465990.8	3781500	-1.15E-06	0.00067401	0.002191
931	465993.7	3781491	-9.16E-07	0.00080347	0.0021663
932	465996.6	3781481	-6.95E-07	0.00093736	0.0022098
933	465999.5	3781472	-4.88E-07	0.0010736	0.0022922
934	466002.4	3781462	-2.91E-07	0.0012062	0.0023468
935	466005.3	3781453	-1.06E-07	0.001335	0.0023722
936	466008.2	3781443	7.02E-08	0.0014605	0.0023774
937	466011.1	3781434	2.38E-07	0.0015833	0.0023636
938	466014	3781424	3.96E-07	0.0017034	0.0023565
939	466016.9	3781415	5.47E-07	0.0018213	0.0023347
940	466019.8	3781405	6.91E-07	0.0019371	0.0023
941	466022.7	3781396	8.28E-07	0.0020512	0.0022504
942	466025.6	3781386	9.59E-07	0.0021647	0.0022224
943	466028.5	3781377	1.08E-06	0.0022768	0.0021821
944	466031.3	3781367	1.20E-06	0.0023869	0.0021193
945	466034.2	3781357	1.32E-06	0.0025041	0.0019193
946	466037.1	3781348	1.43E-06	0.0026097	0.001974
947	466040	3781338	1.54E-06	0.0027145	0.0020411
948	466042.9	3781329	1.64E-06	0.002818	0.0020936
949	466045.8	3781319	1.73E-06	0.0029211	0.0021338
950	466048.7	3781310	1.83E-06	0.0030229	0.0021568
951	466051.6	3781300	1.92E-06	0.0031242	0.0022261
952	466054.5	3781291	2.00E-06	0.0032244	0.0022807
953	466057.4	3781281	2.09E-06	0.0033254	0.002303
954	466060.3	3781272	2.17E-06	0.0034253	0.0022894
955	466063.2	3781262	2.25E-06	0.0035243	0.0022799
956	466066.1	3781253	2.32E-06	0.0036217	0.00232
957	466068.9	3781243	2.40E-06	0.0037186	0.0023566
958	466071.8	3781234	2.47E-06	0.0038132	0.0023712
959	466074.7	3781224	2.54E-06	0.0039042	0.0023625
960	466077.6	3781215	2.61E-06	0.0039882	0.002358
961	466080.5	3781205	2.67E-06	0.0040693	0.0023739
962	466083.4	3781196	2.74E-06	0.0041459	0.0023774
963	466086.3	3781186	2.80E-06	0.0042138	0.0023506
964	466089.2	3781177	2.86E-06	0.0042823	0.0023042
965	466092.1	3781167	2.92E-06	0.0043431	0.0023027
966	466095	3781158	2.98E-06	0.0043924	0.00228
967	466097.9	3781148	3.03E-06	0.004435	0.0022323

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
968	466100.8	3781139	3.09E-06	0.0044724	0.0022009
969	466103.7	3781129	3.14E-06	0.0045092	0.002195
970	466106.6	3781119	3.19E-06	0.0045383	0.0021861
971	466109.4	3781110	3.24E-06	0.0045514	0.0022237
972	466112.3	3781100	3.29E-06	0.0045596	0.0022321
973	466115.2	3781091	3.33E-06	0.0045614	0.0022131
974	466118.1	3781081	3.38E-06	0.0045547	0.002171
975	466121	3781072	3.42E-06	0.0045265	0.0021691
976	466123.9	3781062	3.46E-06	0.0044966	0.002149
977	466126.8	3781053	3.50E-06	0.0044492	0.002128
978	466129.7	3781043	3.54E-06	0.0043956	0.0021387
979	466132.6	3781034	3.57E-06	0.0043265	0.0021301
980	466135.5	3781024	3.61E-06	0.004266	0.0021578
981	466138.4	3781015	3.64E-06	0.0042357	0.0021891
982	466141.3	3781005	3.67E-06	0.0042045	0.0021898
983	466144.2	3780996	3.70E-06	0.0041954	0.0021679
984	466147	3780986	3.73E-06	0.0042017	0.0021262
985	466149.9	3780977	3.76E-06	0.0042093	0.002073
986	466152.8	3780967	3.78E-06	0.0042197	0.0021073
987	466155.7	3780958	3.80E-06	0.0042292	0.0021242
988	466158.6	3780948	3.82E-06	0.0042374	0.0021128
989	466161.5	3780939	3.84E-06	0.0042479	0.0021003
990	466164.4	3780929	3.85E-06	0.0042553	0.002134
991	466167.3	3780920	3.86E-06	0.0042585	0.0021489
992	466170.2	3780910	3.86E-06	0.0042623	0.0021473
993	466173.1	3780900	3.86E-06	0.0042653	0.0021263
994	466176	3780891	3.86E-06	0.0042663	0.0020827
995	466178.9	3780881	3.85E-06	0.0042667	0.0020508
996	466181.8	3780872	3.84E-06	0.0042672	0.0020137
997	466184.6	3780862	3.83E-06	0.004269	0.0019565
998	466187.5	3780853	3.82E-06	0.0042706	0.0019189
999	466190.4	3780843	3.80E-06	0.004282	0.0018445
1000	466193.3	3780834	3.78E-06	0.0042786	0.0018666
1001	466196.2	3780824	3.75E-06	0.0042733	0.0018744
1002	466199.1	3780815	3.73E-06	0.0042661	0.0018672
1003	466202	3780805	3.70E-06	0.0042572	0.001875
1004	466204.9	3780796	3.67E-06	0.0042466	0.0018819
1005	466207.8	3780786	3.64E-06	0.0042344	0.00185
1006	466210.7	3780777	3.60E-06	0.0042204	0.0017961
1007	466213.6	3780767	3.56E-06	0.0042047	0.0018065
1008	466216.5	3780758	3.53E-06	0.0041875	0.0018179
1009	466219.4	3780748	3.48E-06	0.0041689	0.0018215
1010	466222.3	3780739	3.44E-06	0.0041484	0.0018067
1011	466225.1	3780729	3.40E-06	0.0041265	0.0017743

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1012	466228	3780720	3.35E-06	0.0041029	0.001742
1013	466230.9	3780710	3.30E-06	0.0040777	0.0017733
1014	466233.8	3780701	3.24E-06	0.0040506	0.0017889
1015	466236.7	3780691	3.19E-06	0.004022	0.0018
1016	466239.6	3780682	3.13E-06	0.0039919	0.0018326
1017	466242.5	3780672	3.07E-06	0.0039604	0.0018461
1018	466245.4	3780662	3.01E-06	0.003927	0.00184
1019	466248.3	3780653	2.95E-06	0.0038904	0.0018159
1020	466251.2	3780643	2.88E-06	0.0038519	0.0018603
1021	466254.1	3780634	2.81E-06	0.003812	0.0018837
1022	466257	3780624	2.74E-06	0.0037702	0.001886
1023	466259.9	3780615	2.67E-06	0.0037268	0.0018684
1024	466262.7	3780605	2.60E-06	0.0036814	0.0018316
1025	466265.6	3780596	2.52E-06	0.0036345	0.0017769
1026	466268.5	3780586	2.44E-06	0.0035862	0.0017725
1027	466271.4	3780577	2.36E-06	0.0035365	0.0017911
1028	466274.3	3780567	2.28E-06	0.0034848	0.0017988
1029	466277.2	3780558	2.20E-06	0.0034306	0.0017912
1030	466280.1	3780548	2.11E-06	0.0033754	0.001767
1031	466283	3780539	2.02E-06	0.003318	0.001727
1032	466285.9	3780529	1.92E-06	0.0032599	0.0016734
1033	466288.8	3780520	1.83E-06	0.0032006	0.0016554
1034	466291.7	3780510	1.73E-06	0.0031401	0.0017013
1035	466294.6	3780501	1.64E-06	0.0030771	0.0017437
1036	466297.5	3780491	1.54E-06	0.0030131	0.0017718
1037	466300.4	3780482	1.43E-06	0.0029478	0.0017833
1038	466303.2	3780472	1.33E-06	0.0028815	0.0017806
1039	466306.1	3780463	1.23E-06	0.0028146	0.0017652
1040	466309	3780453	1.12E-06	0.0027472	0.0017628
1041	466311.9	3780444	1.02E-06	0.0026798	0.0017597
1042	466314.8	3780434	9.17E-07	0.0026124	0.0017428
1043	466317.7	3780424	8.17E-07	0.0025453	0.0017239
1044	466320.6	3780415	7.20E-07	0.0024793	0.0017094
1045	466323.5	3780405	6.28E-07	0.0024152	0.0016818
1046	466326.4	3780396	5.41E-07	0.002353	0.0016444
1047	466329.3	3780386	4.61E-07	0.0022936	0.0016371
1048	466332.2	3780377	3.89E-07	0.0022373	0.0016178
1049	466335.1	3780367	3.25E-07	0.0021841	0.0015867
1050	466338	3780358	2.68E-07	0.0021342	0.0015448
1051	466340.8	3780348	2.20E-07	0.0020878	0.0014943
1052	466343.7	3780339	1.78E-07	0.0020451	0.0014377
1053	466346.6	3780329	1.42E-07	0.0020046	0.0013884
1054	466349.5	3780320	1.09E-07	0.0019657	0.0013706
1055	466352.4	3780310	7.96E-08	0.0019283	0.0013479

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1056	466355.3	3780301	5.27E-08	0.0018919	0.0013175
1057	466358.2	3780291	2.81E-08	0.0018564	0.001301
1058	466361.1	3780282	5.30E-09	0.0018215	0.0012968
1059	466364	3780272	-1.55E-08	0.0017879	0.001287
1060	466366.9	3780263	-3.45E-08	0.0017553	0.0012715
1061	466369.8	3780253	-5.22E-08	0.0017232	0.0012525
1062	466372.7	3780244	-6.83E-08	0.0016919	0.0012272
1063	466375.6	3780234	-8.30E-08	0.0016616	0.0012094
1064	466378.5	3780225	-9.66E-08	0.0016322	0.0011929

Table H.4 - Project Worker Risk by Receptor

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1	463000	3777400	-5.8932E-09	0.000051956	0.0001714
2	463400	3777400	-5.6498E-09	0.000060273	0.00016015
3	463800	3777400	-5.2793E-09	0.000069465	0.00014821
4	464200	3777400	-5.0164E-09	7.7867E-05	0.0001598
5	464600	3777400	-5.0113E-09	0.0000845	0.00014518
6	465000	3777400	-5.5273E-09	0.000088357	0.00014122
7	465400	3777400	-6.4028E-09	0.000089381	0.0001168
8	465800	3777400	-7.1104E-09	0.000089735	0.00012359
9	466200	3777400	-7.4793E-09	0.00008991	0.00014205
10	466600	3777400	-7.6004E-09	0.000087712	0.00014956
11	467000	3777400	-7.9388E-09	0.000083395	0.00012451
12	467400	3777400	-8.4724E-09	0.000076332	0.00012277
13	467800	3777400	-9.1072E-09	0.000067618	0.000097945
14	468200	3777400	-9.607E-09	5.7707E-05	0.00013909
15	468600	3777400	-1.0102E-08	0.000051401	0.0001259
16	469000	3777400	-1.0733E-08	0.000045263	0.0001287
17	469400	3777400	-1.1465E-08	0.000039319	0.00014835
18	469800	3777400	-1.1981E-08	0.000033968	0.00011444
19	470200	3777400	-1.223E-08	0.000029227	8.3238E-05
20	470600	3777400	-1.2333E-08	0.00002486	0.0001114
21	463000	3777800	-6.6594E-09	0.000053082	0.00016145
22	463400	3777800	-6.3573E-09	0.000063834	0.00018159
23	463800	3777800	-5.9944E-09	0.000075225	0.00018492
24	464200	3777800	-5.5232E-09	0.000087426	0.00017494
25	464600	3777800	-5.3101E-09	0.000097805	0.00018208
26	465000	3777800	-5.6401E-09	0.00010467	0.00017778
27	465400	3777800	-6.6511E-09	0.00010749	0.00013833
28	465800	3777800	-7.628E-09	0.00010861	0.00014043
29	466200	3777800	-8.0744E-09	0.00010912	0.00014407
30	466600	3777800	-8.2889E-09	0.00010772	0.00016653
31	467000	3777800	-8.6738E-09	0.0001028	0.00014181
32	467400	3777800	-9.2889E-09	0.000094019	0.00013467
33	467800	3777800	-9.9789E-09	0.000082523	0.00011645
34	468200	3777800	-1.056E-08	0.000070033	0.0001531
35	468600	3777800	-1.1212E-08	0.000059296	9.9868E-05
36	469000	3777800	-1.2054E-08	0.000051273	0.00014354
37	469400	3777800	-1.2805E-08	0.000043972	0.00013178
38	469800	3777800	-1.3169E-08	0.000037557	0.0001035
39	470200	3777800	-1.329E-08	0.000031733	0.0001232
40	470600	3777800	-1.3391E-08	0.000026447	0.000094592
41	463000	3778200	-8.0275E-09	0.000049153	0.00014093
42	463400	3778200	-7.3311E-09	0.000065266	0.0001872
43	463800	3778200	-6.8413E-09	8.0587E-05	0.00019165
44	464200	3778200	-6.2732E-09	9.6963E-05	0.00021668

