

# ***ATTACHMENT 14***

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***HEALTH RISK ASSESSMENT FOR EMERGENCY GENERATOR  
OPERATIONS***

## MEMO

Date: **July 9, 2020**

To: **Bibiana Alvarez, Project Manager, Analytical Environmental Services**

From: **Shari Beth Libicki, PhD**  
**Taylor Vencill, MS, PE**

Subject: **HEALTH RISK ASSESSMENT FOR PROPOSED EMERGENCY GENERATOR OPERATIONS AT POINT MOLATE, RICHMOND, CALIFORNIA**

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Ramboll US Corporation (Ramboll) conducted a Health Risk Assessment (HRA) for the proposed emergency generator operations as part of the Project at Point Molate in Richmond, California ("the Project"). This memo details the methods and assumptions used in the HRA, including emissions estimation and dispersion modelling.

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Ramboll understands that the Project anticipates the installation of five (5) emergency generators to support operations within commercial buildings in the Winehaven Historic District of the proposed Project area. Ramboll also understands that if the Project does not proceed with implementation of on-site wastewater treatment, emergency generators would be required at each of three (3) sewage pipeline lift stations which would transport wastewater to the municipal wastewater treatment plant.

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The proposed fire station will also be equipped with an emergency generator, estimated to be approximately 20 kW and fired on propane. Health impacts from propane-fueled equipment are typically very small compared to diesel-fueled generators; thus, given the size and fuel of the generator here, health impacts from the fire station operations are expected to be minimal, and were not modeled as part of this analysis.

### THRESHOLDS OF SIGNIFICANCE

The City of Richmond is the lead agency responsible for Project approval. Per City of Richmond requirements, Ramboll evaluated the Project in accordance with the current Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Guidelines, which were updated in May 2017.<sup>1</sup> These guidelines present methods for evaluating compliance with CEQA as well as thresholds for determining significance. With respect to the emergency generator HRA, the BAAQMD thresholds of significance are as follows:

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<sup>1</sup> BAAQMD. 2017. California Environmental Quality Act (CEQA) Air Quality Guidelines. May. Available online at: [http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa\\_guidelines\\_may2017-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en)

- Increased cancer risk of >10.0 in a million
- Increased non-cancer risk of > 1.0 HI (chronic or acute)
- Ambient PM<sub>2.5</sub> increase: > 0.3 µg/m<sup>3</sup> annual average

Ramboll evaluated each of these thresholds for on-site sensitive receptors, assuming all eight parcels may include residential land uses, as well as the nearest off-site residential areas. Within certain multi-story buildings near proposed generators, elevated residential receptors were modeled at 3meter vertical intervals up to the projected height of each building in order to represent potential residents living on each building floor. The model receptor grid is shown in **Figure 1** and specifies the receptors modeled at ground-level and at elevated heights. Other than receptors within the nearest off-site residential area, no additional sensitive receptors were identified in the Project vicinity (see **Appendix A**).

### **EMERGENCY GENERATOR OPERATIONAL EMISSIONS**

The following sections describe the input data and methodologies used in the emergency generator HRA. Detailed information for each section can be found in the referenced tables and appendices.

#### **Toxic Air Contaminant (TAC) Emissions**

The TAC emissions associated with the operation of Project emergency generators were calculated with the following assumptions:

1. Diesel Particulate Matter (DPM): DPM emissions were used to evaluate the cancer risk and non-cancer chronic Hazard Index (HI) from emergency generator operation. In this analysis, total Particulate Matter (PM) exhaust emissions were assumed as DPM. Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen (California Environmental Protection Agency [Cal/EPA] 1998)<sup>2</sup>. Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that “potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components” (OEHHA 2003). The DPM analyses for cancer and chronic hazards will be based on the surrogate approach, as recommended by Cal/EPA. Emission factors for each of the generators are assumed based on California Air Resources Board (CARB) Off Road Compression - Ignition Diesel Engine Standards<sup>3</sup>. Proposed emergency generator engines were assumed to be certified Tier 4.

<sup>2</sup> California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment (OEHHA). 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel’s April 22, 1998, meeting.

<sup>3</sup> Cal/EPA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment (OEHHA). February. Available online at: [http://oehha.ca.gov/air/hot\\_spots/hotspots2015.html](http://oehha.ca.gov/air/hot_spots/hotspots2015.html).

