

## **APPENDIX D**

### **AIR QUALITY ASSESSMENT**

***UPPER ROAD RESIDENTIAL LAND  
DIVISION CONSTRUCTION HEALTH RISK  
ASSESSMENT  
ROSS, CALIFORNIA***

**April 9, 2013**



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## **Introduction**

This report presents the environmental construction air quality assessment conducted for the Upper Road land Division proposed on a 36 (+/-) acre parcel of vacant hillside land on the southeastern flank of Bald Hill, which in turn lies on the northern slopes of Mount Tamalpais, in the western area of the Town of Ross in Marin County, California. The site abuts Marin Municipal Water District (MMWD) lands and Natalie Coffin Greene Park on the west and southerly sides. Private lands, which are mostly developed with single-family homes on large lots, abut the site to the north and easterly sides.

The project proposes to subdivide the site into three residential parcels. Access to the three home sites would be via a 20-foot wide private road and 12 foot wide common driveways. The air quality issue evaluated in this air quality assessment addresses short-term impacts on existing sensitive development near the site due to construction. The use of diesel-powered off-road equipment and trucks to construct the project would temporarily emit diesel particulate matter, a toxic air contaminant that could adversely affect nearby residences (i.e., sensitive receptors). This analysis addresses these impacts for the proposed project as well as a construction alternative that would involve the removal of cut soils from the project site by truck.

The proposed project would construct a new roadway to access the three residential building pads. This would result in a total cut and fill including a fluff of approximately 27,000 cubic yards of soil. The project objectives of balancing cut and fill on-site and reducing road grades is proposed to be accomplished by taking the cut material from the road system and incorporating it into a single fill pad on Parcel 1 with irregular contours which preserve the adjacent Redwood grove and swales. A series of six terraced concrete retaining walls of approximately six feet in height would also be constructed on Parcel 1 to buttress the fill material. An alternative that involves off-hauling of the soil was evaluated.

The majority of construction emissions are anticipated during site grading and the construction of the infrastructure (i.e., roadways, utilities and driveways). Specific residential building designs are not proposed at this time and none would be reviewed as a part of the current application. However, estimates of construction activity for three residential dwellings and associated emissions were included in this analysis.

## **Discussion of TACs**

Toxic Air Contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer or serious illness) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a highway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state and federal level. The identification, regulation and

monitoring of TACs is relatively new compared to that for criteria air pollutants that have established ambient air quality standards. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an ambient air quality standard or emission-based threshold.

### ***Diesel Particulate Matter***

Diesel exhaust, in the form of diesel particulate matter (DPM), is the predominant TAC in urban air with the potential to cause cancer. It is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to the CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the federal Hazardous Air Pollutants programs. California has adopted a comprehensive diesel risk reduction program. The U.S. EPA and the CARB have adopted low-sulfur diesel fuel standards in 2006 that reduce diesel particulate matter substantially. The CARB recently adopted new regulations requiring the retrofit and/or replacement of construction equipment, on-highway diesel trucks and diesel buses in order to lower fine particulate matter (PM<sub>2.5</sub>) emissions and reduce statewide cancer risk from diesel exhaust.

### ***Fine Particulate Matter (PM<sub>2.5</sub>)***

Particulate matter in excess of state and federal standards represents another challenge for the Bay Area. Elevated concentrations of PM<sub>2.5</sub> are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

### ***Sensitive Receptors***

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. For cancer risk assessments, children are the most sensitive receptors, since they are more susceptible to cancer causing TACs. Residential locations are assumed to include infants and small children. The closest sensitive receptors to the project site are single-family residences located north and east of the site boundaries as well as residences along Upper Road that would be adjacent to truck traffic.

## **Thresholds of Significance**

The Bay Area Air Quality Management District (BAAQMD) identified significance thresholds for exposure to TACs and PM<sub>2.5</sub> as part of its May 2011 CEQA Air Quality Guidelines<sup>1</sup> that were recently called into question by an order issued March 5, 2012, in *California Building*

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<sup>1</sup> BAAQMD, 2011. *BAAQMD CEQA Air Quality Guidelines*. May. Updated May 2012 after the 2011 version was vacated by a 2012 court ruling.

*Industry Association v. BAAQMD* (Alameda Superior Court Case No. RGI0548693). The order requires BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The claims made in the case concerned the environmental impacts of adopting the thresholds, that is, how the thresholds would indirectly affect land use development patterns. Those issues are not relevant to the scientific basis of BAAQMD's analysis of what levels of pollutants should be deemed significant.

This analysis considers the science informing the thresholds as being supported by substantial evidence. Scientific information supporting the thresholds was documented in BAAQMD's proposed thresholds of significance analysis.<sup>2</sup> The thresholds will not cause any indirect impact in terms of land use development patterns insofar as this project is concerned, because the proposal to construct the project is not influenced by the BAAQMD guidelines. Accordingly, this report uses the thresholds and methodologies from BAAQMD's May 2011 CEQA Air Quality Guidelines to determine whether there would be any project construction health risk impacts. The following are the significance criteria that are used to judge this project's impacts:

If emissions of TACs or PM<sub>2.5</sub> exceed any of the thresholds of significance listed below, the proposed project would result in a significant impact and mitigation would be required.

- An excess cancer risk level of more than 10 in 1 million, or a non-cancer (chronic or acute) hazard index greater than 1.0.
- An incremental increase of more than 0.3 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) annual average PM<sub>2.5</sub>.

## **Construction Impacts – Community Risk**

This analysis addresses impacts from construction TAC emissions caused by the proposed project. The closest existing residences to the project site are residences located to the north and the east of the project boundary (see Figure 1). A screening health risk assessment of the project construction activities was conducted that evaluated potential health effects at these nearby sensitive receptors from construction emissions of DPM. A dispersion model was used to predict the off-site concentrations resulting from project construction so that lifetime cancer risks could be predicted. Figure 1 shows the project site and sensitive receptor locations (residences) used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

Construction period diesel exhaust emissions were computed using California Emissions Estimator Model (CalEEMod) version 2011.1.1 for off-road construction equipment and from the EMFAC2011 model for emissions from trucks (e.g., haul trucks and water trucks). The number and types of construction equipment and diesel vehicles, along with the anticipated length of their use, for the grading phase of construction were based on a site-specific activity schedule. This included the estimated number of days the equipment would operate for each phase and the average number of hours per day of operation. Off-road equipment horsepower estimates were based on the defaults used by CalEEMod, unless otherwise provided by the applicant. The model default emission rates for construction equipment were assumed.

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<sup>2</sup> BAAQMD, 2009. *California Environmental Quality Act Guidelines Update Proposed Thresholds of Significance*. December.

Construction of the project is anticipated to occur over about an 18-month period starting in 2014. Construction emissions were computed for the following phases:

Grading and site preparation. On-site and off-site construction emissions associated with site preparation, grading/excavation and placement of infrastructure were computed using CalEEMod for two scenarios: (1) Proposed project with no off-site hauling of soil and (2) Project construction alternative that would include the off-site hauling of excavated soil material. The primary difference is the use of trucks to haul an estimated 27,000 cubic yards (CY) of soil using “Super Dump” type trucks having a capacity of 12 CY. This would require approximately 98 working days with an average of 54 truck trips. The CalEEMod modeling, performed by Tamura and Associates is included as Appendix A. Only the on-site emissions of 0.03 tons of PM<sub>2.5</sub> (60 pounds) exhaust were included for the on-site emissions. Off-site emissions were modeled separately using the CARB’s EMFAC2011 mobile source emissions model for heavy-duty trucks traveling at 10 miles per hour. EMFAC2011 emission rates are also provided in Appendix A.