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
45	464600	3778200	-5.7203E-09	0.00011333	0.00019072
46	465000	3778200	-5.75E-09	0.00012565	0.000205
47	465400	3778200	-6.7391E-09	0.0001318	0.00019859
48	465800	3778200	-8.0953E-09	0.00013408	0.00015887
49	466200	3778200	-8.7323E-09	0.00013561	0.00015069
50	466600	3778200	-9.1002E-09	0.00013666	0.00019888
51	467000	3778200	-9.501E-09	0.00013088	0.00016853
52	467400	3778200	-1.0207E-08	0.00011969	0.00014037
53	467800	3778200	-1.0956E-08	0.00010441	0.00013559
54	468200	3778200	-1.1648E-08	0.000086844	0.00016569
55	468600	3778200	-1.2564E-08	0.000069321	0.00017194
56	469000	3778200	-1.3561E-08	5.8832E-05	0.00015792
57	469400	3778200	-1.4148E-08	0.000049735	0.0001387
58	469800	3778200	-1.4337E-08	0.000041713	0.00014466
59	470200	3778200	-1.4473E-08	0.000034509	0.00010507
60	470600	3778200	-1.4729E-08	0.000027875	0.00011588
61	463000	3778600	-1.0082E-08	0.000042417	0.00019198
62	463400	3778600	-9.0849E-09	0.000058733	0.00016627
63	463800	3778600	-8.0899E-09	8.2378E-05	0.00021901
64	464200	3778600	-7.2757E-09	0.0001055	0.00020413
65	464600	3778600	-6.3854E-09	0.00013006	0.00025755
66	465000	3778600	-5.8385E-09	0.0001516	0.00023524
67	465400	3778600	-6.5423E-09	0.00016478	0.00025065
68	465800	3778600	-8.3892E-09	0.00017026	0.00019951
69	466200	3778600	-9.5188E-09	0.0001765	0.00017517
70	466600	3778600	-9.9617E-09	0.00018005	0.00025146
71	467000	3778600	-1.0357E-08	0.00017382	0.000203
72	467400	3778600	-1.1131E-08	0.00015906	0.00014604
73	467800	3778600	-1.192E-08	0.00013653	0.00019958
74	468200	3778600	-1.2872E-08	0.00011015	0.00015086
75	468600	3778600	-1.4114E-08	0.000082415	0.00018903
76	469000	3778600	-1.5047E-08	0.000068687	0.00018027
77	469400	3778600	-1.5356E-08	0.000056819	0.00017637
78	469800	3778600	-1.5573E-08	0.000046462	0.00011719
79	470200	3778600	-1.603E-08	0.000037156	0.00014588
80	470600	3778600	-1.6796E-08	0.000028752	0.0001152
81	463000	3779000	-1.2397E-08	0.0000366	0.00026578
82	463400	3779000	-1.154E-08	0.000049226	0.00025243
83	463800	3779000	-1.0367E-08	7.0432E-05	0.00023077
84	464200	3779000	-8.8972E-09	0.00010783	0.00026243
85	464600	3779000	-7.4472E-09	0.00014492	0.0002508
86	465000	3779000	-6.07E-09	0.00018167	0.00029566
87	465400	3779000	-5.9916E-09	0.00021066	0.00031235
88	465800	3779000	-8.1764E-09	0.00022588	0.00030653
89	466200	3779000	-1.0214E-08	0.00024099	0.0002277

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
90	466600	3779000	-1.077E-08	0.00025077	0.00034572
91	467000	3779000	-1.1038E-08	0.0002459	0.00025451
92	467400	3779000	-1.1729E-08	0.00022264	0.00015883
93	467800	3779000	-1.2702E-08	0.00018604	0.00023172
94	468200	3779000	-1.4072E-08	0.00014495	0.00021689
95	468600	3779000	-1.5473E-08	0.00010559	0.00024146
96	469000	3779000	-1.6096E-08	0.000081346	0.00022378
97	469400	3779000	-1.6514E-08	0.000065395	0.00014815
98	469800	3779000	-1.7324E-08	0.000051403	0.00017452
99	470200	3779000	-1.8535E-08	0.0000391	0.00013074
100	470600	3779000	-1.9866E-08	0.000028511	0.00014454
101	463000	3779400	-1.367E-08	0.000030178	0.00040149
102	463400	3779400	-1.3915E-08	0.00004343	0.00035369
103	463800	3779400	-1.3042E-08	0.000061719	0.00030343
104	464200	3779400	-1.1617E-08	0.00010096	0.00021442
105	464600	3779400	-9.41E-09	0.00015085	0.00030583
106	465000	3779400	-6.8075E-09	0.00021122	0.00032838
107	465400	3779400	-5.1299E-09	0.00027239	0.00036654
108	465800	3779400	-6.6107E-09	0.00031633	0.00043057
109	466200	3779400	-1.0188E-08	0.00034937	0.00034705
110	466600	3779400	-1.101E-08	0.00037952	0.00046515
111	467000	3779400	-1.064E-08	0.00037833	0.00032657
112	467400	3779400	-1.1061E-08	0.00033592	0.00027614
113	467800	3779400	-1.2474E-08	0.00026968	0.00026631
114	468200	3779400	-1.4347E-08	0.00020155	0.00034726
115	468600	3779400	-1.5728E-08	0.00014366	0.00029771
116	469000	3779400	-1.6693E-08	0.000098066	0.00020517
117	469400	3779400	-1.8307E-08	0.000075258	0.00019201
118	469800	3779400	-2.0414E-08	0.000055908	0.00016175
119	470200	3779400	-2.2495E-08	0.000039929	0.00014586
120	470600	3779400	-2.418E-08	0.000027513	0.00012755
121	463000	3779800	-1.4215E-08	2.8997E-05	0.00051431
122	463400	3779800	-1.4647E-08	0.000038166	0.00046601
123	463800	3779800	-1.4736E-08	0.000057647	0.00035812
124	464200	3779800	-1.4111E-08	0.00008646	0.00033216
125	464600	3779800	-1.2324E-08	0.00014673	0.00032015
126	465000	3779800	-8.7879E-09	0.0002285	0.00035808
127	465400	3779800	-4.3038E-09	0.00033955	0.00047883
128	465800	3779800	-2.2186E-09	0.00046383	0.00056991
129	466200	3779800	-6.8743E-09	0.0005607	0.00065577
130	466600	3779800	-8.1695E-09	0.00065353	0.00062314
131	467000	3779800	-5.1371E-09	0.00067349	0.00043062
132	467400	3779800	-5.1896E-09	0.00057149	0.00042865
133	467800	3779800	-7.7587E-09	0.00042988	0.0004885
134	468200	3779800	-1.1186E-08	0.00030232	0.00040632

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
135	468600	3779800	-1.4124E-08	0.00020576	0.00026672
136	469000	3779800	-1.7833E-08	0.00012675	0.00021544
137	469400	3779800	-2.1973E-08	0.000085231	0.00021332
138	469800	3779800	-2.5762E-08	0.00005928	0.00019675
139	470200	3779800	-2.9585E-08	0.000043441	0.00028323
140	470600	3779800	-3.2737E-08	0.000013058	0.00056361
141	463000	3780200	-1.5277E-08	0.000026881	0.00047128
142	463400	3780200	-1.5332E-08	0.000034353	0.00057606
143	463800	3780200	-1.3991E-08	0.000057326	0.00037733
144	464200	3780200	-1.3902E-08	0.000077677	0.00042054
145	464600	3780200	-1.279E-08	0.00014272	0.00030266
146	465000	3780200	-9.4187E-09	0.00023958	0.0004396
147	465400	3780200	-2.0091E-09	0.00040365	0.00057212
148	465800	3780200	7.714E-09	0.00065688	0.00074921
149	466200	3780200	1.3801E-08	0.0010284	0.0011049
150	466600	3780200	2.3678E-08	0.0014797	0.0010235
151	467000	3780200	3.6628E-08	0.0016239	0.00066795
152	467400	3780200	2.6155E-08	0.0011953	0.00096626
153	467800	3780200	1.1475E-08	0.00077629	0.00054402
154	468200	3780200	-1.0526E-09	0.00049446	0.00043738
155	468600	3780200	-1.2159E-08	0.0002935	0.00035658
156	469000	3780200	-2.1928E-08	0.00014748	0.00031663
157	469400	3780200	-2.9389E-08	0.000092414	0.00025115
158	469800	3780200	-3.6955E-08	0.000052854	0.00077634
159	470200	3780200	-3.8924E-08	0.000021939	0.00057576
160	470600	3780200	-3.6963E-08	0.000017802	0.00018301
161	463000	3780600	-1.7223E-08	0.000020893	0.00055248
162	463400	3780600	-1.6764E-08	0.000030658	0.00059511
163	463800	3780600	-1.4905E-08	0.000042923	0.00056569
164	464200	3780600	-9.9655E-09	0.000080282	0.00047962
165	464600	3780600	-4.2288E-09	0.00015675	0.00050336
166	465000	3780600	4.6667E-09	0.00028575	0.00046657
167	465400	3780600	2.4932E-08	0.00052708	0.00058095
168	465800	3780600	7.574E-08	0.0010602	0.00096115
169	466200	3780600	2.6143E-07	0.0025726	0.0016718
170	467000	3780600	3.3137E-07	0.0080855	0.003293
171	467400	3780600	1.365E-07	0.0033001	0.0013774
172	467800	3780600	5.5509E-08	0.0015393	0.0010457
173	468200	3780600	1.045E-08	0.00075785	0.00051829
174	468600	3780600	-1.7801E-08	0.00034842	0.00042073
175	469000	3780600	-3.3857E-08	0.0001499	0.00036152
176	469400	3780600	-4.2481E-08	0.00008487	0.00033449
177	469800	3780600	-4.6771E-08	0.000063655	0.00036411
178	470200	3780600	-4.7312E-08	0.000033146	0.0002689
179	470600	3780600	-4.7163E-08	0.000023327	0.00035296

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180	463000	3781000	-1.5898E-08	0.000039613	0.0005343
181	463400	3781000	-1.4203E-08	5.1544E-05	0.00056017
182	463800	3781000	-9.99E-09	0.000071458	0.00059991
183	464200	3781000	2.2825E-10	0.00014822	0.00067007
184	464600	3781000	1.9245E-08	0.00029687	0.00058755
185	465000	3781000	4.8304E-08	0.00052595	0.00072929
186	465400	3781000	1.0564E-07	0.00095873	0.00094402
187	465800	3781000	2.3628E-07	0.0019169	0.0013921
188	467400	3781000	3.3138E-07	0.0047662	0.0026501
189	467800	3781000	7.8813E-08	0.0017012	0.0010088
190	468200	3781000	-1.5321E-08	0.00060262	0.00085306
191	468600	3781000	-5.1877E-08	0.00019847	0.00056247
192	469000	3781000	-6.4017E-08	0.00009115	0.00040235
193	469400	3781000	-6.5989E-08	0.000036802	0.00031049
194	469800	3781000	-6.3625E-08	8.2039E-06	0.00025574
195	470200	3781000	-5.9454E-08	0	0.00020889
196	470600	3781000	-5.488E-08	0	0.00017308
197	463000	3781400	-1.1548E-08	0.000080636	0.00068991
198	463400	3781400	-6.7247E-09	0.00014653	0.00071561
199	463800	3781400	-1.9866E-09	0.00021131	0.00070842
200	464200	3781400	8.9022E-09	0.00031461	0.00075375
201	464600	3781400	2.7914E-08	0.00047967	0.00089814
202	465000	3781400	5.7275E-08	0.00073738	0.0011355
203	465400	3781400	1.0247E-07	0.0010559	0.0014847
204	465800	3781400	1.8122E-07	0.001426	0.0018198
205	467800	3781400	-9.5207E-08	0.00038715	0.0010937
206	468200	3781400	-1.5276E-07	0.000062143	0.00068019
207	468600	3781400	-1.3934E-07	0	0.00048322
208	469000	3781400	-1.195E-07	0	0.00038875
209	469400	3781400	-1.0169E-07	0	0.00031953
210	469800	3781400	-8.7121E-08	0	0.00026343
211	470200	3781400	-7.5407E-08	0	0.00020943
212	470600	3781400	-6.5904E-08	0	0.00017478
213	463000	3781800	-2.0303E-08	0.000099446	0.00055279
214	463400	3781800	-2.2536E-08	0.00012254	0.00067267
215	463800	3781800	-3.0251E-08	0.00012911	0.00074556
216	464200	3781800	-4.8133E-08	0.00010863	0.00082901
217	464600	3781800	-8.3199E-08	0.000056441	0.0010317
218	465000	3781800	-1.6169E-07	0	0.0011249
219	465400	3781800	-3.5426E-07	0	0.0015993
220	465800	3781800	-1.1152E-06	0	0.0019217
221	467400	3781800	-1.2422E-06	0	0.001271
222	467800	3781800	-5.7413E-07	0	0.0010476
223	468200	3781800	-3.4073E-07	0	0.00070301
224	468600	3781800	-2.2984E-07	0	0.00045789

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
225	469000	3781800	-1.6815E-07	0	0.00034406
226	469400	3781800	-1.3065E-07	0	0.00026205
227	469800	3781800	-1.0449E-07	0	0.00022457
228	470200	3781800	-8.6649E-08	0	0.00019815
229	470600	3781800	-7.3568E-08	0	0.00017895
230	463000	3782200	-7.8565E-08	0	0.00054222
231	463400	3782200	-1.1054E-07	0	0.00065931
232	463800	3782200	-1.6008E-07	0	0.00068076
233	464200	3782200	-2.0837E-07	0	0.00070657
234	464600	3782200	-3.9765E-07	0	0.00098983
235	465000	3782200	-6.5108E-07	0	0.0011686
236	465400	3782200	-1.0742E-06	0	0.0012327
237	465800	3782200	-1.8556E-06	0	0.0016472
238	467400	3782200	-7.2441E-07	0	0.00087365
239	467800	3782200	-4.2731E-07	0	0.0013976
240	468200	3782200	-2.8604E-07	0	0.00078711
241	468600	3782200	-2.0589E-07	0	0.00049364
242	469000	3782200	-1.6184E-07	0	0.0008815
243	469400	3782200	-1.2411E-07	0	0.00026352
244	469800	3782200	-1.0052E-07	0	0.00021824
245	470200	3782200	-8.3622E-08	0	0.00018049
246	470600	3782200	-7.132E-08	0	0.00015856
247	463000	3782600	-1.6757E-07	0	0.00051825
248	463400	3782600	-2.166E-07	0	0.00057307
249	463800	3782600	-2.1175E-07	0	0.00051461
250	464200	3782600	-3.5566E-07	0	0.00068225
251	464600	3782600	-5.0428E-07	0	0.00090761
252	465000	3782600	-6.0395E-07	0	0.00095008
253	465400	3782600	-6.5421E-07	0	0.0014029
254	465800	3782600	-5.9431E-07	0	0.0012778
255	466200	3782600	-4.8214E-07	0	0.0014353
256	466600	3782600	-3.7756E-07	0	0.0014402
257	467000	3782600	-2.8255E-07	0	0.0013144
258	467400	3782600	-2.1876E-07	0	0.0012023
259	467800	3782600	-1.8315E-07	0	0.00102
260	468200	3782600	-1.5185E-07	0	0.00082144
261	468600	3782600	-1.2954E-07	0	0.00079895
262	469000	3782600	-1.0834E-07	0	0.00040141
263	469400	3782600	-9.2884E-08	0	0.00027557
264	469800	3782600	-7.9955E-08	0	0.00019545
265	470200	3782600	-6.9443E-08	0	0.00016788
266	470600	3782600	-6.0952E-08	0	0.00014055
267	463000	3783000	-1.947E-07	0	0.0005251
268	463400	3783000	-2.1533E-07	0	0.00048524
269	463800	3783000	-1.9443E-07	0	0.00049067