2. PM<sub>2.5</sub>: Exhaust Particulate Matter less than 2.5 microns in diameter (PM<sub>2.5</sub>) emissions were used to evaluate the PM<sub>2.5</sub> concentration due to emergency generator operation. PM<sub>2.5</sub> emissions were conservatively assumed to be equal to total PM emissions, although some particles categorized as total PM are, in actuality, larger than PM<sub>2.5</sub>.

Modeled emissions are presented in **Table 1** as total PM from emergency generator operations; PM<sub>2.5</sub> and DPM emissions are conservatively assumed to be equivalent to these values.

### Emergency Generator Health Risk Assessment

Ramboll analyzed Project emergency generator-related risks by estimating ambient air concentrations of DPM and PM<sub>2.5</sub>. To estimate air concentrations of DPM and PM<sub>2.5</sub>, Ramboll used AERMOD, a steady-state Gaussian plume model developed by USEPA for regulatory applications. For each receptor location, AERMOD generates air concentrations that result from emissions from multiple sources. If unit emissions (i.e., 1 g/s) are modeled, the resultant value for each receptor location is called the air dispersion factor. AERMOD requires emission source locations and release parameters, receptor locations, and processed meteorological data. Input meteorological data sources include surface data from the Chevron Long Wharf meteorological observation station, upper air data from Oakland International Airports, and land cover data from the 1992 National Land Cover Data Set of the United States Geological Survey. Ramboll processed five years (2013, 2014, 2015, 2017, and 2018) of complete meteorological data from nearby stations with the USEPA's meteorological data preprocessor, AERMET. A wind rose for this meteorological data set is shown in **Figure 2**.

#### Model Source Locations

A total of five commercial generators are to be installed to service buildings 1, 6 and 10 in the Whitehaven Historic District as part of the Project. The most probable locations of these generators were provided by the Project Sponsor and are shown in **Figure 3**. Each generator was modeled assuming a 50-foot setback from the closest Project building.

Two model source setups were analyzed: one where the on-site wastewater treatment is included in the Project Plan (hereby referred to as the "WWTP scenario"), and one where on-site wastewater treatment will be excluded from the Project Plan (hereby referred to as the "no-WWTP scenario"). In the WWTP scenario, only the five (5) emergency generators in the Winehaven Historic District are modeled, assuming that two (2) sewage pipeline lift station generators will be modeled as part of a separate WWTP HRA that is also being conducted to support this Project. In the no-WWTP scenario, all five (5) emergency generators in the Winehaven Historic District are modeled, along with three (3) emergency generators associated with lift stations along the sewage pipeline connecting the Project site to the local wastewater treatment plant. These two source setups are shown in **Figure 3**.

#### Model Source Parameters

Emissions for emergency generator operations were modeled as point sources, assuming up to 50 hours of operation annually per generator for mandatory testing and maintenance. Per BAAQMD guidance, health risks due to emergency operation were not modeled.<sup>4</sup> Model emission rates assume emissions are averaged across 8,760 hours per year, assuming generators may operate at any hour of the day. Generator release parameters (including stack height, diameter, exit temperature, and exit velocity) are determined based on default parameters from BAAQMD given in the San Francisco

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<sup>4</sup> BAAQMD. 2019. Policy: Calculating Potential to Emit for Emergency Backup Power Generators. Available at: [https://www.baaqmd.gov/~media/files/engineering/policy\\_and\\_procedures/banking-and-offsets/calculating-pte-for-emergency-generators-06032019-pdf.pdf?la=en](https://www.baaqmd.gov/~media/files/engineering/policy_and_procedures/banking-and-offsets/calculating-pte-for-emergency-generators-06032019-pdf.pdf?la=en)

Citywide Health Risk Assessment: Technical Support Documentation<sup>5</sup>. Source parameters for all emergency generators are shown in **Table 2**, and AERMOD input files are provided electronically as **Appendix B**. As discussed above, emissions were modeled using the unit rate emission factor method, such that the model estimates dispersion factors are based on an emission rate of 1 g/s and the dispersion factors have units of [ $\mu\text{g}/\text{m}^3$ ]/[g/s]. Estimated emissions were multiplied by the dispersion factors to obtain concentrations.

Building Downwash

The AERMOD model incorporates Plume Rise Modeling Enhancements (PRIME) to account for downwash. The direction-specific building downwash dimensions used as inputs were determined by the latest version (04274) of the Building Profile Input Program, PRIME (BPIP PRIME). BPIP PRIME uses building downwash algorithms incorporated into AERMOD to account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures.