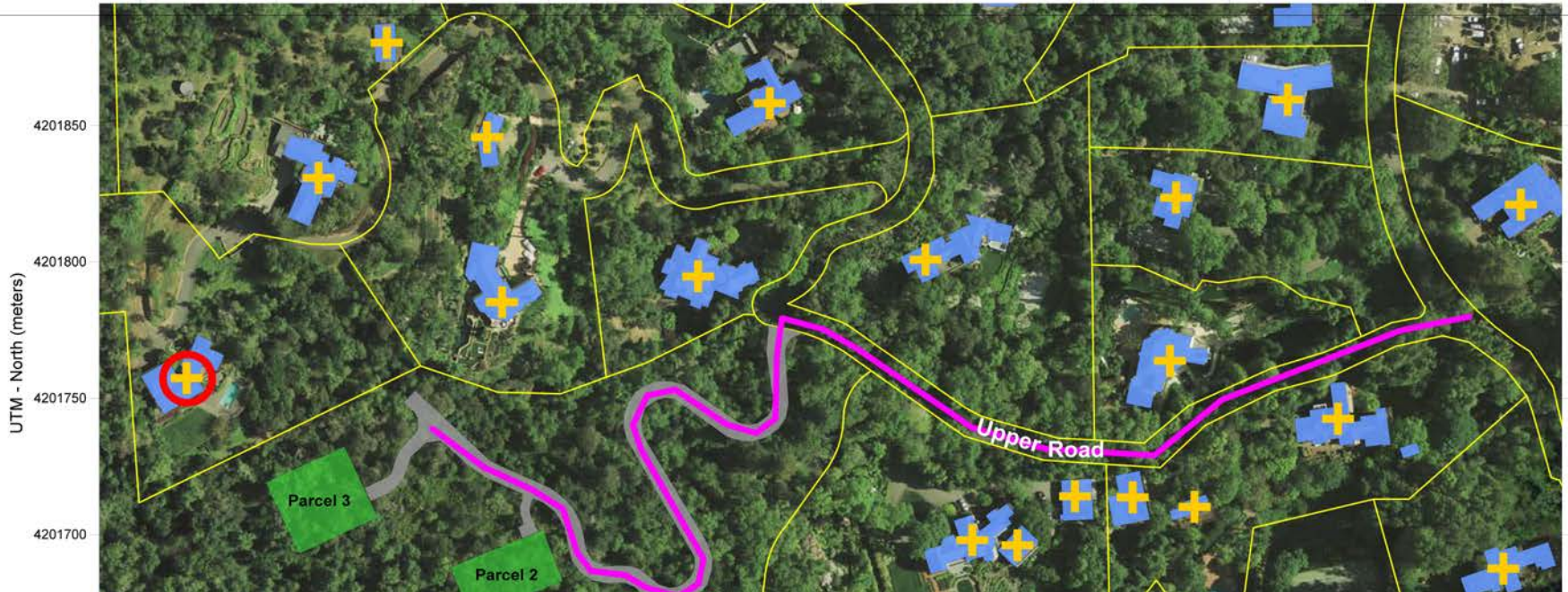
Residential Building Construction. Building construction of 3 residential units was modeled using the CalEEMod model. Project specific estimates for equipment usage and duration were input to the model. These inputs along with the CalEEMod model files are also provided in Appendix B.

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM at existing residences in the vicinity of the project site. The ISCST3 modeling utilized area sources to represent the on-site emissions from project grading and construction areas. Three area sources were used to represent the areas where grading and site preparation would occur and three area sources were used for construction activities, one for each building site. An emission release height of 6 meters was used for all area sources. The elevated source height reflects the height of the equipment exhaust pipes and buoyancy of the exhaust plume. Emissions from truck travel were modeled as a line area source (a series of adjacent line sources along the roadway) extending from the building sites to Upper Road then along Upper Road until the intersection of Upper Road and Glenwood Avenue. DPM concentrations were calculated at nearby sensitive receptors at a breathing height of 1.8 meters (5.9 feet).

Since representative historical meteorological data are not available, the modeling relied upon screening meteorological data provided by the BAAQMD. The screening meteorological data, which are comprised of 54 combinations of wind speed and atmospheric stability that represent meteorological conditions that may exist over a 24-hour period (daytime and nighttime conditions), are based on the meteorological conditions used with by the SCREEN3 model. The screening meteorological conditions were used to model worst-hour concentrations. These worst-hour concentrations were then converted to annual concentrations, needed to address cancer, non-cancer chronic health risk impacts and annual PM<sub>2.5</sub> concentrations, by applying the BAAQMD recommended conversion factor of 0.1 to the 1-hour concentrations.

Dispersion model inputs and excess cancer risk computations are provided in Appendix C.

**Figure 1. Project Construction Site, Off-Haul Route, Sensitive Receptor Locations, and Location of Maximum Exposed Individual (MEI)**



The maximum-modeled DPM concentration occurred at a residence adjacent to the northern boundary of the construction area. The location of this receptor is identified on Figure 1. Increased cancer risks were calculated using the maximum modeled annual DPM concentrations and BAAQMD recommended risk assessment methods that include both child exposures (3rd trimester through two years of age) and adult exposures. Infant and child exposures were assumed to occur at residences throughout the entire construction period.

Predicted excess cancer risk, annual PM<sub>2.5</sub> concentrations and hazard index are reported in Table 1. These are reported for both the proposed project and the project with the off-hauling of soil from the site. Thresholds used to judge the significance of these impacts are also included in Table 1.

**Table 1. Predicted Community Risk Impacts from Construction Activities**

<b>Project Scenario</b>	<b>Excess Cancer Risk (per million)</b>	<b>Annual PM<sub>2.5</sub> Concentration (µg/m<sup>3</sup>)</b>	<b>Hazard Index</b>
Proposed Project	10.1 Child 0.5 Adult	0.12	<0.1
Proposed Project with soil off hauling	10.4 Child 0.5 Adult	0.12	<0.1
<i>BAAQMD Thresholds</i>	<i>10.0</i>	<i>0.3</i>	<i>1.0</i>

Results of this assessment indicate that the maximum construction residential child cancer risk would be 10.1 in one million and a residential adult cancer risk of 0.5 in one million for the proposed project. The child cancer risks slightly exceed the BAAQMD's threshold used for evaluating cancer risk of 10 excess cancer cases per million. The project with the off-haul alternative that includes truck traffic to remove soil would have slightly higher excess child cancer risks. The maximum construction residential excess cancer risk with off hauling would be 10.4 in one million for a child and 0.5 in one million for an adult. The excess child cancer risk associated with this alternative would be significant. Note that the predicted cancer risk is based on the assumption that an infant would be present at the location of maximum risk and would be present at that location almost continuously through the construction period.

The maximum annual PM<sub>2.5</sub> concentrations would be 0.12 µg/m<sup>3</sup>, which would be below the BAAQMD significance threshold of 0.3 µg/m<sup>3</sup>. Associated non-cancer hazards would be well below BAAQMD thresholds for DPM, with a chronic hazard index computed at less than 0.1. This hazard index is much lower than the BAAQMD significance threshold of greater than 1.0 Appendix A and B includes the emission calculations. Appendix C includes dispersion modeling inputs along with the cancer risk calculations.

## **Recommended Mitigation Measures**

Approximately 80 to 85 percent of the excess cancer risk attributable to the entire construction project would result from on-site grading. BAAQMD CEQA Air Quality Guidelines recommend mitigation measures to reduce fugitive dust emissions that also include specific measures to reduce exhaust emissions. These include the following:



1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.


In addition, the project should include the following measure to reduce diesel exhaust emissions during the grading phase of construction:

1. Any diesel-powered construction equipment greater than 50 horsepower in size (including generators and compressors) operated on the site for more than 2 days shall meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent;
2. Minimize the number of hours that equipment will operate including the use of idling restrictions.

Implementation of the BAAQMD recommended mitigation measures, which are basic measures recommended their 2011 CEQA Air Quality Guidelines, is considered to reduce exhaust emissions by 5 percent. Implementation of the recommended measures to reduce on-site construction diesel exhaust would further reduce on-site diesel exhaust emissions. The computed maximum excess residential child cancer risk with implementation of Mitigation Measure AQ-1 and AQ-2 would be a child excess cancer 7.2 in one million for the project and 7.5 in one million for the project with soil off hauling. *With implementation of these mitigation measures, the project would have a less-than-significant impact with respect to community risk caused by construction activities.*

**Appendix A**  
**Grading and Off-Haul Emissions Computations**



TO: J.T. Wick  
CC: Brian Swedberg, Neal Tamura  
FROM: Todd Tamura   
RE: Revised Construction Emissions Analysis – Upper Road Land Division  
DATE: January 14, 2013

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As requested, we have quantified emissions from construction equipment used for the Upper Road Land Division project. The Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines currently in effect<sup>1</sup> do not require quantification of construction emissions—i.e., the determination of the significance of the emissions is based upon whether specific mitigation measures are taken. This project will implement the mandatory mitigation measures identified in those guidelines; i.e.,

- Water active construction areas at least twice daily
- Cover all trucks hauling soil, sand, and other loose materials
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public roads
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more)
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 15 mph
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways
- Replant vegetation in disturbed areas as quickly as possible

In addition, idling times will be minimized and limited to no more than 5 minutes (as required by 13 CCR 2485), clear signage shall be provided for construction workers at all access points, construction equipment will be maintained and properly tuned (and checked by a certified visible emissions evaluator), a publicly visible sign will be posted with contact information for dust complaints, and all construction equipment will be EPA Tier 2-certified (or better).