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
270	464200	3783000	-2.808E-07	0	0.00072271
271	464600	3783000	-2.8566E-07	0	0.00084317
272	465000	3783000	-2.5721E-07	0	0.00094815
273	465400	3783000	-2.1877E-07	0	0.001038
274	465800	3783000	-1.8802E-07	0	0.0010769
275	466200	3783000	-1.6991E-07	0	0.00096594
276	466600	3783000	-1.4235E-07	0	0.0010917
277	467000	3783000	-1.1078E-07	0	0.0011165
278	467400	3783000	-1.0048E-07	0	0.0011034
279	467800	3783000	-9.2212E-08	0	0.00093844
280	468200	3783000	-8.3624E-08	0	0.00084672
281	468600	3783000	-7.6292E-08	0	0.00072576
282	469000	3783000	-7.0591E-08	0	0.00055159
283	469400	3783000	-6.5004E-08	0	0.00049253
284	469800	3783000	-5.9381E-08	0	0.0003662
285	470200	3783000	-5.4172E-08	0	0.00030007
286	470600	3783000	-4.9727E-08	0	0.0004737
287	463000	3783400	-1.1874E-07	0	0.00037662
288	463400	3783400	-1.289E-07	0	0.00041817
289	463800	3783400	-1.3078E-07	0	0.00046027
290	464200	3783400	-1.5372E-07	0	0.00057613
291	464600	3783400	-1.3347E-07	0	0.00065703
292	465000	3783400	-1.1967E-07	0	0.00086736
293	465400	3783400	-1.092E-07	0	0.00075673
294	465800	3783400	-9.9286E-08	0	0.00091597
295	466200	3783400	-9.1295E-08	0	0.00084153
296	466600	3783400	-8.0251E-08	0	0.0009079
297	467000	3783400	-7.4578E-08	0	0.00097121
298	467400	3783400	-6.0321E-08	0	0.00091036
299	467800	3783400	-5.7738E-08	0	0.00086747
300	468200	3783400	-5.4129E-08	0	0.0009204
301	468600	3783400	-4.9457E-08	0	0.00086162
302	469000	3783400	-4.6259E-08	0	0.00063333
303	469400	3783400	-4.4281E-08	0	0.00061668
304	469800	3783400	-4.2887E-08	0	0.00054616
305	470200	3783400	-4.032E-08	0	0.00048176
306	470600	3783400	-3.8052E-08	0	0.0004527
307	463000	3783800	-8.4529E-08	0	0.00035584
308	463400	3783800	-8.1416E-08	0	0.0004147
309	463800	3783800	-8.7582E-08	0	0.00044987
310	464200	3783800	-8.1367E-08	0	0.00045208
311	464600	3783800	-7.7736E-08	0	0.00062308
312	465000	3783800	-7.1613E-08	0	0.00065631
313	465400	3783800	-6.8792E-08	0	0.00068372
314	465800	3783800	-5.9338E-08	0	0.00064859

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
315	466200	3783800	-5.7778E-08	0	0.00073812
316	466600	3783800	-5.6191E-08	0	0.00070396
317	467000	3783800	-5.0898E-08	0	0.00080624
318	467400	3783800	-4.1728E-08	0	0.00079462
319	467800	3783800	-3.8994E-08	0	0.00073366
320	468200	3783800	-3.9548E-08	0	0.00060871
321	468600	3783800	-3.6508E-08	0	0.00064014
322	469000	3783800	-3.3146E-08	0	0.00063128
323	469400	3783800	-3.2217E-08	0	0.00064259
324	469800	3783800	-3.0748E-08	0	0.00062785
325	470200	3783800	-2.8569E-08	0	0.00046136
326	470600	3783800	-2.5068E-08	0	0.00039317
327	463000	3784200	-5.7922E-08	0	0.00034262
328	463400	3784200	-6.1119E-08	0	0.00045155
329	463800	3784200	-5.1833E-08	0	0.00036335
330	464200	3784200	-5.6255E-08	0	0.00050424
331	464600	3784200	-5.2734E-08	0	0.00054071
332	465000	3784200	-5.0271E-08	0	0.00054005
333	465400	3784200	-4.5074E-08	0	0.00065967
334	465800	3784200	-4.2957E-08	0	0.00067418
335	466200	3784200	-4.1492E-08	0	0.00066709
336	466600	3784200	-4.0264E-08	0	0.00062996
337	467000	3784200	-3.587E-08	0	0.00063738
338	467400	3784200	-3.0586E-08	2.0802E-06	0.00063397
339	467800	3784200	-2.7324E-08	4.5219E-06	0.00057679
340	468200	3784200	-2.7607E-08	0	0.00057089
341	468600	3784200	-2.6928E-08	0	0.00050916
342	469000	3784200	-2.5386E-08	0	0.00049014
343	469400	3784200	-2.3901E-08	0	0.00048331
344	469800	3784200	-2.1757E-08	0	0.00054164
345	470200	3784200	-1.98E-08	0	0.00037168
346	470600	3784200	-1.7232E-08	0	0.0003446
347	463000	3784600	-4.3968E-08	0	0.00032559
348	463400	3784600	-3.9413E-08	0	0.0003508
349	463800	3784600	-4.0177E-08	0	0.00038537
350	464200	3784600	-4.0416E-08	0	0.00044849
351	464600	3784600	-3.8855E-08	0	0.00049393
352	465000	3784600	-3.608E-08	0	0.00043427
353	465400	3784600	-3.3538E-08	0	0.00050822
354	465800	3784600	-3.3743E-08	0	0.00055245
355	466200	3784600	-3.0456E-08	0	0.00054773
356	466600	3784600	-2.9776E-08	0	0.00049116
357	467000	3784600	-2.6674E-08	5.0384E-07	0.00051631
358	467400	3784600	-2.3963E-08	0.000005085	0.00051451
359	467800	3784600	-2.0041E-08	0.000011515	0.00051351

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
360	468200	3784600	-1.9571E-08	5.2803E-06	0.00049575
361	468600	3784600	-1.9812E-08	3.4688E-06	0.00041695
362	469000	3784600	-1.9595E-08	2.4715E-06	0.00049848
363	469400	3784600	-1.7502E-08	4.7325E-06	0.00045397
364	469800	3784600	-1.5589E-08	4.9337E-06	0.00037846
365	470200	3784600	-1.529E-08	0	0.00034815
366	470600	3784600	-1.3081E-08	0	0.00026545
367	463000	3785000	-3.4877E-08	0	0.00029198
368	463400	3785000	-3.2896E-08	0	0.00034406
369	463800	3785000	-3.2517E-08	0	0.00038677
370	464200	3785000	-3.1344E-08	0	0.00038866
371	464600	3785000	-3.0034E-08	0	0.00046145
372	465000	3785000	-2.7023E-08	0	0.00049121
373	465400	3785000	-2.7016E-08	0	0.00048077
374	465800	3785000	-2.5411E-08	0	0.00046602
375	466200	3785000	-2.2963E-08	0	0.0004475
376	466600	3785000	-2.1989E-08	1.6912E-06	0.00040061
377	467000	3785000	-2.0972E-08	4.3698E-06	0.00044233
378	467400	3785000	-1.9E-08	7.1842E-06	0.00042411
379	467800	3785000	-1.6063E-08	0.000011989	0.00045084
380	468200	3785000	-1.5665E-08	8.7262E-06	0.00039356
381	468600	3785000	-1.5326E-08	7.3028E-06	0.00042366
382	469000	3785000	-1.5811E-08	4.2918E-06	0.00034189
383	469400	3785000	-1.4341E-08	6.0563E-06	0.00036234
384	469800	3785000	-1.1769E-08	1.3383E-06	0.00031675
385	470200	3785000	-9.6432E-09	6.9512E-07	0.0002628
386	470600	3785000	-1.0839E-08	0	0.0002544
387	466580	3780314	9.0929E-08	0.0021488	0.0015745
388	466686	3780436	3.1098E-07	0.0041326	0.0020686
389	466722	3780485	4.0569E-07	0.0052703	0.0024559
390	466771	3780558	5.4622E-07	0.0077199	0.0037458
391	466838	3780637	6.5613E-07	0.013015	0.0057863
392	466989	3780761	6.8049E-07	0.029999	0.0099872
393	467040	3780807	6.7403E-07	0.029128	0.0082
394	467081	3780858	6.8554E-07	0.023373	0.0070365
395	467102	3780880	6.7884E-07	0.019561	0.0066587
396	467117	3780893	6.6827E-07	0.017269	0.0060774
397	467127	3780906	6.7002E-07	0.015736	0.0059692
398	467141	3780921	6.6537E-07	0.013982	0.0054884
399	467151	3780934	6.6654E-07	0.012818	0.0049618
400	467166	3780946	6.5252E-07	0.011577	0.0045266
401	467169	3780961	6.7489E-07	0.010992	0.0041438
402	467186	3780979	6.6676E-07	0.0098488	0.0036788
403	467200	3780990	6.5229E-07	0.0091445	0.0034798
404	467214	3781002	6.3961E-07	0.008523	0.003462

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
405	467226	3781016	6.3537E-07	0.0080218	0.0035143
406	467237	3781029	6.3127E-07	0.007623	0.0035314
407	467250	3781042	6.215E-07	0.0072255	0.0034802
408	467263	3781057	6.1468E-07	0.0068695	0.0033676
409	467281	3781070	5.9134E-07	0.0064539	0.0031714
410	467291	3781086	5.9164E-07	0.0062389	0.0031905
411	467316	3781096	5.4644E-07	0.0057588	0.0031083
412	467334	3781100	5.1177E-07	0.0054398	0.0029454
413	467351	3781107	4.8444E-07	0.0051591	0.0027309
414	467341	3781127	5.2835E-07	0.0053502	0.0025941
415	467345	3781149	5.4622E-07	0.0053377	0.0023915
416	467359	3781165	5.3083E-07	0.0051435	0.0020417
417	467374	3781184	5.1487E-07	0.0049529	0.0017545
418	467388	3781197	4.9335E-07	0.0047617	0.001812
419	467400	3781212	4.7775E-07	0.0046151	0.0018673
420	467411	3781226	4.6261E-07	0.0044813	0.0018513
421	467423	3781241	4.4445E-07	0.0043314	0.0018919
422	467437	3781256	4.1982E-07	0.0041426	0.0019427
423	467451	3781269	3.9283E-07	0.0039431	0.00196
424	467467	3781279	3.5948E-07	0.0037032	0.0019356
425	467476	3781297	3.4431E-07	0.0035803	0.0019765
426	467489	3781313	3.177E-07	0.0033797	0.0019444
427	467501	3781326	2.9191E-07	0.0031861	0.0019797
428	467518	3781339	2.5458E-07	0.002911	0.0019628
429	467528	3781355	2.3128E-07	0.0027266	0.0019577
430	467541	3781368	2.0112E-07	0.0024973	0.001909
431	467557	3781382	1.6399E-07	0.0022176	0.0018174
432	467566	3781398	1.3884E-07	0.0020133	0.0017456
433	467580	3781408	1.0623E-07	0.0017719	0.0016998
434	467598	3781426	6.0105E-08	0.0014242	0.0016221
435	467620	3781436	1.4512E-08	0.0011024	0.0015045
436	467497	3780282	3.4797E-08	0.0012827	0.0010716
437	468461	3781430	-1.5603E-07	0	0.00053933
438	468467	3782387	-1.8292E-07	0	0.00055724
439	466986	3783844	-4.9135E-08	0	0.00078092
440	467261.4	3784344	-2.9836E-08	0	0.00057476
441	466273.7	3784551	-3.0949E-08	0	0.00054736
442	464383.9	3778064	-5.7474E-09	0.00010053	0.00018939
443	465013.8	3777989	-5.7148E-09	0.00011407	0.00018706
444	462990.3	3778641	-1.0337E-08	0.000041245	0.00020801
445	464324.9	3781923	-1.1527E-07	0	0.00077222
446	466381.3	3780215	1.5255E-08	0.0012557	0.001171
447	467591	3781534	-8.4177E-08	0.00029318	0.0015094
448	466739.4	3782632	-3.1718E-07	0	0.0013237
449	466047.6	3782368	-1.7219E-06	0	0.0017994

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
450	465898.3	3781805	-1.7966E-06	0	0.0022382
451	466388.1	3780222	1.6575E-08	0.0012845	0.0011871
452	466394.9	3780230	1.8034E-08	0.0013147	0.0012034
453	466401.6	3780237	1.9636E-08	0.0013461	0.0012194
454	466408.4	3780245	2.141E-08	0.0013792	0.0012372
455	466415.1	3780252	2.3376E-08	0.0014138	0.0012562
456	466421.9	3780259	2.5594E-08	0.0014504	0.0012751
457	466428.7	3780267	2.8137E-08	0.0014893	0.0012949
458	466435.4	3780274	3.108E-08	0.0015308	0.0013149
459	466442.2	3780281	3.4492E-08	0.0015754	0.0013356
460	466448.9	3780289	3.8515E-08	0.0016237	0.001357
461	466455.7	3780296	4.3364E-08	0.0016764	0.0013786
462	466462.4	3780303	4.9368E-08	0.0017351	0.0014087
463	466469.2	3780311	5.7059E-08	0.001802	0.0014413
464	466476	3780318	6.7024E-08	0.0018796	0.0014748
465	466482.7	3780326	8.0062E-08	0.0019712	0.0015091
466	466489.5	3780333	9.6866E-08	0.0020798	0.0015444
467	466496.2	3780340	1.1774E-07	0.0022064	0.0015796
468	466503	3780348	1.4264E-07	0.0023516	0.0016176
469	466509.7	3780355	1.7078E-07	0.002512	0.0016567
470	466516.5	3780362	2.0116E-07	0.0026832	0.0016957
471	466523.3	3780370	2.3286E-07	0.0028623	0.0017364
472	466530	3780377	2.6503E-07	0.0030454	0.0017774
473	466536.8	3780385	2.9706E-07	0.0032305	0.0018193
474	466543.5	3780392	3.2845E-07	0.0034155	0.001859
475	466550.3	3780399	3.5899E-07	0.0036	0.0018969
476	466557.1	3780407	3.8866E-07	0.0037842	0.0019363
477	466563.8	3780414	4.1703E-07	0.003966	0.0019748
478	466570.6	3780421	4.4442E-07	0.0041474	0.0020143
479	466577.3	3780429	4.707E-07	0.0043279	0.0020542
480	466584.1	3780436	4.9556E-07	0.0045062	0.0020932
481	466590.8	3780443	5.1951E-07	0.0046854	0.0021488
482	466597.6	3780451	5.4297E-07	0.0048677	0.0022121
483	466604.4	3780458	5.6521E-07	0.0050498	0.002276
484	466611.1	3780466	5.8628E-07	0.0052321	0.0023406
485	466617.9	3780473	6.0692E-07	0.005419	0.0024089
486	466624.6	3780480	6.2678E-07	0.0056091	0.0024797
487	466631.4	3780488	6.4561E-07	0.0058016	0.0025515
488	466638.2	3780495	6.6377E-07	0.0059991	0.0026296
489	466644.9	3780502	6.8171E-07	0.0062043	0.0027298
490	466651.7	3780510	6.9838E-07	0.0064124	0.0028297
491	466658.4	3780517	7.1462E-07	0.0066289	0.0029343
492	466665.2	3780525	7.3057E-07	0.0068554	0.0030441
493	466671.9	3780532	7.4557E-07	0.0070893	0.0031546
494	466678.7	3780539	7.6023E-07	0.007335	0.0032694

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
495	466685.5	3780547	7.7425E-07	0.0075922	0.0033859
496	466692.2	3780554	7.8808E-07	0.0078652	0.0035074
497	466699	3780561	8.0129E-07	0.0081531	0.00363
498	466705.7	3780569	8.1386E-07	0.0084578	0.0037531
499	466712.5	3780576	8.2585E-07	0.0087818	0.0038759
500	466719.3	3780584	8.3794E-07	0.0091318	0.0040035
501	466726	3780591	8.4953E-07	0.0095072	0.0041291
502	466732.8	3780598	8.6087E-07	0.0099136	0.0042735
503	466739.5	3780606	8.7205E-07	0.010355	0.0044311
504	466746.3	3780613	8.8288E-07	0.010836	0.0045877
505	466753	3780620	8.9312E-07	0.01136	0.0047387
506	466759.8	3780628	9.0337E-07	0.011937	0.0048877
507	466766.6	3780635	9.1344E-07	0.012576	0.0050305
508	466773.3	3780642	9.2306E-07	0.013282	0.00516
509	466780.1	3780650	9.3296E-07	0.014072	0.0052961
510	466786.8	3780657	9.424E-07	0.014955	0.0057548
511	466793.6	3780665	9.5189E-07	0.01595	0.00623
512	466800.3	3780672	9.613E-07	0.017076	0.0067244
513	466807.1	3780679	9.7052E-07	0.018356	0.0072296
514	466813.9	3780687	9.8052E-07	0.019829	0.007771
515	466820.6	3780694	9.9055E-07	0.021521	0.0083085
516	466827.4	3780701	1.0005E-06	0.023473	0.0088231
517	466834.1	3780709	1.0106E-06	0.025739	0.0092958
518	466840.9	3780716	1.0218E-06	0.028396	0.0099337
519	466847.7	3780724	1.0336E-06	0.031507	0.010828
520	466854.4	3780731	1.0458E-06	0.035148	0.011507
521	466861.2	3780738	1.0594E-06	0.039442	0.012457
522	466867.9	3780746	1.0742E-06	0.04448	0.013456
523	466874.7	3780753	1.0903E-06	0.050359	0.013862
524	466881.4	3780760	1.1082E-06	0.05716	0.013447
525	466888.2	3780768	1.1274E-06	0.064871	0.016162
526	466895	3780775	1.1481E-06	0.073388	0.018872
527	466901.7	3780782	0.00000117	0.082431	0.019939
528	466908.5	3780790	1.1911E-06	0.091376	0.018838
529	466915.2	3780797	1.2102E-06	0.099405	0.021795
530	466922	3780805	1.2254E-06	0.10552	0.024424
531	466928.8	3780812	1.2345E-06	0.10882	0.023756
532	466935.5	3780819	1.2374E-06	0.10896	0.019672
533	466942.3	3780827	1.2344E-06	0.10609	0.021981
534	466949	3780834	1.2261E-06	0.10069	0.021264
535	466955.8	3780841	1.2139E-06	0.093548	0.019492
536	466962.5	3780849	1.1997E-06	0.085456	0.018281
537	466969.3	3780856	0.000001185	0.077098	0.018251
538	466976.1	3780864	1.1703E-06	0.068918	0.01739
539	466982.8	3780871	1.1565E-06	0.061269	0.015334

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
540	466989.6	3780878	1.1441E-06	0.054337	0.014317
541	466996.3	3780886	1.1331E-06	0.048181	0.013295
542	467003.1	3780893	1.123E-06	0.042793	0.011965
543	467009.8	3780900	1.1147E-06	0.038144	0.010564
544	467016.6	3780908	1.1074E-06	0.034144	0.0094956
545	467023.4	3780915	1.1007E-06	0.030718	0.0085336
546	467030.1	3780923	1.0949E-06	0.027792	0.0081272
547	467036.9	3780930	1.0899E-06	0.025293	0.0078811
548	467043.6	3780937	1.0855E-06	0.023157	0.0076394
549	467050.4	3780945	0.000001081	0.021321	0.0073658
550	467057.2	3780952	0.000001077	0.019742	0.0070686
551	467063.9	3780959	1.0733E-06	0.018379	0.0067496
552	467070.7	3780967	1.0703E-06	0.017199	0.0064232
553	467077.4	3780974	1.0667E-06	0.01617	0.0060831
554	467084.2	3780981	1.0633E-06	0.01527	0.005769
555	467090.9	3780989	1.0601E-06	0.01448	0.0055507
556	467097.7	3780996	0.000001057	0.013785	0.0053741
557	467104.5	3781004	1.0535E-06	0.013167	0.00519
558	467111.2	3781011	1.0498E-06	0.012617	0.005001
559	467118	3781018	1.0461E-06	0.012126	0.0048084
560	467124.7	3781026	0.000001042	0.011685	0.0046132
561	467131.5	3781033	1.0382E-06	0.011289	0.0044171
562	467138.3	3781040	1.0341E-06	0.010931	0.0042209
563	467145	3781048	1.0297E-06	0.010605	0.0040413
564	467151.8	3781055	1.0254E-06	0.01031	0.003917
565	467158.5	3781063	1.0205E-06	0.010038	0.0038059
566	467165.3	3781070	1.0157E-06	0.0097896	0.0038508
567	467172	3781077	1.0103E-06	0.0095594	0.0038762
568	467178.8	3781085	1.0048E-06	0.0093472	0.0038927
569	467185.6	3781092	9.9883E-07	0.009149	0.0038944
570	467192.3	3781099	9.9177E-07	0.0089605	0.0038759
571	467199.1	3781107	9.8729E-07	0.0087967	0.0038501
572	467205.8	3781114	9.8153E-07	0.0086388	0.0037981
573	467212.6	3781121	9.7492E-07	0.0084877	0.0037211
574	467219.3	3781129	9.6775E-07	0.0083435	0.0036234
575	467226.1	3781136	9.6045E-07	0.0082072	0.0036787
576	467232.9	3781144	9.5281E-07	0.0080771	0.00371
577	467239.6	3781151	9.4466E-07	0.0079517	0.0037119
578	467246.4	3781158	9.3627E-07	0.0078312	0.0036819
579	467253.1	3781166	9.2759E-07	0.0077148	0.0036187
580	467259.9	3781173	9.1867E-07	0.0076023	0.0035239
581	467266.7	3781180	9.0936E-07	0.0074934	0.0033587
582	467273.4	3781188	8.9941E-07	0.0073867	0.0031618
583	467280.2	3781195	8.8912E-07	0.0072825	0.0029468
584	467286.9	3781203	8.786E-07	0.007181	0.0027214

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585	467293.7	3781210	8.6738E-07	0.0070804	0.002493
586	467300.4	3781217	8.56E-07	0.0069815	0.0022692
587	467307.2	3781225	8.442E-07	0.0068834	0.0021529
588	467314	3781232	8.3179E-07	0.0067849	0.0021868
589	467320.7	3781239	8.1883E-07	0.0066857	0.0022176
590	467327.5	3781247	8.0584E-07	0.0065874	0.0022436
591	467334.2	3781254	7.9225E-07	0.0064873	0.0022619
592	467341	3781262	7.7807E-07	0.006385	0.002304
593	467347.8	3781269	7.6335E-07	0.0062804	0.0023757
594	467354.5	3781276	7.4842E-07	0.0061743	0.0023983
595	467361.3	3781284	7.3294E-07	0.0060652	0.0024015
596	467368	3781291	7.1678E-07	0.0059521	0.0023918
597	467374.8	3781298	7.0044E-07	0.0058366	0.0023706
598	467381.5	3781306	6.8358E-07	0.0057173	0.0023527
599	467388.3	3781313	6.6583E-07	0.0055925	0.002329
600	467395.1	3781320	6.4771E-07	0.005464	0.0022895
601	467401.8	3781328	6.3006E-07	0.0053349	0.0022364
602	467408.6	3781335	6.1192E-07	0.0052012	0.0021757
603	467415.3	3781343	5.9329E-07	0.005063	0.002183
604	467422.1	3781350	5.7429E-07	0.0049207	0.0021789
605	467428.9	3781357	5.5483E-07	0.004774	0.002163
606	467435.6	3781365	5.3508E-07	0.0046235	0.0021355
607	467442.4	3781372	5.1514E-07	0.0044696	0.0021379
608	467449.1	3781379	4.9486E-07	0.0043118	0.0021685
609	467455.9	3781387	4.7423E-07	0.0041503	0.0021846
610	467462.6	3781394	4.5357E-07	0.0039863	0.0021793
611	467469.4	3781402	4.3267E-07	0.0038193	0.0021068
612	467476.2	3781409	4.1134E-07	0.0036487	0.0020384
613	467482.9	3781416	3.8985E-07	0.0034757	0.0019991
614	467489.7	3781424	3.68E-07	0.0032998	0.001958
615	467496.4	3781431	3.4568E-07	0.0031209	0.0019089
616	467503.2	3781438	3.2292E-07	0.0029392	0.0018533
617	467509.9	3781446	2.9956E-07	0.0027544	0.0017923
618	467516.7	3781453	2.7526E-07	0.0025654	0.0017417
619	467523.5	3781460	2.4995E-07	0.0023722	0.001702
620	467530.2	3781468	2.2341E-07	0.0021741	0.001657
621	467537	3781475	1.9518E-07	0.0019696	0.0016071
622	467543.7	3781483	1.6529E-07	0.001759	0.0015536
623	467550.5	3781490	1.3351E-07	0.0015361	0.0015911
624	467557.3	3781497	9.9964E-08	0.001312	0.0015646
625	467564	3781505	6.4749E-08	0.0010829	0.0015505
626	467570.8	3781512	2.8309E-08	0.00085023	0.0015459
627	467577.5	3781519	-8.8932E-09	0.00061592	0.0015388
628	467584.3	3781527	-4.6608E-08	0.0003819	0.0015256
629	467584.9	3781542	-8.9407E-08	0.00025712	0.0014779

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
630	467578.8	3781550	-9.598E-08	0.00021752	0.0014396
631	467572.7	3781558	-1.0424E-07	0.00017259	0.0014025
632	467566.5	3781566	-1.1495E-07	0.00012254	0.001472
633	467560.4	3781574	-1.2906E-07	0.000067725	0.0015963
634	467554.3	3781582	-1.4685E-07	9.7721E-06	0.0016478
635	467548.2	3781589	-1.6873E-07	0	0.0016935
636	467542	3781597	-1.9527E-07	0	0.001728
637	467535.9	3781605	-2.2642E-07	0	0.0017559
638	467529.8	3781613	-2.6209E-07	0	0.0017805
639	467523.6	3781621	-3.0119E-07	0	0.0017768
640	467517.5	3781629	-3.4351E-07	0	0.0017274
641	467511.4	3781637	-3.8829E-07	0	0.0016463
642	467505.3	3781645	-4.3553E-07	0	0.0015473
643	467499.1	3781653	-4.8494E-07	0	0.0014877
644	467493	3781661	-5.3605E-07	0	0.0015086
645	467486.9	3781668	-5.8896E-07	0	0.0015425
646	467480.8	3781676	-6.4293E-07	0	0.0015698
647	467474.6	3781684	-6.975E-07	0	0.0015852
648	467468.5	3781692	-7.516E-07	0	0.0016088
649	467462.4	3781700	-8.0474E-07	0	0.0016124
650	467456.3	3781708	-8.5588E-07	0	0.0016138
651	467450.1	3781716	-9.0429E-07	0	0.0016761
652	467444	3781724	-9.496E-07	0	0.0017098
653	467437.9	3781732	-9.9193E-07	0	0.0016989
654	467431.7	3781739	-1.0319E-06	0	0.0017051
655	467425.6	3781747	-1.0704E-06	0	0.0017009
656	467419.5	3781755	-0.000001107	0	0.0016802
657	467413.4	3781763	-1.1417E-06	0	0.0016189
658	467407.2	3781771	-1.1753E-06	0	0.0015158
659	467401.1	3781779	-0.000001208	0	0.0013869
660	467395	3781787	-1.2399E-06	0	0.0012857
661	467388.9	3781795	-1.2704E-06	0	0.0013135
662	467382.7	3781803	-1.3003E-06	0	0.0013858
663	467376.6	3781811	-1.3284E-06	0	0.0014483
664	467370.5	3781818	-0.000001355	0	0.0014776
665	467364.3	3781826	-1.3808E-06	0	0.0014653
666	467358.2	3781834	-1.4059E-06	0	0.0015226
667	467352.1	3781842	-1.4307E-06	0	0.001572
668	467346	3781850	-1.4551E-06	0	0.001612
669	467339.8	3781858	-1.4787E-06	0	0.0016411
670	467333.7	3781866	-1.5015E-06	0	0.0016589
671	467327.6	3781874	-1.5236E-06	0	0.0016603
672	467321.5	3781882	-1.5455E-06	0	0.0016051
673	467315.3	3781889	-1.5664E-06	0	0.001539
674	467309.2	3781897	-0.000001586	0	0.0014638