Because there has previously been interest in quantifying construction emissions, the emissions from the proposed project and project alternative were also quantified. BAAQMD has recommended use of the latest version of the California Emissions Estimator Model™

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<sup>1</sup> BAAQMD, “BAAQMD CEQA Guidelines,” December 1999, pp. 13-15.

(CalEEMod™)<sup>2</sup> to calculate construction emissions, and that model was used for this analysis. Input and output files for the proposed project (on-site use) and alternative scenario (off-site hauling) are provided with this memorandum, along with a file showing how CalEEMod estimates of mitigated construction emissions (in tons) were converted to units of lb/day. Use of this model is conservative, given that it over predicts many off-road engine load factors by 33%.<sup>3</sup> Exhaust emissions of reactive organic gases (ROG), oxides of nitrogen (NO<sub>x</sub>), particulate matter smaller than 10 microns (PM<sub>10</sub>), and particulate matter smaller than 2.5 microns (PM<sub>2.5</sub>) for the proposed and alternate scenarios are shown in the tables below:

Pollutant	Emissions (lb/day)	
	Proposed Project <sup>a</sup>	Alternative Scenario <sup>b</sup>
ROG	6	5
NO <sub>x</sub>	16	28
PM <sub>10</sub>	1	1
PM <sub>2.5</sub>	1	1

<sup>a</sup>Based on construction lasting 71 calendar days.

<sup>b</sup>Based on construction lasting 111 calendar days.

These emissions are not significant. For example, for NO<sub>x</sub> (the pollutant emitted in the greatest quantities by construction equipment), emissions in the San Francisco Bay Area Air Basin are approximately 448.0 tons (896,000 pounds) per day, including 103.0 tons (206,000 pounds) per day from off-road engines such as construction equipment.<sup>4</sup> Emissions from the proposed project and alternative scenario are also well below the significance thresholds in BAAQMD's 2010-2011 CEQA Guidelines (82 lb/day for PM<sub>10</sub> and 54 lb/day for the other pollutants listed above), even though BAAQMD is no longer recommending that the significance thresholds in their 2010-2011 CEQA Guidelines be used as a generally applicable measure of a project's significant air quality impacts.<sup>5</sup>

<sup>2</sup> ENVIRON, California Emissions Estimator Model™ version 2011.1.1, South Coast Air Quality Management District, 2011.

<sup>3</sup> Nicole Dolney (Manager, Off-Road Diesel Analysis Section, CARB Planning and Technical Support Division), electronic mail message to Kai Zhao (ENVIRON), September 8, 2010; Kai Zhao (ENVIRON), draft memorandum to Emeryville Air Group, "Subject: Summary of ARB's Workshop on Revision to the Off-Road and On-Road Vehicle Emissions Inventories (Oakland – September 8<sup>th</sup>, 2010)," September 15, 2010; Nicole Dolney, voicemail message to Todd Tamura, December 21, 2012.

<sup>4</sup> This is the most recent estimate (2008) available from the California Air Resources Board's website at [http://www.arb.ca.gov/app/emsinv/emseic1\\_query.php?F\\_DIV=-4&F\\_YR=2008&F\\_SEASON=A&SP=2009&F\\_AREA=AB&F\\_AB=SF&F\\_DD=Y](http://www.arb.ca.gov/app/emsinv/emseic1_query.php?F_DIV=-4&F_YR=2008&F_SEASON=A&SP=2009&F_AREA=AB&F_AB=SF&F_DD=Y).

<sup>5</sup> BAAQMD, <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx> (last accessed Dec. 19, 2012).

**Ross**  
**Bay Area AQMD Air District, Annual**  
**Construction only - No Off Hauling of Soil**

**1.0 Project Characteristics**

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**1.1 Land Usage**

Land Uses	Size	Metric
Single Family Housing	3	Dwelling Unit

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>		<b>Utility Company</b>	Pacific Gas & Electric Company
<b>Climate Zone</b>	5		2.2		
		<b>Precipitation Freq (Days)</b>			
			64		

**1.3 User Entered Comments**

Project Characteristics - 7 Upper Road, Ross, CA. Construction emissions only.

Land Use - 3 residential units, 35.97 acre lot (from project specs). Building square footage = 0 (only access road development).

Construction Phase - Construction schedule from spreadsheet (Grading and Trenching & Wall Foundations phases are concurrent).

Off-road Equipment - Demolition equipment usage from spreadsheet

Off-road Equipment - Grading equipment usage from spreadsheet

Off-road Equipment - Paving equipment usage from spreadsheet

Off-road Equipment - Trenching & Wall Foundations equipment usage from spreadsheet

Trips and VMT - Demo incl. 2 dump runs (6 mi. each way). Grading incl. dirt on-site relocation (4500 trips, 0.5 mi.) and water truck (2 vendor trips/day). Trenching incl. concrete (82 vendor trips, 4 mi.) Paving incl. concrete and aggregate (133 vendor trips, 4 mi.)

Demolition - Demolition of 15'x20' shed.

Grading - Assuming ~105,000 sq. ft. of disturbed soil (from development plan drawing)

Construction Off-road Equipment Mitigation - Assuming all equipment tier 2 or better.

## 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					
2013	0.11	0.64	0.61	0.00	64.19	0.04	64.23	6.40	0.04	6.44	0.00	70.60	70.60	0.01	0.00	70.79
<b>Total</b>	<b>0.11</b>	<b>0.64</b>	<b>0.61</b>	<b>0.00</b>	<b>64.19</b>	<b>0.04</b>	<b>64.23</b>	<b>6.40</b>	<b>0.04</b>	<b>6.44</b>	<b>0.00</b>	<b>70.60</b>	<b>70.60</b>	<b>0.01</b>	<b>0.00</b>	<b>70.79</b>

#### 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					
2013	0.21	0.58	0.57	0.00	0.00	0.03	0.03	0.00	0.03	0.03	0.00	70.60	70.60	0.01	0.00	70.79
<b>Total</b>	<b>0.21</b>	<b>0.58</b>	<b>0.57</b>	<b>0.00</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>70.60</b>	<b>70.60</b>	<b>0.01</b>	<b>0.00</b>	<b>70.79</b>

### 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	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
Energy	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	11.69	11.69	0.00	0.00	11.76
Mobile	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
Waste						0.00	0.00		0.00	0.00	0.77	0.00	0.77	0.05	0.00	1.72
Water						0.00	0.00		0.00	0.00	0.00	0.44	0.44	0.01	0.00	0.61
<b>Total</b>	<b>0.13</b>	<b>0.06</b>	<b>0.40</b>	<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	<b>2.81</b>	<b>42.61</b>	<b>45.43</b>	<b>0.06</b>	<b>0.00</b>	<b>46.75</b>

**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	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
Energy	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	11.69	11.69	0.00	0.00	11.76
Mobile	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
Waste						0.00	0.00		0.00	0.00	0.77	0.00	0.77	0.05	0.00	1.72
Water						0.00	0.00		0.00	0.00	0.00	0.44	0.44	0.01	0.00	0.61
<b>Total</b>	<b>0.13</b>	<b>0.06</b>	<b>0.40</b>	<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	<b>2.81</b>	<b>42.61</b>	<b>45.43</b>	<b>0.06</b>	<b>0.00</b>	<b>46.75</b>

### 3.0 Construction Detail

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#### 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

#### 3.2 Demolition - 2013

##### 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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.40	0.40	0.00	0.00	0.40
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>	<b>0.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>



**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>

**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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.40	0.40	0.00	0.00	0.40
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>	<b>0.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02

<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>
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### 3.3 Grading - 2013