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
675	467303.1	3781905	-1.6039E-06	0	0.0013476
676	467297	3781913	-1.6202E-06	0	0.0012163
677	467290.8	3781921	-0.000001635	0	0.0010805
678	467284.7	3781929	-0.000001649	0	0.0010337
679	467278.6	3781937	-1.6622E-06	0	0.0010795
680	467272.4	3781945	-1.6749E-06	0	0.0011193
681	467266.3	3781953	-1.6867E-06	0	0.0011617
682	467260.2	3781961	-1.6975E-06	0	0.0012071
683	467254.1	3781968	-1.7072E-06	0	0.0012534
684	467247.9	3781976	-1.7162E-06	0	0.0012496
685	467241.8	3781984	-1.7241E-06	0	0.0013411
686	467235.7	3781992	-1.7304E-06	0	0.0015191
687	467229.6	3782000	-1.7345E-06	0	0.001638
688	467223.4	3782008	-1.7361E-06	0	0.0015762
689	467217.3	3782016	-1.7362E-06	0	0.0014852
690	467211.2	3782024	-0.000001735	0	0.0013903
691	467205	3782032	-1.7325E-06	0	0.0012924
692	467198.9	3782040	-1.7285E-06	0	0.001304
693	467192.8	3782047	-1.7233E-06	0	0.0014678
694	467186.7	3782055	-1.717E-06	0	0.0016355
695	467180.5	3782063	-1.7106E-06	0	0.001824
696	467174.4	3782071	-1.7036E-06	0	0.0020176
697	467168.3	3782079	-0.000001696	0	0.0020896
698	467162.2	3782087	-1.6875E-06	0	0.0021448
699	467156	3782095	-1.6789E-06	0	0.0022057
700	467149.9	3782103	-1.6685E-06	0	0.002223
701	467143.8	3782111	-1.6563E-06	0	0.0021922
702	467137.7	3782118	-1.6433E-06	0	0.0021361
703	467131.5	3782126	-1.6299E-06	0	0.0020662
704	467125.4	3782134	-1.6164E-06	0	0.0020608
705	467119.3	3782142	-1.6025E-06	0	0.0020669
706	467113.1	3782150	-1.5884E-06	0	0.0020392
707	467107	3782158	-1.5741E-06	0	0.0020094
708	467100.9	3782166	-1.5591E-06	0	0.0019582
709	467094.8	3782174	-1.5433E-06	0	0.0018902
710	467088.6	3782182	-1.5268E-06	0	0.0018095
711	467082.5	3782190	-1.5092E-06	0	0.0017203
712	467076.4	3782197	-1.4905E-06	0	0.0016577
713	467070.3	3782205	-1.4709E-06	0	0.0015948
714	467064.1	3782213	-1.4497E-06	0	0.0015339
715	467058	3782221	-1.4272E-06	0	0.0014741
716	467051.9	3782229	-1.4032E-06	0	0.0013674
717	467045.8	3782237	-1.3776E-06	0	0.001197
718	467039.6	3782245	-1.3503E-06	0	0.0011659
719	467033.5	3782253	-1.3214E-06	0	0.0012455

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
720	467027.4	3782261	-1.2909E-06	0	0.0013321
721	467021.2	3782268	-1.2587E-06	0	0.0014241
722	467015.1	3782276	-0.000001225	0	0.0015297
723	467009	3782284	-1.1898E-06	0	0.0016586
724	467002.9	3782292	-1.1533E-06	0	0.0017824
725	466996.7	3782300	-1.1158E-06	0	0.0018981
726	466990.6	3782308	-1.0775E-06	0	0.0018503
727	466984.5	3782316	-1.0389E-06	0	0.0017721
728	466978.4	3782324	-1.0002E-06	0	0.0016872
729	466972.2	3782332	-9.6182E-07	0	0.001609
730	466966.1	3782340	-9.2402E-07	0	0.0015259
731	466960	3782347	-8.8721E-07	0	0.00144
732	466953.8	3782355	-8.5174E-07	0	0.0013695
733	466947.7	3782363	-8.1771E-07	0	0.0013006
734	466941.6	3782371	-7.8541E-07	0	0.0012335
735	466935.5	3782379	-7.5483E-07	0	0.0012712
736	466929.3	3782387	-7.2617E-07	0	0.0013202
737	466923.2	3782395	-6.9933E-07	0	0.0013798
738	466917.1	3782403	-6.7436E-07	0	0.0014325
739	466911	3782411	-6.5055E-07	0	0.0014283
740	466904.8	3782419	-6.2708E-07	0	0.0014188
741	466898.7	3782426	-6.0573E-07	0	0.0014258
742	466892.6	3782434	-5.8602E-07	0	0.0014482
743	466886.5	3782442	-5.6757E-07	0	0.001493
744	466880.3	3782450	-5.5036E-07	0	0.0015535
745	466874.2	3782458	-5.3415E-07	0	0.0015986
746	466868.1	3782466	-5.1882E-07	0	0.0016217
747	466861.9	3782474	-5.0425E-07	0	0.0016222
748	466855.8	3782482	-4.9049E-07	0	0.0016264
749	466849.7	3782490	-4.7743E-07	0	0.00163
750	466843.6	3782497	-4.6513E-07	0	0.0016283
751	466837.4	3782505	-4.5346E-07	0	0.0016212
752	466831.3	3782513	-4.4264E-07	0	0.001605
753	466825.2	3782521	-4.3236E-07	0	0.0015678
754	466819.1	3782529	-4.2246E-07	0	0.0015635
755	466812.9	3782537	-4.1293E-07	0	0.0015455
756	466806.8	3782545	-4.0347E-07	0	0.0015255
757	466800.7	3782553	-3.9375E-07	0	0.0015068
758	466794.5	3782561	-3.848E-07	0	0.0014933
759	466788.4	3782569	-3.7625E-07	0	0.001472
760	466782.3	3782576	-3.6793E-07	0	0.0014465
761	466776.2	3782584	-3.5998E-07	0	0.0014286
762	466770	3782592	-3.5227E-07	0	0.0014082
763	466763.9	3782600	-3.4481E-07	0	0.0013841
764	466757.8	3782608	-3.3758E-07	0	0.0013565

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
765	466751.7	3782616	-3.3059E-07	0	0.0013259
766	466745.5	3782624	-3.2384E-07	0	0.0013165
767	466730.2	3782628	-3.2233E-07	0	0.0013528
768	466721	3782625	-3.2766E-07	0	0.0013758
769	466711.7	3782621	-3.3315E-07	0	0.0013735
770	466702.5	3782618	-3.3864E-07	0	0.0013583
771	466693.3	3782614	-3.4411E-07	0	0.0013188
772	466684.1	3782611	-3.4968E-07	0	0.0012768
773	466674.8	3782607	-3.5549E-07	0	0.0013138
774	466665.6	3782604	-3.6146E-07	0	0.0013936
775	466656.4	3782600	-3.6749E-07	0	0.0014355
776	466647.2	3782596	-3.7362E-07	0	0.0014843
777	466637.9	3782593	-3.7997E-07	0	0.0015219
778	466628.7	3782589	-3.8651E-07	0	0.0015236
779	466619.5	3782586	-3.9318E-07	0	0.001498
780	466610.3	3782582	-4.0007E-07	0	0.0014601
781	466601	3782579	-4.0725E-07	0	0.0014483
782	466591.8	3782575	-4.1456E-07	0	0.0014264
783	466582.6	3782572	-4.2218E-07	0	0.0014021
784	466573.4	3782568	-4.3006E-07	0	0.0013411
785	466564.1	3782565	-0.000000438	0	0.0013388
786	466554.9	3782561	-4.4628E-07	0	0.0013475
787	466545.7	3782558	-4.5485E-07	0	0.0013678
788	466536.5	3782554	-4.6364E-07	0	0.0013799
789	466527.2	3782551	-4.7274E-07	0	0.001395
790	466518	3782547	-4.8223E-07	0	0.0014783
791	466508.8	3782544	-4.9199E-07	0	0.0015161
792	466499.6	3782540	-5.021E-07	0	0.0014314
793	466490.3	3782537	-5.1271E-07	0	0.0013588
794	466481.1	3782533	-5.2403E-07	0	0.001366
795	466471.9	3782530	-5.3574E-07	0	0.0013856
796	466462.7	3782526	-5.4773E-07	0	0.0014277
797	466453.4	3782523	-5.6038E-07	0	0.00146
798	466444.2	3782519	-5.7376E-07	0	0.0014806
799	466435	3782515	-5.8781E-07	0	0.0014883
800	466425.8	3782512	-6.0257E-07	0	0.0014979
801	466416.5	3782508	-6.1777E-07	0	0.0014258
802	466407.3	3782505	-6.3356E-07	0	0.0012985
803	466398.1	3782501	-6.5031E-07	0	0.0012899
804	466388.9	3782498	-6.6762E-07	0	0.001358
805	466379.6	3782494	-6.8604E-07	0	0.0014972
806	466370.4	3782491	-7.0649E-07	0	0.0016298
807	466361.2	3782487	-7.2658E-07	0	0.0017246
808	466352	3782484	-7.4735E-07	0	0.0017404
809	466342.7	3782480	-7.6885E-07	0	0.0017357

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
810	466333.5	3782477	-7.9091E-07	0	0.0017574
811	466324.3	3782473	-8.1369E-07	0	0.0017613
812	466315.1	3782470	-8.3584E-07	0	0.0017442
813	466305.8	3782466	-8.6025E-07	0	0.0016188
814	466296.6	3782463	-8.8569E-07	0	0.0014696
815	466287.4	3782459	-9.1251E-07	0	0.0014665
816	466278.2	3782456	-9.3976E-07	0	0.0015509
817	466268.9	3782452	-9.6678E-07	0	0.0016374
818	466259.7	3782449	-9.9433E-07	0	0.0017299
819	466250.5	3782445	-0.000001022	0	0.001803
820	466241.3	3782442	-1.0502E-06	0	0.0018534
821	466232	3782438	-1.0788E-06	0	0.0018794
822	466222.8	3782434	-1.1077E-06	0	0.0018518
823	466213.6	3782431	-1.1368E-06	0	0.0017956
824	466204.4	3782427	-1.1646E-06	0	0.0018065
825	466195.1	3782424	-0.000001193	0	0.001796
826	466185.9	3782420	-1.2241E-06	0	0.0017645
827	466176.7	3782417	-1.2556E-06	0	0.0017338
828	466167.5	3782413	-1.2884E-06	0	0.0017228
829	466158.3	3782410	-1.3223E-06	0	0.0016977
830	466149	3782406	-1.3565E-06	0	0.0016959
831	466139.8	3782403	-0.000001391	0	0.0017715
832	466130.6	3782399	-1.4259E-06	0	0.0018153
833	466121.4	3782396	-1.4609E-06	0	0.001831
834	466112.1	3782392	-1.4962E-06	0	0.0018561
835	466102.9	3782389	-1.5313E-06	0	0.0018785
836	466093.7	3782385	-1.5659E-06	0	0.0019181
837	466084.5	3782382	-1.5998E-06	0	0.0019423
838	466075.2	3782378	-1.6327E-06	0	0.0019419
839	466066	3782375	-1.6641E-06	0	0.0019169
840	466056.8	3782371	-0.000001694	0	0.0018688
841	466045	3782358	-1.8245E-06	0	0.001817
842	466042.5	3782349	-1.9306E-06	0	0.001828
843	466040	3782339	-2.0374E-06	0	0.001815
844	466037.4	3782329	-0.000002142	0	0.0017917
845	466034.9	3782320	-0.000002242	0	0.0017574
846	466032.4	3782310	-2.3347E-06	0	0.0017135
847	466029.8	3782301	-2.4181E-06	0	0.0016607
848	466027.3	3782291	-2.4922E-06	0	0.0016527
849	466024.8	3782282	-2.5573E-06	0	0.0016493
850	466022.3	3782272	-2.6148E-06	0	0.0016363
851	466019.7	3782263	-0.00000266	0	0.0016008
852	466017.2	3782253	-2.7066E-06	0	0.0015988
853	466014.7	3782244	-2.7486E-06	0	0.0016185
854	466012.1	3782234	-2.7871E-06	0	0.0016417

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
855	466009.6	3782225	-2.8234E-06	0	0.0016553
856	466007.1	3782215	-2.8561E-06	0	0.00174
857	466004.5	3782205	-2.8854E-06	0	0.0018392
858	466002	3782196	-2.9123E-06	0	0.001925
859	465999.5	3782186	-2.9362E-06	0	0.0019693
860	465997	3782177	-2.9571E-06	0	0.0019695
861	465994.4	3782167	-2.9752E-06	0	0.0019543
862	465991.9	3782158	-2.9909E-06	0	0.0019227
863	465989.4	3782148	-3.0047E-06	0	0.0018676
864	465986.8	3782139	-3.0167E-06	0	0.0017852
865	465984.3	3782129	-3.0259E-06	0	0.0018094
866	465981.8	3782120	-3.0328E-06	0	0.0018987
867	465979.2	3782110	-3.0374E-06	0	0.0019671
868	465976.7	3782101	-3.0401E-06	0	0.0020204
869	465974.2	3782091	-3.0403E-06	0	0.0020564
870	465971.7	3782081	-3.0389E-06	0	0.0020742
871	465969.1	3782072	-3.0358E-06	0	0.0020726
872	465966.6	3782062	-3.0305E-06	0	0.0020215
873	465964.1	3782053	-3.0229E-06	0	0.0019165
874	465961.5	3782043	-3.0129E-06	0	0.0017986
875	465959	3782034	-3.0006E-06	0	0.0016712
876	465956.5	3782024	-2.9863E-06	0	0.0016673
877	465953.9	3782015	-2.9697E-06	0	0.001802
878	465951.4	3782005	-0.000002951	0	0.001929
879	465948.9	3781996	-2.9302E-06	0	0.0020276
880	465946.4	3781986	-2.9072E-06	0	0.0020773
881	465943.8	3781977	-2.8817E-06	0	0.0021071
882	465941.3	3781967	-2.8541E-06	0	0.0021164
883	465938.8	3781958	-2.8241E-06	0	0.0021049
884	465936.2	3781948	-2.7915E-06	0	0.0021106
885	465933.7	3781938	-2.7562E-06	0	0.0021799
886	465931.2	3781929	-2.7183E-06	0	0.0022272
887	465928.6	3781919	-2.6773E-06	0	0.002249
888	465926.1	3781910	-2.6331E-06	0	0.0022386
889	465923.6	3781900	-2.5852E-06	0	0.0021865
890	465921.1	3781891	-0.000002533	0	0.0021117
891	465918.5	3781881	-2.4759E-06	0	0.0020449
892	465916	3781872	-2.4134E-06	0	0.0020749
893	465913.5	3781862	-2.3446E-06	0	0.0021634
894	465910.9	3781853	-2.2692E-06	0	0.002227
895	465908.4	3781843	-2.1868E-06	0	0.0022663
896	465905.9	3781834	-2.0975E-06	0	0.0022592
897	465903.3	3781824	-2.0022E-06	0	0.0022156
898	465900.8	3781814	-1.9016E-06	0	0.0022017
899	465901.2	3781795	-1.7401E-06	0	0.0022618