#### 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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.06	0.37	0.27	0.00		0.03	0.03		0.03	0.03	0.00	36.15	36.15	0.00	0.00	36.25
<b>Total</b>	<b>0.06</b>	<b>0.37</b>	<b>0.27</b>	<b>0.00</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>36.15</b>	<b>36.15</b>	<b>0.00</b>	<b>0.00</b>	<b>36.25</b>

#### 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	0.01	0.09	0.11	0.00	64.18	0.00	64.18	6.40	0.00	6.40	0.00	6.82	6.82	0.00	0.00	6.83
Vendor	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.29	2.29	0.00	0.00	2.29
Worker	0.01	0.01	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	7.19	7.19	0.00	0.00	7.20
<b>Total</b>	<b>0.02</b>	<b>0.11</b>	<b>0.17</b>	<b>0.00</b>	<b>64.19</b>	<b>0.00</b>	<b>64.19</b>	<b>6.40</b>	<b>0.00</b>	<b>6.40</b>	<b>0.00</b>	<b>16.30</b>	<b>16.30</b>	<b>0.00</b>	<b>0.00</b>	<b>16.32</b>

#### 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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.13	0.32	0.26	0.00		0.02	0.02		0.02	0.02	0.00	36.15	36.15	0.00	0.00	36.25
<b>Total</b>	<b>0.13</b>	<b>0.32</b>	<b>0.26</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>36.15</b>	<b>36.15</b>	<b>0.00</b>	<b>0.00</b>	<b>36.25</b>

**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	0.01	0.09	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.82	6.82	0.00	0.00	6.83
Vendor	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.29	2.29	0.00	0.00	2.29
Worker	0.01	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.19	7.19	0.00	0.00	7.20
<b>Total</b>	<b>0.02</b>	<b>0.11</b>	<b>0.17</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>16.30</b>	<b>16.30</b>	<b>0.00</b>	<b>0.00</b>	<b>16.32</b>

**3.4 Trenching & Wall Foundations - 2013**

**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	0.03	0.11	0.11	0.00		0.01	0.01		0.01	0.01	0.00	10.83	10.83	0.00	0.00	10.88
<b>Total</b>	<b>0.03</b>	<b>0.11</b>	<b>0.11</b>	<b>0.00</b>		<b>0.01</b>	<b>0.01</b>		<b>0.01</b>	<b>0.01</b>	<b>0.00</b>	<b>10.83</b>	<b>10.83</b>	<b>0.00</b>	<b>0.00</b>	<b>10.88</b>

**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
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Category	tons/yr										MT/yr					
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	1.36	0.00	0.00	1.36
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.47	1.47	0.00	0.00	1.47
<b>Total</b>	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.83</b>	<b>2.83</b>	<b>0.00</b>	<b>0.00</b>	<b>2.83</b>

**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	0.05	0.10	0.08	0.00		0.01	0.01		0.01	0.01	0.00	10.83	10.83	0.00	0.00	10.88
<b>Total</b>	<b>0.05</b>	<b>0.10</b>	<b>0.08</b>	<b>0.00</b>		<b>0.01</b>	<b>0.01</b>		<b>0.01</b>	<b>0.01</b>	<b>0.00</b>	<b>10.83</b>	<b>10.83</b>	<b>0.00</b>	<b>0.00</b>	<b>10.88</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	1.36	0.00	0.00	1.36
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.47	1.47	0.00	0.00	1.47
<b>Total</b>	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.83</b>	<b>2.83</b>	<b>0.00</b>	<b>0.00</b>	<b>2.83</b>

**3.5 Paving - 2013**

**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	0.00	0.02	0.01	0.00		0.00	0.00		0.00	0.00	0.00	1.64	1.64	0.00	0.00	1.65
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.00</b>	<b>0.02</b>	<b>0.01</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.64</b>	<b>1.64</b>	<b>0.00</b>	<b>0.00</b>	<b>1.65</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24	2.24	0.00	0.00	2.24
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00	0.15
<b>Total</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>	<b>2.39</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>

**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	0.01	0.01	0.01	0.00		0.00	0.00		0.00	0.00	0.00	1.64	1.64	0.00	0.00	1.65
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.64</b>	<b>1.64</b>	<b>0.00</b>	<b>0.00</b>	<b>1.65</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24	2.24	0.00	0.00	2.24	
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00	0.15	
<b>Total</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>	<b>2.39</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>	

**4.0 Mobile Detail**

**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	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
Unmitigated	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	28.71	30.24	26.31	63,814	63,814
Total	28.71	30.24	26.31	63,814	63,814

#### 4.3 Trip Type Information

Land Use	Miles			Trip %		
	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
Single Family Housing	12.40	4.30	5.40	26.10	29.10	44.80

### 5.0 Energy Detail

#### 5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	5.48	5.48	0.00	0.00	5.52
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	5.48	5.48	0.00	0.00	5.52
NaturalGas Mitigated	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24
NaturalGas Unmitigated	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24

Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
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### 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	tons/yr										MT/yr					
Single Family Housing	116244	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24
<b>Total</b>		<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.20</b>	<b>6.20</b>	<b>0.00</b>	<b>0.00</b>	<b>6.24</b>

#### 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	tons/yr										MT/yr					
Single Family Housing	116244	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24
<b>Total</b>		<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.20</b>	<b>6.20</b>	<b>0.00</b>	<b>0.00</b>	<b>6.24</b>

### 5.3 Energy by Land Use - Electricity

#### Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Single Family Housing	18854.3					5.48	0.00	0.00	5.52
<b>Total</b>						<b>5.48</b>	<b>0.00</b>	<b>0.00</b>	<b>5.52</b>



**Mitigated**

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Single Family Housing	18854.3					5.48	0.00	0.00	5.52
<b>Total</b>						<b>5.48</b>	<b>0.00</b>	<b>0.00</b>	<b>5.52</b>

**6.0 Area Detail**

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**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	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
Unmitigated	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

**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	0.00					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
Hearth	0.11	0.00	0.15	0.00		0.00	0.02		0.00	0.02	2.04	0.72	2.76	0.00	0.00	2.86	
Landscaping	0.00	0.00	0.02	0.00		0.00	0.00		0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.04	
<b>Total</b>	<b>0.11</b>	<b>0.00</b>	<b>0.17</b>	<b>0.00</b>		<b>0.00</b>	<b>0.02</b>		<b>0.00</b>	<b>0.02</b>	<b>2.04</b>	<b>0.76</b>	<b>2.80</b>	<b>0.00</b>	<b>0.00</b>	<b>2.90</b>	

**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	0.00					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
Hearth	0.11	0.00	0.15	0.00		0.00	0.02		0.00	0.02	2.04	0.72	2.76	0.00	0.00	2.86
Landscaping	0.00	0.00	0.02	0.00		0.00	0.00		0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.04
<b>Total</b>	<b>0.11</b>	<b>0.00</b>	<b>0.17</b>	<b>0.00</b>		<b>0.00</b>	<b>0.02</b>		<b>0.00</b>	<b>0.02</b>	<b>2.04</b>	<b>0.76</b>	<b>2.80</b>	<b>0.00</b>	<b>0.00</b>	<b>2.90</b>

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					0.44	0.01	0.00	0.61
Unmitigated					0.44	0.01	0.00	0.61
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## 7.2 Water by Land Use

### Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Single Family Housing	0.195462 / 0.123226					0.44	0.01	0.00	0.61
<b>Total</b>						<b>0.44</b>	<b>0.01</b>	<b>0.00</b>	<b>0.61</b>

### Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Single Family Housing	0.195462 / 0.123226					0.44	0.01	0.00	0.61
<b>Total</b>						<b>0.44</b>	<b>0.01</b>	<b>0.00</b>	<b>0.61</b>

## 8.0 Waste Detail

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**8.1 Mitigation Measures Waste**

**Category/Year**

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					0.77	0.05	0.00	1.72
Unmitigated					0.77	0.05	0.00	1.72
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

**8.2 Waste by Land Use**

**Unmitigated**

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Single Family Housing	3.78					0.77	0.05	0.00	1.72
<b>Total</b>						<b>0.77</b>	<b>0.05</b>	<b>0.00</b>	<b>1.72</b>

**Mitigated**

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			

Single Family Housing	3.78					0.77	0.05	0.00	1.72
Total						0.77	0.05	0.00	1.72

**9.0 Vegetation**

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**Ross**  
**Bay Area AQMD Air District, Annual**  
**Construction Only - Includes Off Haul of Soil**

**1.0 Project Characteristics**

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**1.1 Land Usage**

Land Uses	Size	Metric
Single Family Housing	3	Dwelling Unit

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>		<b>Utility Company</b>	Pacific Gas & Electric Company
<b>Climate Zone</b>	5		2.2		
		<b>Precipitation Freq (Days)</b>			
			64		

**1.3 User Entered Comments**

Project Characteristics - 7 Upper Road, Ross, CA. Construction emissions only.