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
900	465904.1	3781786	-1.6781E-06	0	0.0022721
901	465907	3781776	-1.6105E-06	0	0.0022696
902	465909.9	3781767	-1.5378E-06	0	0.0022541
903	465912.7	3781757	-1.4603E-06	0	0.0022253
904	465915.6	3781748	-1.3784E-06	0	0.0021784
905	465918.5	3781738	-1.2924E-06	0	0.0021346
906	465921.4	3781729	-1.2028E-06	0	0.002095
907	465924.3	3781719	-1.1104E-06	0	0.0021134
908	465927.2	3781710	-1.0161E-06	0	0.0021369
909	465930.1	3781700	-9.2142E-07	0	0.0021509
910	465933	3781691	-8.2751E-07	0	0.002151
911	465935.9	3781681	-7.3613E-07	0	0.0021494
912	465938.8	3781672	-6.4892E-07	0	0.0021546
913	465941.7	3781662	-5.671E-07	0	0.0021465
914	465944.6	3781653	-4.9162E-07	0	0.0021196
915	465947.5	3781643	-4.2301E-07	0	0.0020636
916	465950.4	3781634	-3.6109E-07	0	0.0021022
917	465953.2	3781624	-3.0528E-07	0	0.0021956
918	465956.1	3781615	-2.5494E-07	0	0.0022771
919	465959	3781605	-2.0927E-07	0	0.0023433
920	465961.9	3781595	-1.6754E-07	0	0.002447
921	465964.8	3781586	-1.2934E-07	0	0.0024692
922	465967.7	3781576	-9.4028E-08	0	0.0024654
923	465970.6	3781567	-6.1411E-08	0	0.0024485
924	465973.5	3781557	-3.1106E-08	9.8575E-06	0.0024387
925	465976.4	3781548	-2.9415E-09	0.000050767	0.0024325
926	465979.3	3781538	2.3368E-08	0.00018542	0.0024069
927	465982.2	3781529	4.7928E-08	0.00032002	0.0023748
928	465985.1	3781519	7.0877E-08	0.00045088	0.0023389
929	465988	3781510	9.2456E-08	0.0005718	0.0022719
930	465990.8	3781500	1.1276E-07	0.00068827	0.002191
931	465993.7	3781491	1.3189E-07	0.00080932	0.0021663
932	465996.6	3781481	1.5003E-07	0.00093108	0.0022098
933	465999.5	3781472	1.6708E-07	0.0010495	0.0022922
934	466002.4	3781462	1.8328E-07	0.0011643	0.0023468
935	466005.3	3781453	1.986E-07	0.0012756	0.0023722
936	466008.2	3781443	2.1314E-07	0.0013837	0.0023774
937	466011.1	3781434	2.2699E-07	0.0014892	0.0023636
938	466014	3781424	2.4014E-07	0.0015921	0.0023565
939	466016.9	3781415	2.5269E-07	0.0016928	0.0023347
940	466019.8	3781405	2.6463E-07	0.0017914	0.0023
941	466022.7	3781396	2.7604E-07	0.0018883	0.0022504
942	466025.6	3781386	2.8699E-07	0.0019843	0.0022224
943	466028.5	3781377	2.9746E-07	0.002079	0.0021821
944	466031.3	3781367	3.075E-07	0.0021717	0.0021193

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
945	466034.2	3781357	3.1715E-07	0.0022696	0.0019193
946	466037.1	3781348	3.2641E-07	0.0023583	0.001974
947	466040	3781338	3.353E-07	0.002446	0.0020411
948	466042.9	3781329	3.439E-07	0.0025326	0.0020936
949	466045.8	3781319	3.521E-07	0.0026185	0.0021338
950	466048.7	3781310	3.6006E-07	0.0027032	0.0021568
951	466051.6	3781300	3.6771E-07	0.0027873	0.0022261
952	466054.5	3781291	3.7481E-07	0.0028701	0.0022807
953	466057.4	3781281	3.8199E-07	0.0029536	0.002303
954	466060.3	3781272	3.8895E-07	0.003036	0.0022894
955	466063.2	3781262	3.957E-07	0.0031176	0.0022799
956	466066.1	3781253	4.0223E-07	0.0031979	0.00232
957	466068.9	3781243	4.0854E-07	0.0032776	0.0023566
958	466071.8	3781234	4.1469E-07	0.0033553	0.0023712
959	466074.7	3781224	4.207E-07	0.0034302	0.0023625
960	466077.6	3781215	4.2662E-07	0.0034996	0.002358
961	466080.5	3781205	4.3237E-07	0.0035667	0.0023739
962	466083.4	3781196	4.3797E-07	0.0036302	0.0023774
963	466086.3	3781186	4.4349E-07	0.003687	0.0023506
964	466089.2	3781177	4.4878E-07	0.003744	0.0023042
965	466092.1	3781167	4.5398E-07	0.003795	0.0023027
966	466095	3781158	4.5913E-07	0.0038372	0.00228
967	466097.9	3781148	4.6417E-07	0.0038741	0.0022323
968	466100.8	3781139	4.6909E-07	0.003907	0.0022009
969	466103.7	3781129	4.737E-07	0.0039391	0.002195
970	466106.6	3781119	4.7811E-07	0.0039651	0.0021861
971	466109.4	3781110	4.8236E-07	0.0039787	0.0022237
972	466112.3	3781100	4.8648E-07	0.0039884	0.0022321
973	466115.2	3781091	4.9047E-07	0.003993	0.0022131
974	466118.1	3781081	4.9435E-07	0.0039911	0.002171
975	466121	3781072	4.9808E-07	0.0039725	0.0021691
976	466123.9	3781062	5.0167E-07	0.0039524	0.002149
977	466126.8	3781053	5.051E-07	0.0039188	0.002128
978	466129.7	3781043	5.084E-07	0.0038803	0.0021387
979	466132.6	3781034	5.1149E-07	0.0038296	0.0021301
980	466135.5	3781024	5.1443E-07	0.0037856	0.0021578
981	466138.4	3781015	5.1727E-07	0.0037645	0.0021891
982	466141.3	3781005	5.1993E-07	0.0037427	0.0021898
983	466144.2	3780996	5.2238E-07	0.0037376	0.0021679
984	466147	3780986	5.2463E-07	0.0037442	0.0021262
985	466149.9	3780977	5.2659E-07	0.0037515	0.002073
986	466152.8	3780967	5.283E-07	0.0037608	0.0021073
987	466155.7	3780958	5.2967E-07	0.003769	0.0021242
988	466158.6	3780948	5.307E-07	0.003776	0.0021128
989	466161.5	3780939	5.3144E-07	0.0037843	0.0021003

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
990	466164.4	3780929	5.3178E-07	0.0037901	0.002134
991	466167.3	3780920	5.316E-07	0.003792	0.0021489
992	466170.2	3780910	5.3105E-07	0.0037941	0.0021473
993	466173.1	3780900	5.3012E-07	0.0037952	0.0021263
994	466176	3780891	5.2876E-07	0.0037944	0.0020827
995	466178.9	3780881	5.2699E-07	0.0037928	0.0020508
996	466181.8	3780872	5.2488E-07	0.0037909	0.0020137
997	466184.6	3780862	5.224E-07	0.0037897	0.0019565
998	466187.5	3780853	5.1962E-07	0.003788	0.0019189
999	466190.4	3780843	5.1649E-07	0.0037936	0.0018445
1000	466193.3	3780834	5.1309E-07	0.0037875	0.0018666
1001	466196.2	3780824	5.0933E-07	0.0037796	0.0018744
1002	466199.1	3780815	5.0534E-07	0.0037701	0.0018672
1003	466202	3780805	5.0107E-07	0.003759	0.001875
1004	466204.9	3780796	4.9655E-07	0.0037464	0.0018819
1005	466207.8	3780786	4.9181E-07	0.0037323	0.00185
1006	466210.7	3780777	4.8683E-07	0.0037166	0.0017961
1007	466213.6	3780767	4.8156E-07	0.0036994	0.0018065
1008	466216.5	3780758	4.7613E-07	0.0036808	0.0018179
1009	466219.4	3780748	4.7052E-07	0.0036611	0.0018215
1010	466222.3	3780739	4.6459E-07	0.0036396	0.0018067
1011	466225.1	3780729	4.5842E-07	0.0036167	0.0017743
1012	466228	3780720	0.000000452	0.0035924	0.001742
1013	466230.9	3780710	4.4528E-07	0.0035665	0.0017733
1014	466233.8	3780701	4.3815E-07	0.0035388	0.0017889
1015	466236.7	3780691	4.308E-07	0.0035097	0.0018
1016	466239.6	3780682	4.2327E-07	0.0034794	0.0018326
1017	466242.5	3780672	4.1548E-07	0.0034476	0.0018461
1018	466245.4	3780662	4.0737E-07	0.0034142	0.00184
1019	466248.3	3780653	3.9903E-07	0.0033781	0.0018159
1020	466251.2	3780643	3.9054E-07	0.0033403	0.0018603
1021	466254.1	3780634	3.819E-07	0.0033014	0.0018837
1022	466257	3780624	3.7299E-07	0.0032608	0.001886
1023	466259.9	3780615	3.6385E-07	0.0032187	0.0018684
1024	466262.7	3780605	3.544E-07	0.0031748	0.0018316
1025	466265.6	3780596	3.4474E-07	0.0031296	0.0017769
1026	466268.5	3780586	3.3486E-07	0.003083	0.0017725
1027	466271.4	3780577	3.2478E-07	0.0030352	0.0017911
1028	466274.3	3780567	3.1434E-07	0.0029856	0.0017988
1029	466277.2	3780558	3.0346E-07	0.0029336	0.0017912
1030	466280.1	3780548	2.9242E-07	0.0028806	0.001767
1031	466283	3780539	2.8099E-07	0.0028257	0.001727
1032	466285.9	3780529	2.6945E-07	0.0027701	0.0016734
1033	466288.8	3780520	2.5774E-07	0.0027134	0.0016554
1034	466291.7	3780510	2.4581E-07	0.0026556	0.0017013

REC	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1035	466294.6	3780501	2.3344E-07	0.0025955	0.0017437
1036	466297.5	3780491	2.2091E-07	0.0025343	0.0017718
1037	466300.4	3780482	2.0822E-07	0.0024722	0.0017833
1038	466303.2	3780472	1.9538E-07	0.002409	0.0017806
1039	466306.1	3780463	1.825E-07	0.0023454	0.0017652
1040	466309	3780453	1.6963E-07	0.0022815	0.0017628
1041	466311.9	3780444	1.5686E-07	0.0022176	0.0017597
1042	466314.8	3780434	1.4423E-07	0.0021538	0.0017428
1043	466317.7	3780424	1.3185E-07	0.0020906	0.0017239
1044	466320.6	3780415	1.1986E-07	0.0020285	0.0017094
1045	466323.5	3780405	1.0848E-07	0.0019685	0.0016818
1046	466326.4	3780396	9.7725E-08	0.0019105	0.0016444
1047	466329.3	3780386	8.781E-08	0.0018554	0.0016371
1048	466332.2	3780377	7.8823E-08	0.0018036	0.0016178
1049	466335.1	3780367	7.0781E-08	0.0017551	0.0015867
1050	466338	3780358	6.3723E-08	0.0017101	0.0015448
1051	466340.8	3780348	5.7606E-08	0.0016686	0.0014943
1052	466343.7	3780339	5.2347E-08	0.0016307	0.0014377
1053	466346.6	3780329	4.7713E-08	0.0015952	0.0013884
1054	466349.5	3780320	4.3571E-08	0.0015614	0.0013706
1055	466352.4	3780310	3.9826E-08	0.0015291	0.0013479
1056	466355.3	3780301	3.6382E-08	0.0014977	0.0013175
1057	466358.2	3780291	3.3214E-08	0.0014675	0.001301
1058	466361.1	3780282	3.0267E-08	0.0014378	0.0012968
1059	466364	3780272	2.757E-08	0.0014094	0.001287
1060	466366.9	3780263	2.5098E-08	0.001382	0.0012715
1061	466369.8	3780253	2.2793E-08	0.0013551	0.0012525
1062	466372.7	3780244	2.0667E-08	0.0013289	0.0012272
1063	466375.6	3780234	1.8719E-08	0.0013038	0.0012094
1064	466378.5	3780225	1.6919E-08	0.0012794	0.0011929

APPENDEIX I MODELING FILES

Modeling Files are available at:

http://bit.ly/2D9HKvx

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APPENDIX J POLICY

J.1 – 2016 AQMP Stationary Source Ozone Control Measures

J.2 – 2016 AQMP Mobile Source Ozone Control Measures

J.3 – 2016 AQMP $PM_{2.5}$ Control Measures

J.4 – Summary of Clean Communities Plan Measures

J.5 – Summary of County of San Bernardino General Plan Air Policies

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Table J.1 2016 AQMP Stationary Source Ozone Control Measures

ID	Title	Emission Reductions (tpd) (2023/2031)	Applies to Project?
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	2.5 / 6	No, stationary sources are electrified.
CMB-02	Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications [NOx]	1.1 / 2.8	No, Project is not commercial or residential.
CMB-03	Emission Reductions from Non- Refinery Flares [NOx, VOC]	1.4 / 1.5	No, Project has no flare.
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	0.8 / 1.6	No, Project is not a restaurant.
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	0 / 5 [a]	No, Project would not trigger RECLAIM.
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	TBD [b]	No, Project does not affect AQMD programs, policies or incentives.
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.3 / 1.1	No, Project is not commercial or residential
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	TBD [b]	No, Project would not build new structures with roofs.
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	1.2 / 2.1	No, Project is not residential.
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A [c]	No, Project does not affect AQMD education and public outreach.
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	N/A [c]	No, Project excludes stationary combustion.
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD [b]	No, Project has no affect on AQMD ability to revise BARCT.
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.07 / 0.29 [d]	No, Project is not residential or commercial.
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	0.2 / 0.3 [d]	No, Project is not residential.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	1.2 / 2.8 [d]	No, Project excludes stationary combustion.