Land Use - 3 residential units, 35.97 acre lot (from project specs). Building square footage = 0 (only access road development).

Construction Phase - Construction schedule from spreadsheet (Grading and Trenching & Wall Foundations phases are concurrent).

Off-road Equipment - Demolition equipment usage from spreadsheet

Off-road Equipment - Grading equipment usage from spreadsheet

Off-road Equipment - Paving equipment usage from spreadsheet

Off-road Equipment - Trenching & Wall Foundations equipment usage from spreadsheet

Trips and VMT - Demo incl. 2 dump runs (6 mi. each way). Grading incl. dirt off-haul (4500 trips, 19 mi.) and water truck (2 vendor trips/day). Paving incl. Main Driveway Surface/Walls concrete and aggregate (133 vendor trips, 4 mi.)

Grading - Assuming ~105,000 sq. ft. of disturbed soil (from development plan drawing)  
 Construction Off-road Equipment Mitigation - Assuming all equipment tier 2 or better  
 Demolition - Demolition of 15'x20' shed.

## 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					
2013	0.19	1.59	1.09	0.00	2.97	0.07	3.04	0.00	0.07	0.07	0.00	218.84	218.84	0.01	0.00	219.09
<b>Total</b>	<b>0.19</b>	<b>1.59</b>	<b>1.09</b>	<b>0.00</b>	<b>2.97</b>	<b>0.07</b>	<b>3.04</b>	<b>0.00</b>	<b>0.07</b>	<b>0.07</b>	<b>0.00</b>	<b>218.84</b>	<b>218.84</b>	<b>0.01</b>	<b>0.00</b>	<b>219.09</b>

Note - 0.03 tpy associated with on-site construction

#### 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					
2013	0.27	1.53	1.06	0.00	0.01	0.06	0.07	0.00	0.06	0.06	0.00	218.84	218.84	0.01	0.00	219.09
<b>Total</b>	<b>0.27</b>	<b>1.53</b>	<b>1.06</b>	<b>0.00</b>	<b>0.01</b>	<b>0.06</b>	<b>0.07</b>	<b>0.00</b>	<b>0.06</b>	<b>0.06</b>	<b>0.00</b>	<b>218.84</b>	<b>218.84</b>	<b>0.01</b>	<b>0.00</b>	<b>219.09</b>

Note - 0.02 tpy associated with on-site construction

### 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	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
Energy	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	11.69	11.69	0.00	0.00	11.76
Mobile	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
Waste						0.00	0.00		0.00	0.00	0.77	0.00	0.77	0.05	0.00	1.72
Water						0.00	0.00		0.00	0.00	0.00	0.44	0.44	0.01	0.00	0.61
<b>Total</b>	<b>0.13</b>	<b>0.06</b>	<b>0.40</b>	<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	<b>2.81</b>	<b>42.61</b>	<b>45.43</b>	<b>0.06</b>	<b>0.00</b>	<b>46.75</b>

**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	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
Energy	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	11.69	11.69	0.00	0.00	11.76
Mobile	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
Waste						0.00	0.00		0.00	0.00	0.77	0.00	0.77	0.05	0.00	1.72
Water						0.00	0.00		0.00	0.00	0.00	0.44	0.44	0.01	0.00	0.61
<b>Total</b>	<b>0.13</b>	<b>0.06</b>	<b>0.40</b>	<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	<b>2.81</b>	<b>42.61</b>	<b>45.43</b>	<b>0.06</b>	<b>0.00</b>	<b>46.75</b>



### 3.0 Construction Detail

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#### 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

#### 3.2 Demolition - 2013

##### 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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.40	0.40	0.00	0.00	0.40
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>	<b>0.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>

**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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.40	0.40	0.00	0.00	0.40
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>	<b>0.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.40</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02

<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>
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### 3.3 Grading - 2013

#### 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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.06	0.37	0.27	0.00		0.03	0.03		0.03	0.03	0.00	35.90	35.90	0.01	0.00	36.01
<b>Total</b>	<b>0.06</b>	<b>0.37</b>	<b>0.27</b>	<b>0.00</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>35.90</b>	<b>35.90</b>	<b>0.01</b>	<b>0.00</b>	<b>36.01</b>

#### 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	0.10	1.10	0.63	0.00	2.95	0.04	2.99	0.00	0.03	0.04	0.00	158.27	158.27	0.00	0.00	158.37
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.65	3.65	0.00	0.00	3.65
Worker	0.01	0.01	0.09	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	11.47	11.47	0.00	0.00	11.48
<b>Total</b>	<b>0.11</b>	<b>1.13</b>	<b>0.74</b>	<b>0.00</b>	<b>2.96</b>	<b>0.04</b>	<b>3.00</b>	<b>0.00</b>	<b>0.03</b>	<b>0.04</b>	<b>0.00</b>	<b>173.39</b>	<b>173.39</b>	<b>0.00</b>	<b>0.00</b>	<b>173.50</b>

#### 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					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.13	0.32	0.26	0.00		0.02	0.02		0.02	0.02	0.00	35.90	35.90	0.01	0.00	36.01
<b>Total</b>	<b>0.13</b>	<b>0.32</b>	<b>0.26</b>	<b>0.00</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>35.90</b>	<b>35.90</b>	<b>0.01</b>	<b>0.00</b>	<b>36.01</b>

**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	0.10	1.10	0.63	0.00	0.01	0.04	0.04	0.00	0.03	0.04	0.00	158.27	158.27	0.00	0.00	158.37
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.65	3.65	0.00	0.00	3.65
Worker	0.01	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.47	11.47	0.00	0.00	11.48
<b>Total</b>	<b>0.11</b>	<b>1.13</b>	<b>0.74</b>	<b>0.00</b>	<b>0.01</b>	<b>0.04</b>	<b>0.04</b>	<b>0.00</b>	<b>0.03</b>	<b>0.04</b>	<b>0.00</b>	<b>173.39</b>	<b>173.39</b>	<b>0.00</b>	<b>0.00</b>	<b>173.50</b>

**3.4 Trenching & Wall Foundations - 2013**

**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	0.01	0.05	0.04	0.00		0.00	0.00		0.00	0.00	0.00	4.51	4.51	0.00	0.00	4.53
<b>Total</b>	<b>0.01</b>	<b>0.05</b>	<b>0.04</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4.51</b>	<b>4.51</b>	<b>0.00</b>	<b>0.00</b>	<b>4.53</b>

**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
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Category	tons/yr										MT/yr						
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.00	0.00	0.61
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.61</b>	<b>0.61</b>	<b>0.00</b>	<b>0.00</b>	<b>0.61</b>

**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	0.02	0.04	0.03	0.00		0.00	0.00		0.00	0.00	0.00	4.51	4.51	0.00	0.00	4.53
<b>Total</b>	<b>0.02</b>	<b>0.04</b>	<b>0.03</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4.51</b>	<b>4.51</b>	<b>0.00</b>	<b>0.00</b>	<b>4.53</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.00	0.00	0.61
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.61</b>	<b>0.61</b>	<b>0.00</b>	<b>0.00</b>	<b>0.61</b>

**3.5 Paving - 2013**

**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	0.00	0.02	0.01	0.00		0.00	0.00		0.00	0.00	0.00	1.57	1.57	0.00	0.00	1.57
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.00</b>	<b>0.02</b>	<b>0.01</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.57</b>	<b>1.57</b>	<b>0.00</b>	<b>0.00</b>	<b>1.57</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24	2.24	0.00	0.00	2.24
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00	0.15
<b>Total</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>	<b>2.39</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>

**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	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00	0.00	1.57	1.57	0.00	0.00	1.57
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.57</b>	<b>1.57</b>	<b>0.00</b>	<b>0.00</b>	<b>1.57</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24	2.24	0.00	0.00	2.24	
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00	0.15	
<b>Total</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>	<b>2.39</b>	<b>0.00</b>	<b>0.00</b>	<b>2.39</b>	

**4.0 Mobile Detail**

**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	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
Unmitigated	0.02	0.05	0.23	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	29.73	29.73	0.00	0.00	29.76
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	28.71	30.24	26.31	63,814	63,814
Total	28.71	30.24	26.31	63,814	63,814

#### 4.3 Trip Type Information

Land Use	Miles			Trip %		
	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
Single Family Housing	12.40	4.30	5.40	26.10	29.10	44.80

### 5.0 Energy Detail

#### 5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	5.48	5.48	0.00	0.00	5.52
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	5.48	5.48	0.00	0.00	5.52
NaturalGas Mitigated	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24
NaturalGas Unmitigated	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24



Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
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### 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	tons/yr										MT/yr					
Single Family Housing	116244	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24
<b>Total</b>		<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.20</b>	<b>6.20</b>	<b>0.00</b>	<b>0.00</b>	<b>6.24</b>

#### 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	tons/yr										MT/yr					
Single Family Housing	116244	0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.00	6.20	6.20	0.00	0.00	6.24
<b>Total</b>		<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.20</b>	<b>6.20</b>	<b>0.00</b>	<b>0.00</b>	<b>6.24</b>

### 5.3 Energy by Land Use - Electricity

#### Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Single Family Housing	18854.3					5.48	0.00	0.00	5.52
<b>Total</b>						<b>5.48</b>	<b>0.00</b>	<b>0.00</b>	<b>5.52</b>

**Mitigated**

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Single Family Housing	18854.3					5.48	0.00	0.00	5.52
<b>Total</b>						<b>5.48</b>	<b>0.00</b>	<b>0.00</b>	<b>5.52</b>

**6.0 Area Detail**

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**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	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
Unmitigated	0.11	0.00	0.17	0.00		0.00	0.02		0.00	0.02	2.04	0.75	2.80	0.00	0.00	2.90
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

**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	0.00					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
Hearth	0.11	0.00	0.15	0.00		0.00	0.02		0.00	0.02	2.04	0.72	2.76	0.00	0.00	2.86
Landscaping	0.00	0.00	0.02	0.00		0.00	0.00		0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.04
<b>Total</b>	<b>0.11</b>	<b>0.00</b>	<b>0.17</b>	<b>0.00</b>		<b>0.00</b>	<b>0.02</b>		<b>0.00</b>	<b>0.02</b>	<b>2.04</b>	<b>0.76</b>	<b>2.80</b>	<b>0.00</b>	<b>0.00</b>	<b>2.90</b>

**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	0.00					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
Hearth	0.11	0.00	0.15	0.00		0.00	0.02		0.00	0.02	2.04	0.72	2.76	0.00	0.00	2.86
Landscaping	0.00	0.00	0.02	0.00		0.00	0.00		0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.04
<b>Total</b>	<b>0.11</b>	<b>0.00</b>	<b>0.17</b>	<b>0.00</b>		<b>0.00</b>	<b>0.02</b>		<b>0.00</b>	<b>0.02</b>	<b>2.04</b>	<b>0.76</b>	<b>2.80</b>	<b>0.00</b>	<b>0.00</b>	<b>2.90</b>

**7.0 Water Detail**

**7.1 Mitigation Measures Water**

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					0.44	0.01	0.00	0.61
Unmitigated					0.44	0.01	0.00	0.61
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

## 7.2 Water by Land Use

### Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Single Family Housing	0.195462 / 0.123226					0.44	0.01	0.00	0.61
<b>Total</b>						<b>0.44</b>	<b>0.01</b>	<b>0.00</b>	<b>0.61</b>

### Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Single Family Housing	0.195462 / 0.123226					0.44	0.01	0.00	0.61
<b>Total</b>						<b>0.44</b>	<b>0.01</b>	<b>0.00</b>	<b>0.61</b>

## 8.0 Waste Detail

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**8.1 Mitigation Measures Waste**

**Category/Year**

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					0.77	0.05	0.00	1.72
Unmitigated					0.77	0.05	0.00	1.72
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

**8.2 Waste by Land Use**

**Unmitigated**

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Single Family Housing	3.78					0.77	0.05	0.00	1.72
<b>Total</b>						<b>0.77</b>	<b>0.05</b>	<b>0.00</b>	<b>1.72</b>

**Mitigated**

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			

Single Family Housing	3.78					0.77	0.05	0.00	1.72
Total						0.77	0.05	0.00	1.72

## 9.0 Vegetation

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EMFAC2011 Emission Rates

Region Type: County

Region: Marin

Calendar Year: 2014

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdYr	Speed (miles/hr)	VMT (miles/day)	PM2_5_RU (gms/mile)
Marin	2014	Annual	T7	DSL	Aggregatec	10	922.997	0.351085

**Appendix B**  
**Residential Building Emission Computations**



## Upper Road, Ross

### Residential Building Construction Assumptions

#### Construction Phasing Compressed into 18 months

Phase Name	Phase Type	Phase StartDate	Phase EndDate	Number Days Week	Num Days	Average Hours/Day by Phase	Average PM2.5 Emissions in pounds per Day	Comments
Site Preparation	Site Preparation	2014/01/02	2014/01/08	5	5		0.31	Assume sites are prepared (no real grading)
Building Construction	Building Construction	2014/01/13	2015/01/09	5	260		0.02	One year of building construction
Paving	Paving	2014/12/05	2014/12/18	5	10		0.05	Driveway paving
Architectural Coating	Architectural Coating	2014/12/19	2015/05/07	5	100			This is the finishing phase
					375			
						Total	7.25	

Phase Name	OffRoad EquipmentType	OffRoad Equipment Qty.	Avg. UsageHours/day	Horse Power	Load Factor	# of Days
------------	-----------------------	------------------------	---------------------	-------------	-------------	-----------

#### Assumed Equipment

Site Preparation	Graders	1	8	162	0.41	5	8.0	
Building Construction	Cranes	1	8	208	0.38	3-5	0.2	
Building Construction	Forklifts	1	6	149	0.20	8-10	0.2	One forklift for 3 homes
Building Construction	Generator Sets (gasoline-fueled)	1	8	84	0.49	2	0.1	One generator for all lots
Building Construction	Tractors/Loaders/Backhoes	1	6	75	0.38	6 wk	0.7	Some minor loader use, mostly upfront
Paving	Rollers	1	6	84	0.38	2	1.2	
Paving	Tractors/Loaders/Backhoes	1	8	75	0.38	1	0.8	
Architectural Coating	Air Compressors	1	4	78	0.36	15	0.6	

**Upper Ross Road Home Building Construction  
Marin County, Summer**

**Building Construction - Average Pounds Per Day**

**1.0 Project Characteristics**

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**1.1 Land Usage**

Land Uses	Size	Metric
Single Family Housing	9	Dwelling Unit

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Urban	<b>Wind Speed (m/s)</b>		<b>Utility Company</b>	Pacific Gas & Electric Company
<b>Climate Zone</b>	5		2.2		
		<b>Precipitation Freq (Days)</b>			

**1.3 User Entered Comments**

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- Construction Phase - Site Grading already completed in previous construction phase
- Off-road Equipment - Adjusted load factor -33%
- Off-road Equipment - Adjusted load factors -33%
- Off-road Equipment - Adjusted load factors -33%
- Off-road Equipment - adjusted load factor -33%
- Construction Off-road Equipment Mitigation - Assume all large equipment used is Tier 3

**2.0 Emissions Summary**

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**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					
2014	0.77	5.66	4.15	0.01	1.00	0.31	1.31	0.00	0.31	0.31	0.00	702.01	0.00	0.07	0.00	703.46
2015	5.10	0.69	0.84	0.00	0.07	0.06	0.13	0.00	0.06	0.06	0.00	136.61	0.00	0.01	0.00	136.87
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**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					
2014	0.77	5.66	4.15	0.01	0.96	0.31	1.27	0.00	0.31	0.31	0.00	702.01	0.00	0.07	0.00	703.46
2015	5.10	0.69	0.84	0.00	0.00	0.06	0.06	0.00	0.06	0.06	0.00	136.61	0.00	0.01	0.00	136.87
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**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	8.82	0.14	12.22	0.01		0.00	1.65		0.00	1.65	182.03	59.16		0.30	0.01	251.03
Energy	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09
Mobile	0.46	0.75	3.60	0.01	0.67	0.03	0.70	0.02	0.03	0.05		608.92		0.02		609.43
Total	9.29	0.98	15.86	0.02	0.67	0.03	2.36	0.02	0.03	1.71	182.03	780.48		0.32	0.01	973.55