ID	Title	Emission Reductions (tpd) (2023/2031)	Applies to Project?
CMB-03	Emission Reductions from Non- Refinery Flares [NOx, VOC]	0.4 / 0.4 [d]	No, Project has no flares.
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	1.5 / 1.8 [d]	No, Project has no greenwaste or composting.
FUG-01	Improved Leak Detection and Repair [VOC]	2 / 2	No, Project has no systems that require leak detection.
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	1 / 2	No, Project uses no coating, solvent, adhesive or sealant.
FLX-02	Stationary Source VOC Incentives [VOC]	TBD [b]	No, Project has no VOC emitting stationary sources.

[a] 5 tpd reduction by 2025.

[b] TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventories and cost-effective control approaches are identified, and are not relied upon for attainment demonstration purposes.

[c] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.

[d] Corresponding VOC reductions from other measures.

Table J.2 2016 AQMP Mobile Source Ozone Control Measures

ID	Title	Emission Reductions (tpd) (2023/2031)	Applies to Project?
EGM-01	Emission Reductions from New Development and Redevelopment Project [All Pollutants]	TBD [a]	Potentially, see Impact Section of AQCCIA.
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	TBD [b]	No, Project is not a marine port.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	TBD	No, Project does not have a rail component.
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	TBD	No, Project is not a warehouse.
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	TBD [b]	No, Project is not an airport.
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	TBD [a]	No, Project does not affect AQMD/ARB incentive funding.
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	TBD [a]	No, Project does not affect AQMD/ARB incentive funding.
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	TBD [a]	No, Project does not affect AQMD/ARB incentive funding.
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	TBD [a]	No, Project does not affect AQMD/ARB incentive funding.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	TBD [a]	No, Project does not affect AQMD's ERC program.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	2.0 / 2.0	No, Project does not affect AQMD's ability to extend SOON program.
MOB-11	Extended Exchange Program [VOC,NOx, CO]	2.9 / 1.0 [NO_X)	No, Project does not affect lawnmower or leafblower exchange program
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	TBD [b]	No, Project has no rail component.

ID	Title	Emission Reductions (tpd) (2023/2031)	Applies to Project?
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	TBD [a]	No, Project does not affect AQMD's ERC program.
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	11 / 7.8 [NO_X}	No, Project does not affect AQMD/ARB incentive funding.

[a] Emission reductions will be determined after projects are identified and implemented.

[b] Submitted into SIP as part of Rate-of-Progress reporting or in baseline inventories for future AQMP/SIP Revisions.

Table J.3 2016 AQMP $PM_{2.5}$ Control Measures

ID	Title	Emission Reductions (tpd) (2021/2025)	Applies to Project?
BCM-01	Further Emission Reductions from Commercial Cooking [PM]	0 / 3.3*	No, Project has no commercial cooking.
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD [a]	No, Project has no cooling towers.
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD [a]	No, Project has no Paved Road Dust Sources
BCM-04	Emission Reductions from Manure Management Strategies [NH3]	0.26 / 0.2 [NH3]	No, Project does not manage manure.
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD [a]	No, Project does not use ammonia to control NO_X.
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD [a]	No, Project does not have abrasive blasting component.
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD [a]	No, Project does not have stone grinding, cutting, or polishing component.
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD [a]	No, Project is not agricultural.
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD [a]	No, Project has no wood burning fireplace.
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	0.1 / 0.1 [NH3]	No, Project has no green waste.

* Contingency measure.

a TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventory and cost-effective control approach are identified, and are not relied upon for attainment demonstration purposes.

Table J.4 Summary of Clean Communities Plan Measures

Measure/Objective	Implementation Approach	Applies to Project?
Community Exposure Reduction Measures		
Community-01: Community Exposure Reduction Plan AQMD staff will develop Community Exposure Reduction Plans tailored to address air-related issues in specific communities.	Six-phase pilot study: • Phase 1: Selection of two pilot communities. • Phase 2: Stakeholder Input. • Phase 3: Investigation and Data Validation. • Phase 4: Implementation of Immediate Action Items. • Phase 5: Development of Community Exposure Reduction Plan. • Phase 6: Implementation of Community Exposure Reduction Plan.	No, Project is not a community.
Community-02: Community Guidance for Reducing Air Toxic Exposure Provide a process for communities and local governments to follow in developing Community Exposure Reduction Plans with AQMD assistance.	• Develop a process, somewhat similar to the process followed in the pilot study of Community-01, that will guide communities and local governments to develop CERPs with AQMD assistance. • Update the process as experience is gained in developing CERPs.	No, Project is not a community or local government.
Community-03: Greening Communities through Accelerated Toxic Emission Reduction Projects for Existing Sources Reduce existing toxic emissions from older toxic emitting sources in residential communities disproportionately impacted by toxic emission sources.	• Identify disproportionately-impacted communities and assess cumulative impacts. • Retrofit or replace existing toxic sources. • Establish funding for emission reduction programs. • Provide outreach and education for permitted and unpermitted sources of emissions.	No, Project does not affect a disproportionately-impacted community or conflict with identification of such communities.
Community Participation Measures		
Participation-01: Clean Communities Pledge Develop a "Clean Communities Pledge" that will encourage local government participation in air quality training and outreach programs.	• Develop a "Clean Communities Pledge". • Recognize achievements of participating members.	No, Project is not a local government.
Participation-02: Clean Schools Pledge Empower schools to take practical steps to reduce school children's exposure to air pollution. Increase participation and awareness of AQMD programs and guidelines among local school districts.	• Develop a "Clean Schools Pledge". • Advocate school participation in air quality-related programs. • Recognize achievements of participating members.	No, Project is not a school.
Participation-03: Enhanced AQMD Community Meetings Further engage the public to inform the AQMD of air quality issues in communities.	• Continue and enhance existing AQMD community meetings to include round table discussions to further understand community concerns.	No, Project does not affect AQMD's ability to have community meetings.
Communication and Outreach Measures		

Measure/Objective	Implementation Approach	Applies to Project?
Outreach-01: Clean Air Toolbox for Local Governments, Communities, and Schools Develop a series of guidance documents that communities can use for planning, making land use decisions, identifying clean air solutions, and key agency contacts for addressing air issues.	Develop a "Clean Air Toolbox" that includes: • "Proximity Matters" advisory document for planners. • CARB's "Land Use Planning Handbook". • Educational and outreach materials.	No, Project does not affect possibility of creating of a Clean Air Toolbox.
Outreach-02: Community Dialogue Improve public access to community-level air quality information by establishing an enhanced and open dialogue between local communities and the AQMD.	• "Ask AQMD" online forum. • Electronic tools.	No, Project does not affect dialogue between communities and AQMD.
Outreach-03: "Playing it Safe" Campaign Increase public awareness for parents, educators, coaches, and youth organizations of when outdoor activities should be curtailed due to air quality concerns. Provide education on the effects of exposure to different air quality situations. Provide sources of additional information.	• Develop a "Playing it Safe" campaign to provide information on the AQMD website on situations when outdoor activities should be curtailed and potential health effects for children. • Develop outreach materials and provide info on AQMD website on situations when outdoor activities should be curtailed and potential health effects for children.	No, Project does not affect AQMD's ability to increase public awareness.
Outreach-04: Cleaner Choices to Reduce School Children's Exposure to Toxics Increase public awareness for parents, educators, and children to make daily choices that will reduce children's exposure to air toxics.	• Educational material development. • Recommendations to reduce exposure to toxics.	No, Project does not affect AQMD's ability to increase public awareness.
Outreach-05: Advocating Toxic-Free Choices Educate the public and increase awareness of ways to minimize or avoid toxic exposure through brochures and online Community Health Bulletins.	• Use several approaches including Community Health Bulletins on TACs, AQMD website enhancements, and brochures to proactively disseminate information to the public on health concerns from TACs and avoiding or minimizing exposure.	No, Project does not affect AQMD's ability to advocate or increase public awareness.
Outreach-06: Business Outreach and Assistance Increase outreach efforts of AQMD's Small Business Assistance Program. Enhance existing services for assistance on permitting and compliance. Develop additional resources available to all businesses.	• Add other means to disseminate information regarding AQMD's Small Business Assistance Program. • Develop an air quality compliance outreach program. • Develop an online forum on AQMD's website where the business community can communicate and share air quality solutions.	No, Project does not affect AQMD's ability to increase outreach efforts to small businesses.
Agency Coordination Measures		

Measure/Objective	Implementation Approach	Applies to Project?
Agency-01: Promoting Better Land-Use Decisions Provide additional tools for local governments to be more proactive and make better informed land- use decisions.	• "Proximity Matters" advisory for planners. • Siting requirements in source-specific toxic rules. • "Reverse" CEQA analysis for sensitive land uses. • Outreach and training. • Early consultation for new projects. • Preliminary site assessment. • CEQA project tracking.	No, Project does not affect AQMD's ability to provide tools for local governments.
Agency-02: Multi-Agency Coordinated Response Improve multi-agency communication by combining jurisdictional efforts to solve complex cross-media issues. Improve agency coordination efforts to resolve air pollution related public health issues.	• Establish an "Interagency Task Force". • Establish process to address recurring issues. • Develop an interagency information sharing system.	No, Project does not affect AQMD's ability to improve multi-agency communication.
Monitoring and Compliance Measures		
Compliance-01: Enhancements to AQMD's Compliance Program Assess compliance presence and response time. Identify mechanisms to improve feedback with the public for reported incidents.	• Assess how resources are deployed to improve compliance presence and response. • Investigate the development of an enhanced tracking and feedback system. • Agreements with other agencies.	No, Project does not affect AQMD's ability to assess compliance.
Compliance-02: Increased Public Awareness and Participation to Enhance Compliance Enhance AQMD's compliance program through additional public participation in compliance activities.	• Public education on air quality issues. • Outreach to improve public awareness and participation. • Enhanced air quality complaint reporting.	No, Project does not affect AQMD's ability to increase public participation in compliance program.
Source Specific Measures		
Stationary-01: Lead Emissions Reduce lead exposure to the public from lead- related activities. Comply with the NAAQS for lead adopted in 2008.	• Action plan development. • Amend Rule 1420 to address smaller lead-emitting facilities.	No, Project is not a source type for which lead is a concern.
Stationary-02: Lead Paint for Pre-1978 Structures Further reduce lead exposure to children from renovation or demolition of existing sources. Innovative approaches to reduce lead exposure. Assist in enforcing new US-EPA standard.	• Public outreach and online information. • Determine feasibility of development of more stringent lead rules.	No, Project does not affect AQMD's ability to regulate renovation or demolition.

Measure/Objective	Implementation Approach	Applies to Project?
Stationary-03: Identifying New Sources Proactively identify potential air toxic sources in the District through rigorous and systematic research methods.	Develop a multi-step approach for identifying sources emitting selected, highly toxic air contaminants including: • Literature searches. • Evaluation of rare and exotic TACs. • Investigative monitoring and sampling.	No, Project does not affect AQMD's ability to identify potential air toxic sources.
Stationary-04: Alternative Assessment for Use of Acutely Hazardous Materials For new or modified sources, use CEQA process to evaluate substitution of acutely hazardous materials with less hazardous materials, where possible.	• Where applicable, during the permitting and CEQA review process, evaluate uses of acutely hazardous materials to identify where less hazardous alternatives can be substituted. • Work with other agencies to ensure that substitutions do not duplicate and are not in conflict with other programs.	No, the Project does not involve acutely hazardous materials.
Stationary-05: Indirect Sources Develop approaches for reducing exposure to diesel PM from facilities with associated diesel- fueled vehicle emissions.	Multi-step approach to reduce diesel PM emissions from sources associated with diesel mobile source emissions: • Step 1: Establish applicability criteria. • Step 2: Develop list of implementation options for diesel PM reduction. • Step 3: Compliance Plan submittal.. • Step 4: Diesel Reduction Plan.	No, Project does not affect AQMD's ability to develop approaches for reducing exposure to diesel PM.
Public Nuisance Measures		
Nuisance-01: Nuisance Rule Enhance effectiveness of AQMD Nuisance Rule 402.	• Evaluate and consider revisions to Rule 402 and "Policies and Procedures on Public Nuisance Investigation".	No, Project does not affect AQMD's ability to propose amendments to Rule 402.
Nuisance-02: Source-Specific Nuisance Rules Address nuisance issues through industry-specific rules or programs.	• Identify persistent odor issues and develop industry-specific rules or programs to reduce odors. • Conduct research on a systematic, scientifically-based odor nuisance resolution practice.	No, Project does not affect AQMD's ability to propose new rules or amendments to existing rules.