**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	8.82	0.14	12.22	0.01		0.00	1.65		0.00	1.65	182.03	59.16		0.30	0.01	251.03
Energy	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09
Mobile	0.46	0.75	3.60	0.01	0.67	0.03	0.70	0.02	0.03	0.05		608.92		0.02		609.43
<b>Total</b>	<b>9.29</b>	<b>0.98</b>	<b>15.86</b>	<b>0.02</b>	<b>0.67</b>	<b>0.03</b>	<b>2.36</b>	<b>0.02</b>	<b>0.03</b>	<b>1.71</b>	<b>182.03</b>	<b>780.48</b>		<b>0.32</b>	<b>0.01</b>	<b>973.55</b>

**3.0 Construction Detail**

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**3.1 Mitigation Measures Construction**

- Use Cleaner Engines for Construction Equipment
- Use DPF for Construction Equipment

**3.2 Site Preparation - 2014**

**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					0.95	0.00	0.95	0.00	0.00	0.00						0.00
Off-Road	0.74	5.64	3.93	0.01		0.31	0.31		0.31	0.31		665.12		0.07		666.52
<b>Total</b>	<b>0.74</b>	<b>5.64</b>	<b>3.93</b>	<b>0.01</b>	<b>0.95</b>	<b>0.31</b>	<b>1.26</b>	<b>0.00</b>	<b>0.31</b>	<b>0.31</b>		<b>665.12</b>		<b>0.07</b>		<b>666.52</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.02	0.02	0.21	0.00	0.04	0.00	0.05	0.00	0.00	0.00		36.89		0.00		36.94
<b>Total</b>	<b>0.02</b>	<b>0.02</b>	<b>0.21</b>	<b>0.00</b>	<b>0.04</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>36.89</b>		<b>0.00</b>		<b>36.94</b>

**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					0.95	0.00	0.95	0.00	0.00	0.00						0.00
Off-Road	0.74	5.64	3.93	0.01		0.31	0.31		0.31	0.31	0.00	665.12		0.07		666.52
<b>Total</b>	<b>0.74</b>	<b>5.64</b>	<b>3.93</b>	<b>0.01</b>	<b>0.95</b>	<b>0.31</b>	<b>1.26</b>	<b>0.00</b>	<b>0.31</b>	<b>0.31</b>	<b>0.00</b>	<b>665.12</b>		<b>0.07</b>		<b>666.52</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.02	0.02	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00		36.89		0.00		36.94
<b>Total</b>	<b>0.02</b>	<b>0.02</b>	<b>0.21</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>36.89</b>		<b>0.00</b>		<b>36.94</b>

### 3.3 Building Construction - 2014

#### 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	0.06	0.46	0.29	0.00		0.03	0.03		0.03	0.03		57.37		0.01		57.49
<b>Total</b>	<b>0.06</b>	<b>0.46</b>	<b>0.29</b>	<b>0.00</b>		<b>0.03</b>	<b>0.03</b>		<b>0.03</b>	<b>0.03</b>		<b>57.37</b>		<b>0.01</b>		<b>57.49</b>

#### 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.01	0.14	0.12	0.00	0.01	0.00	0.01	0.00	0.00	0.00		25.93		0.00		25.95
Worker	0.02	0.02	0.21	0.00	0.04	0.00	0.05	0.00	0.00	0.00		36.89		0.00		36.94
<b>Total</b>	<b>0.03</b>	<b>0.16</b>	<b>0.33</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.06</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>62.82</b>		<b>0.00</b>		<b>62.89</b>

#### 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	0.06	0.46	0.29	0.00		0.03	0.03		0.03	0.03	0.00	57.37		0.01		57.49
<b>Total</b>	<b>0.06</b>	<b>0.46</b>	<b>0.29</b>	<b>0.00</b>		<b>0.03</b>	<b>0.03</b>		<b>0.03</b>	<b>0.03</b>	<b>0.00</b>	<b>57.37</b>		<b>0.01</b>		<b>57.49</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.01	0.14	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00		25.93		0.00		25.95
Worker	0.02	0.02	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00		36.89		0.00		36.94
<b>Total</b>	<b>0.03</b>	<b>0.16</b>	<b>0.33</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>62.82</b>		<b>0.00</b>		<b>62.89</b>

**3.3 Building Construction - 2015**

**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	0.06	0.42	0.29	0.00		0.02	0.02		0.02	0.02		57.37		0.01		57.48
<b>Total</b>	<b>0.06</b>	<b>0.42</b>	<b>0.29</b>	<b>0.00</b>		<b>0.02</b>	<b>0.02</b>		<b>0.02</b>	<b>0.02</b>		<b>57.37</b>		<b>0.01</b>		<b>57.48</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.01	0.13	0.11	0.00	0.01	0.00	0.01	0.00	0.00	0.00		26.06		0.00		26.07
Worker	0.02	0.02	0.19	0.00	0.04	0.00	0.05	0.00	0.00	0.00		36.07		0.00		36.11
<b>Total</b>	<b>0.03</b>	<b>0.15</b>	<b>0.30</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.06</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>62.13</b>		<b>0.00</b>		<b>62.18</b>

**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	0.06	0.42	0.29	0.00		0.02	0.02		0.02	0.02	0.00	57.37		0.01		57.48
<b>Total</b>	<b>0.06</b>	<b>0.42</b>	<b>0.29</b>	<b>0.00</b>		<b>0.02</b>	<b>0.02</b>		<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>57.37</b>		<b>0.01</b>		<b>57.48</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.01	0.13	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00		26.06		0.00		26.07
Worker	0.02	0.02	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00		36.07		0.00		36.11
<b>Total</b>	<b>0.03</b>	<b>0.15</b>	<b>0.30</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>62.13</b>		<b>0.00</b>		<b>62.18</b>

**3.4 Paving - 2015**

**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	0.10	0.66	0.52	0.00		0.05	0.05		0.05	0.05		76.49		0.01		76.68
Paving	0.00					0.00	0.00		0.00	0.00						0.00
<b>Total</b>	<b>0.10</b>	<b>0.66</b>	<b>0.52</b>	<b>0.00</b>		<b>0.05</b>	<b>0.05</b>		<b>0.05</b>	<b>0.05</b>		<b>76.49</b>		<b>0.01</b>		<b>76.68</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.04	0.03	0.32	0.00	0.07	0.00	0.08	0.00	0.00	0.00		60.12		0.00		60.19
<b>Total</b>	<b>0.04</b>	<b>0.03</b>	<b>0.32</b>	<b>0.00</b>	<b>0.07</b>	<b>0.00</b>	<b>0.08</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>60.12</b>		<b>0.00</b>		<b>60.19</b>

**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	0.10	0.66	0.52	0.00		0.05	0.05		0.05	0.05	0.00	76.49		0.01		76.68
Paving	0.00					0.00	0.00		0.00	0.00						0.00
<b>Total</b>	<b>0.10</b>	<b>0.66</b>	<b>0.52</b>	<b>0.00</b>		<b>0.05</b>	<b>0.05</b>		<b>0.05</b>	<b>0.05</b>	<b>0.00</b>	<b>76.49</b>		<b>0.01</b>		<b>76.68</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.04	0.03	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00		60.12		0.00		60.19
<b>Total</b>	<b>0.04</b>	<b>0.03</b>	<b>0.32</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>60.12</b>		<b>0.00</b>		<b>60.19</b>

### 3.5 Architectural Coating - 2015

#### 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					
Archit. Coating	5.06					0.00	0.00		0.00	0.00						0.00
Off-Road	0.03	0.19	0.14	0.00		0.02	0.02		0.02	0.02		21.09		0.00		21.15
<b>Total</b>	<b>5.09</b>	<b>0.19</b>	<b>0.14</b>	<b>0.00</b>		<b>0.02</b>	<b>0.02</b>		<b>0.02</b>	<b>0.02</b>		<b>21.09</b>		<b>0.00</b>		<b>21.15</b>

#### 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.01	0.01	0.06	0.00	0.01	0.00	0.02	0.00	0.00	0.00		12.02		0.00		12.04
<b>Total</b>	<b>0.01</b>	<b>0.01</b>	<b>0.06</b>	<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>12.02</b>		<b>0.00</b>		<b>12.04</b>

**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					
Archit. Coating	5.06					0.00	0.00		0.00	0.00						0.00
Off-Road	0.03	0.19	0.14	0.00		0.02	0.02		0.02	0.02	0.00	21.09		0.00		21.15
<b>Total</b>	<b>5.09</b>	<b>0.19</b>	<b>0.14</b>	<b>0.00</b>		<b>0.02</b>	<b>0.02</b>		<b>0.02</b>	<b>0.02</b>	<b>0.00</b>	<b>21.09</b>		<b>0.00</b>		<b>21.15</b>

**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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.01	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00		12.02		0.00		12.04
<b>Total</b>	<b>0.01</b>	<b>0.01</b>	<b>0.06</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>12.02</b>		<b>0.00</b>		<b>12.04</b>

**4.0 Mobile Detail**

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**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	0.46	0.75	3.60	0.01	0.67	0.03	0.70	0.02	0.03	0.05		608.92		0.02		609.43
Unmitigated	0.46	0.75	3.60	0.01	0.67	0.03	0.70	0.02	0.03	0.05		608.92		0.02		609.43
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	86.13	90.72	78.93	191,441	191,441
Total	86.13	90.72	78.93	191,441	191,441

#### 4.3 Trip Type Information

Land Use	Miles			Trip %		
	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
Single Family Housing	12.40	4.30	5.40	26.10	29.10	44.80

### 5.0 Energy Detail

#### 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
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Category	lb/day										lb/day					
NaturalGas Mitigated	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09
NaturalGas Unmitigated	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## 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	lb/day										lb/day					
Single Family Housing	955.432	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09
Total		0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09

### 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	lb/day										lb/day					
Single Family Housing	0.955432	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09
Total		0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01		112.40		0.00	0.00	113.09

## 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	8.82	0.14	12.22	0.01		0.00	1.65		0.00	1.65	182.03	59.16		0.30	0.01	251.03
Unmitigated	8.82	0.14	12.22	0.01		0.00	1.65		0.00	1.65	182.03	59.16		0.30	0.01	251.03
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## 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	0.14					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.35					0.00	0.00		0.00	0.00						0.00
Hearth	8.31	0.13	11.46	0.01		0.00	1.64		0.00	1.64	182.03	57.81		0.30	0.01	249.64
Landscaping	0.02	0.01	0.77	0.00		0.00	0.00		0.00	0.00		1.35		0.00		1.38
Total	8.82	0.14	12.23	0.01		0.00	1.64		0.00	1.64	182.03	59.16		0.30	0.01	251.02

### 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	0.14					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.35					0.00	0.00		0.00	0.00						0.00
Hearth	8.31	0.13	11.46	0.01		0.00	1.64		0.00	1.64	182.03	57.81		0.30	0.01	249.64

Landscaping	0.02	0.01	0.77	0.00		0.00	0.00		0.00	0.00		1.35		0.00		1.38
Total	8.82	0.14	12.23	0.01		0.00	1.64		0.00	1.64	182.03	59.16		0.30	0.01	251.02

## 7.0 Water Detail

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### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

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### 8.1 Mitigation Measures Waste

## 9.0 Vegetation

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**Appendix C**  
**Dispersion Modeling Inputs and Cancer Risk Calculations**



**Upper Road - Construction Activities**  
**DPM Cancer Risk From Construction Activities**

DPM Emission Rates	Unmitigated	Mitigated
	Annual (lb/yr)	Annual (lb/yr)
Grading Off-Road Equipment	60.0	40.0
Off hauling	1.4	1.4
Construction Off-Road Equipment	7.25	7.25

Modeling Information				
Model:	ISCST3 with screening meteorology			
Source	Construction Areas & Road			
Source Type	Area & Line-Area			
Distance to Residences (ft)	variable			
Receptor Height (m)	1.8 m			
Meteorological Data	Screening meteorological data*			
Area Source Parameters	Unmitigated		Mitigated	
	Grading	Construction	Grading	Construction
Area Source #1 Size (m <sup>2</sup> )	4007	413	4007	413
Emission Rate (g/s/m <sup>2</sup> )**	1.19E-07	5.08E-08	7.92E-08	5.08E-08
Area Source #1 Size (m <sup>2</sup> )	1552	729	1552	729
Emission Rate (g/s/m <sup>2</sup> )**	1.19E-07	5.08E-08	7.92E-08	5.08E-08
Area Source #1 Size (m <sup>2</sup> )	1708	912	1708	912
Emission Rate (g/s/m <sup>2</sup> )**	1.19E-07	5.08E-08	7.92E-08	5.08E-08
Release Height (m)	6	6	6	6
<b>Truck Route (Line-Area Source)</b>				
Truck Route Length (ft)	1868	1868	1868	1868
Emission Rate (g/s)	2.08E-05	2.05E-06	2.08E-05	2.05E-06

\* SCREEN3 Screening meteorological data for all hours of the day (A-F stability)

\*\* Emission rate based on annual emissions, 8,760 hours per year, and size of area source.

Cancer Risk Calculation Method								
Inhalation Dose = C <sub>air</sub> x DBR x A x HD x EF x ED x 10 <sup>-6</sup> / AT								
Where: C <sub>air</sub> = concentration in air (µg/m <sup>3</sup> )								
DBR = daily breathing rate (L/kg body weight-day)								
A = Inhalation absorption factor								
EF = Exposure frequency (days/year)								
HD = daily exposure (hours/day/24)								
ED = Exposure duration (years)								
AT = Averaging time period over which exposure is averaged.								
10 <sup>-6</sup> = Conversion factor								
<b>Inhalation Dose Factors</b>								
Exposure Type	Value <sup>1</sup>							
	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential - Child (70-Year Exposure)	581	1	24	7	50	350	1	25,550
Residential - Adult (70-Year Exposure)	302	1	24	7	50	350	1	25,550
<sup>1</sup> Default values recommended by OEHHA & Bay Area Air Quality Management District								
Cancer Risk (per million) = Inhalation Dose x ASF x CPF x 10 <sup>6</sup>								
= URF x C <sub>air</sub> x ASF								
Where: CPF = Cancer potency factor (mg/kg-day) <sup>-1</sup>								
ASF = Age Sensitivity Factor								
URF = Unit risk factor (cancer risk per µg/m <sup>3</sup> )								
<b>Unit Risk Factor for DPM</b>								
Exposure Type	CPF (mg/kg-day) <sup>-1</sup>	ASF (-)						
Residential - Child (70-Year Exposure)	1.10E+00	10						
Residential - Adult (70-Year Exposure)	1.10E+00	1						

Model Results and Maximum Cancer Risks						
Exposure Type	Unmitigated Proposed Project			Mitigated Proposed Project		
	DPM/PM2.5		DPM Cancer Risk (per million)	DPM/PM2.5		DPM Cancer Risk (per million)
	Max 1-Hr (µg/m <sup>3</sup> )	Annual Ave (µg/m <sup>3</sup> )		Max 1-Hr (µg/m <sup>3</sup> )	Annual Ave (µg/m <sup>3</sup> )	
<b>Residential Child</b>						
Grading	0.991	0.099	<b>8.68</b>	0.660	0.066	<b>5.78</b>
Off Hauling	0.032	0.003	<b>0.28</b>	0.032	0.003	<b>0.28</b>
Construction	0.164	0.016	<b>1.44</b>	0.164	0.016	<b>1.44</b>
<b>Total Project with off hauling</b>		0.119	<b>10.4</b>		0.086	<b>7.5</b>
<b>Total Project without off hauling</b>		0.116	<b>10.1</b>			<b>7.2</b>
<b>Residential Adult</b>						
Grading	0.991	0.099	<b>0.45</b>	0.660	0.066	<b>0.30</b>
Off Hauling	0.032	0.003	<b>0.01</b>	0.032	0.003	<b>0.01</b>
Construction	0.164	0.016	<b>0.07</b>	0.164	0.016	<b>0.07</b>
<b>Total Project with off hauling</b>		0.119	<b>0.5</b>		0.086	<b>0.4</b>
<b>Total Project without off hauling</b>			<b>0.5</b>			<b>0.4</b>

Note: Conversion factor of 0.1 to convert annual concentration from 1-hour maximum