J.5 Summary of County of San Bernardino General Plan Air Policies

Policy or Program		Applies to Project?
Policy CO 4.1:	Because developments can add to the wind hazard (due to increased dust, the removal of wind breaks, and other factors), the County will require either as mitigation measures in the appropriate environmental analysis required by the County for the development proposal or as conditions of approval if no environmental document is required, that developments in areas identified as susceptible to wind hazards to address site-specific analysis of: a. Grading restrictions and/or controls on the basis of soil types, topography or season. b. Landscaping methods, plant varieties, and scheduling to maximize successful revegetation. c. Dust-control measures during grading, heavy truck travel, and other dust generating activities.	Yes, however, the appropriate environmental analysis has been conducted and is the purpose of this report. Therefore, while this policy applies to the project, its requirements are satisfied by the existence of the Report.
Policy CO 4.2:	Coordinate air quality improvement technologies with the South Coast Air Quality Management District (SCAQMD) and the Mojave Air Quality Management District (MAQMD) to improve air quality through reductions in pollutants from the region.	No, project does not interfere with the County's ability to coordinate with SCAQMD or MAQMD.
Policy CO 4.3:	The County will continue to ensure through coordination and cooperation with all airport operators a diverse and efficient ground and air transportation system, which generates the minimum feasible pollutants. Programs 1. Establish incentives and/or regulations to eliminate work trips including such actions as: a. Implementing staggered, flexible and compressed work schedules in public agencies. b. Requiring work schedule flexibility programs for employers with more than 25 employees at a single location. Apply to existing businesses at license renewal time and to new businesses at project approval or permit stage. 2. Participate with public transit providers serving San Bernardino County in a cooperative program to increase transit services with existing equipment and expand services through transit facility improvements. 3. Coordinate with public transit providers to increase funding for transit improvements to supplement other means of travel. 4. Support public transit providers in efforts to increase funding for transit improvements to supplement other means of travels.	No, project does not interfere with the County's ability to establish incentives, participate with public transport providers, coordinate with public transit providers, or support public transport providers. Additionally, project employees already adhere to a non-standard work schedule.

Policy or Program		Applies to Project?
Policy CO 4.4:	Because congestion resulting from growth is expected to result in a significant increase in the air quality degradation, the County may manage growth by insuring the timely provision of infrastructure to serve new development. Programs 1. Consistent with the land use designations in the Land Use Policy Map (see the Land Use Element) that will improve growth management at a subregional level in relation to major activity centers, review new development to encourage new intensified development around transit nodes and along transit corridors. 2. Locate and design new development in a manner that will minimize direct and indirect emission of air contaminants through such means as: a. Promoting mixed-use development to reduce the length and frequency of vehicle trips; b. Providing for increased intensity of development along existing and proposed transit corridors; and c. Providing for the location of ancillary employee services (including but not limited to child care, restaurants, banking facilities, convenience markets) at major employment centers for the purpose of reducing midday vehicle trips. d.The County shall comply, to the extent feasible, with the recommendations on siting new sensitive land uses, as recommended in California Air Resources Board's Air Quality and Land Use Handbook: A Community Health Perspective, which includes the following: Notable siting recommendations include avoiding siting new sensitive land uses within: • 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day; • 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units per day, or where transport refrigeration units exceed 300 hours per week); • 1,000 feet of a chrome plater; • 300 feet of any dry cleaning operation; and 300 feet of a large gas station (defined as a facility with a through put of 3.6 million gallons per year or greater); a 50 foot separation is recommended for typical gas dispensing facilities 3. Incorporate phasing policies and requirements in the General Plan and development plans to achieve timely provision of infrastructure (particularly transportation facilities) to serve development through: a. Tying growth to Level of Service (LOS) standards; and b. Using phasing areas to manage growth.	1. No, project does not interfere with the County's ability to encourage development around transit nodes. 2. No, project does not affect cities ability to provide or promote any mentioned services, and the project does not affect the County's decision making process of sensitive land use siting. 3. No, project does not interfere with the County's ability to incorporate phasing policies.

Policy or Program		Applies to Project?
Policy CO 4.5:	Reduce emissions through reduced energy consumption. Programs 1. Implement programs to phase in energy conservation improvements through the annual budget process.	No, project does not interfere with the County's ability to implement programs.
Policy CO 4.6:	Provide incentives such as preferential parking for alternative-fuel vehicles (e.g., CNG or hydrogen).	No, project does not interfere with the County's ability to provide incentives.
Policy CO 4.7:	Encourage special event center operators to provide discounted transit passes with event tickets or offer discounted on-site parking for carpooling patrons (for or more persons per vehicle).	No, project does not interfere with the County's ability to encourage special event center operators.
Policy CO 4.8:	Replace existing vehicles in the County fleet with the cleanest vehicles commercially available that are cost-effective and meet the vehicle use needs.	No, project does not interfere with the County's ability to replace county fleet vehicles.
Policy CO 4.9:	9 Manage the County's transportation fleet fueling standards to improve the number of alternative fuel vehicles in the County fleet.	No, project does not interfere with the County's ability to manage the County's transportation fleet fueling standards.
Policy CO 4.10:	Support the development of alternative fuel infrastructure that is publicly accessible.	No, project does not interfere with the County's ability to develop fuel infrastructure.
Policy CO 4.11:	Establish programs for priority or free parking on County streets or in County parking lots for alternative fuel vehicles.	No, project does not interfere with the County's ability to establish parking programs.
Policy CO 4.12:	Provide incentives to promote siting or use of clean air technologies (e.g., fuel cell technologies, renewable energy sources, UV coatings, and hydrogen fuel).	No, project does not interfere with the County's ability to provide incentives.

Policy or Program		Applies to Project?
Policy CO 4.13:	Reduce Greenhouse Gas (GHG) emissions within the County boundaries. Programs 1. Emission Inventories. The County will prepare GHG emissions inventories including emissions produced by: (1) the County's operational activities, services and facilities, over which the County has direct responsibility and control, and (2) private industry and development, that is located within the area subject to the County's discretionary land use authority. a) Establish an inventory of existing GHG emissions. b) Establish a projected inventory for year 2020. 2. GHG Emissions Reduction Plan. The County will adopt a GHG Emissions Reduction Plan that includes: a) Measures to reduce GHG emissions attributable to the County's operational activities, services and facilities, over which the County has direct responsibility and control; and, b) Measures to reduce GHG emissions produced by private industry and development that is located within the area subject to the County's discretionary land use authority and ministerial building permit authority; and, c) Implementation and monitoring procedures to provide periodic review of the plan's progress and allow for adjustments over time to ensure fulfillment of the plan's objectives.	No, project does not interfere with the County's ability to adopt a plan that will monitor, measure, or reduce GHG emissions.

J.6 Federal GHG Actions

Date	Action	Description
April 2, 2007	*Massachusetts v. EPA*, 549 U.S. 497	Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. (528-29.)
September 22, 2009	Mandatory Reporting Rule	This rule and subsequent rules which amend 40 CFR Part 98 require and govern the collection accurate and timely data on GHG emissions that can be used to inform future policy decisions.
December 7, 2009	EPA Endangerment Findings	• Elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding." • Combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding." (*Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (Dec. 15, 2009) 74 Fed. Reg. 66496, 546.)

Date	Action	Description
December 19, 2007	Energy Independence and Security Act (EISA)	• Increase the supply of alternative fuel sources by requiring fuel producers to use at least 36 billion gallons of biofuel in 2022. • Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and establish a fuel economy program for medium and heavy duty vehicles. • Prescribe or revise standards affecting regional efficiency for heating and cooling products.
April 2010, September 2011, and August 2012	EPA and NHTSA Joint Final Rules for Vehicle Standards	• In 2010, established a National program consisting of new standards for light-duty vehicles model years 2012 through 2016 which achieve the 250 g CO_2/mile (35 mpg) target in the EISA beginning with the 2016 model year fleet. • In 2011, approved GHG emissions standards for medium and heavy duty trucks model years 2014 through 2018. • In 2012, approved standards for model year 2017 and beyond light duty vehicles to 163 g CO_2/mile (i.e., 54.5 mpg if achieved only by fuel efficiency) for model year 2025.
January 2, 2011	Clean Air Act Permitting for GHGs	On June 23, 2014, the U.S. Supreme Court issued its decision in Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014) ("UARG"). The Court held that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT).
August 3, 2015	Clean Power Plan	The Plan provides standards for power plants, customized goals for states to cut the carbon pollution from power plants, national consistency, accountability and a level playing field while reflecting each state's energy mix. On February 9, 2016, the Supreme Court stayed implementation of the Clean Power Plan pending judicial review. EPA claims "The Court's decision was not on the merits of the rule. EPA firmly believes the Clean Power Plan will be upheld when the merits are considered because the rule rests on strong scientific and legal foundations."

Table J.7 CARB Climate Change Policies and Measures

Recommended Action	Applies to Project?
Implement SB 350 by 2030: • Increase the Renewables Portfolio Standard to 50 percent of retail sales by 2030 and ensure grid reliability. • Establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030. • Reduce GHG emissions in the electricity sector through the implementation of the above measures and other actions as modeled in IRPs to meet GHG emissions reductions planning targets in the IRP process. Load-serving entities and publicly- owned utilities meet GHG emissions reductions planning targets through a combination of measures as described in IRPs.	No, Project will purchase grid electricity.
Implement Mobile Source Strategy (Cleaner Technology and Fuels): • At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025. • At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030. • Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean Cars regulations. • Medium- and heavy-duty GHG Phase 2. • Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low-NO_X standard. • Last Mile Delivery: New regulation that would result in the use of low NO_X or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for class 3-7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030. • Further reduce VMT through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."	No, Project vehicles are heavy-heavy duty and were not subject to heavy-duty GHG Phase 1 regulations. Thus, they would be unlikely to be subject to these measures.
Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).	No, Project does not affect SB 375 targets.
By 2019, adjust performance measures used to select and design transportation facilities. • Harmonize project performance with emissions reductions, and increase competitiveness of transit and active transportation modes (e.g. via guideline documents, funding programs, project selection, etc.).	No, Project does not affect viability of transit or active modes.
By 2019, develop pricing policies to support low-GHG transportation (e.g. low-emission vehicle zones for heavy duty, road user, parking pricing, transit discounts).	No, Project does not affect government pricing policies.
Implement California Sustainable Freight Action Plan: • Improve freight system efficiency. • Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.	No, Project does not affect whether Freight Action Plan can be implemented.

Recommended Action	Applies to Project?
Adopt a Low Carbon Fuel Standard with a CI reduction of 18 percent.	No, Project does not affect CARB's ability to adopt standards.
Implement the Short-Lived Climate Pollutant Strategy by 2030: • 40 percent reduction in methane and hydrofluorocarbon emissions below 2013 levels. • 50 percent reduction in black carbon emissions below 2013 levels.	No, Project does not affect whether SLCP strategy can be implemented.
By 2019, develop regulations and programs to support organic waste landfill reduction goals in the SLCP and SB 1383.	No, Project does not affect CARB's ability to adopt regulations.
Implement the post-2020 Cap-and-Trade Program with declining annual caps.	No, Project does not affect CARB's ability to implement Cap-and-Trade.
By 2018, develop Integrated Natural and Working Lands Implementation Plan to secure California's land base as a net carbon sink: • Protect land from conversion through conservation easements and other incentives. • Increase the long-term resilience of carbon storage in the land base and enhance sequestration capacity • Utilize wood and agricultural products to increase the amount of carbon stored in the natural and built environments • Establish scenario projections to serve as the foundation for the Implementation Plan	No, Project does not affect ability to develop such a plan.
Establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018.	No, Project does not affect ability to establish such a framework.
Implement Forest Carbon Plan	No, Project does not affect abiliby to imiplement such a plan.
Identify and expand funding and financing mechanisms to support GHG reductions across all sectors.	No, Project does not affect whether CARB can identify and expand funding.

Source: (CARB, 2017, pp. 103-104).

J.8 Summary of Applicable City of San Bernardino General Plan Air Policies

Policy	Applies to Project?
Policy 12.4.2 Impose conditions and enforce mitigation measures on mining operations to reduce dust, noise, and safety hazards associated with removal of construction aggregate and minimize impacts on adjacent properties and environmental resources.	Yes, project will comply with applicable city mandated mitigation measures.
Policy 12.4.8 Require that new, non-mining land uses adjacent to existing mining operations be designed to provide a buffer between the new development and the mining operations. The buffer distance shall be based on an evaluation of noise, aesthetics, drainage, operating conditions, biological resources, topography, lighting, traffic, operating hours, and air quality. (LU-1)	No, project land use is mining.
Policy 12.5.1 Reduce the emission of pollutants including carbon monoxide, oxides of nitrogen, photochemical smog, and sulfate in accordance with South Coast Air Quality Management District (SCAQMD) standards.	Yes, the appropriate SCAQMD standards have been followed and are explained in detail by the Report.
Policy 12.5.2 Prohibit the development of land uses (e.g. heavy manufacturing) that will contribute significantly to air quality degradation, unless sufficient mitigation measures are undertaken according SCAQMD standards.	No, this HRA has determined that the Project will not contribute significantly to air quality degradation. Additionally, the Project will follow SCAQMD standards.
Policy 12.5.3 Require dust abatement measures during grading and construction operations. (LU-1)	Yes, and the Project will utilize dust abatement measures during grading as specified in The Report.
Policy 12.5.4 Evaluate the air emissions of industrial land uses to ensure that they will not impact adjacent uses.	Yes, the preparation of this Report serves as an evaluation which is available to the City.
Policy 12.7.1 Cooperate with the South Coast Air Quality Management District and incorporate pertinent local implementation provisions of the Air Quality Management Plan.	Yes, see Report for a complete breakdown of applicable SCAQMD policies.
Policy 12.7.2 Work with the South Coast Air Quality Management District to establish controls and monitor uses in the City that could add to the air basin's degradation (e.g. auto repair, manufacturers).	Yes, this Report provides information to the SQAMD in order to facilitate monitoring.
Policy 12.7.3 Coordinate with SCAQMD to ensure that all elements of air quality plans regarding reduction of air pollutant emissions are being enforced.	Yes, this Report provides information to the SQAMD in order to facilitate compliance.

Policy	Applies to Project?
Policy 12.7.4 Work with the other cities in the South Coast Air Basin to implement regional mechanisms to reduce air emissions and improve air quality.	No, the Project is not a city in the South Coast Air Basin.
Policy 12.7.5 Support legislation that promotes cleaner industry, clean fuel vehicles, and more efficient burning engines and fuels.	Yes, the Project may be subject to and will cooperate with applicable legislation.
Policy 12.7.6 Encourage, publicly recognize, and reward innovative approaches to improve air quality.	Yes, the Project reduces emissions of certain criteria pollutants and therefore may be subject to recognition or rewards.
Policy 12.7.7 Involve environmental groups, the business community, special interests, and the general public in the formulation and implementation of programs that actively reduce airborne pollutants.	No, the Project will not interfere with the City's ability to implement programs.