On-site buildings nearby modeled generator sources were evaluated for downwash effects on each modeled point source. Eighteen onsite buildings and eight off-site buildings were included in the building downwash evaluation. Modeled buildings are shown in **Figure 4** and BPIP PRIME output is included electronically with AERMOD modeling files in **Appendix B**.

**Exposure Parameters and Cancer Risk Calculation**

This analysis followed the recommended methodology from the 2015 Office of Environmental Health Hazard Assessment (OEHHA) Hot Spots Guidance as adopted in the BAAQMD HRA Guidelines<sup>6</sup>. Ramboll conservatively evaluated Project impacts due to emergency generator emissions using default exposure assumptions for a resident child from OEHHA. The resident child scenario assumes a much higher daily breathing rate and age-sensitivity factor (ASF)<sup>7</sup> than other sensitive receptor populations and therefore is the most conservative scenario to evaluate for this analysis. The exposure parameters used to estimate excess lifetime cancer risks for a resident child are presented in **Table 3**.

The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation,  $IF_{inh}$ , can be calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF * ASF}{AT}$$

Where:

- $IF_{inh}$  = Intake Factor for Inhalation ( $\text{m}^3/\text{kg}\text{-day}$ )
- DBR = Daily Breathing Rate (L/kg-day)
- FAH = Fraction of Time at Home (unitless)
- EF = Exposure Frequency (days/year)
- ED = Exposure Duration (years)

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<sup>5</sup> San Francisco Department of Public Health. 2020. San Francisco Citywide Health Risk Assessment: Technical Support Documentation (Table 7). February 2020. Available online at: [https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air\\_Pollutant\\_Exposure\\_Zone\\_Technical\\_Documentation\\_2020.pdf](https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf)

<sup>6</sup> BAAQMD. 2016. Proposed Health Risk Assessment Guidelines. Air Toxics NSR program. January. Available at: [http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines\\_clean\\_jan\\_2016-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines_clean_jan_2016-pdf.pdf?la=en)

<sup>7</sup> Ibid.

- CF = Conversion Factor, 0.001 (m<sup>3</sup>/L)
- ASF = Age Sensitivity Factor (unitless)
- AT = Averaging Time (days)

The chemical intake or dose is estimated by multiplying the inhalation intake factor,  $IF_{inh}$ , by the chemical concentration in air. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the OEHHA Hot Spots guidance<sup>8</sup>.

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. This HRA evaluated theoretical exposures to TACs for two categories of potential adverse health effects, cancer and non-cancer endpoints. Toxicity values used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment.

Excess lifetime cancer risk and chronic hazard HI calculations for operation of generators utilized the toxicity values for DPM. Toxicity values for DPM<sup>9</sup> are as presented in **Table 4**.

Cancer risk and chronic HI were calculated from ambient annual concentrations using intake factors, cancer potency factors, and chronic reference exposure levels calculated consistent with the 2015 OEHHA Hot Spots Guidance<sup>10</sup>. DPM does not have an associated acute HI reference exposure level, so acute HI impacts were not evaluated.

Results from the health risk assessment are shown in **Table 5**. The maximum cancer risk from emergency generator operations is calculated to be 1.5 in 1 million for both the WWTP and no-WWTP scenarios. Emergency generator operations under this configuration option would also result in a chronic HI of 0.0004, and maximum PM<sub>2.5</sub> concentration of 0.0021 micrograms per cubic meter (µg/m<sup>3</sup>) for both the WWTP and no-WWTP scenarios. Cancer risks from the WWTP scenario are shown for each modeled receptor in **Figure 5**, and risks from the no-WWTP scenario are shown in **Figure 6**, noting that for buildings where elevated receptors are modeled, risks from the maximum-risk elevation are shown at each receptor location.

Impacts presented here represent a portion of overall project operational impacts. For a complete evaluation of Project operational impacts, please refer to the Project Operational Health Risk Assessment Memo.

Attachments:

Tables

Figures

Appendix A: Sensitive Receptor Search Results

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<sup>8</sup> Cal/EPA. 2015. The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment. February. Available at: <https://oehha.ca.gov/media/downloads/cmr/2015guidancemanual.pdf>

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

Appendix B: AERMOD Input Files (provided Electronically)

## TABLES



**Table 1  
Generator Model Emission Rates  
Point Molate  
Richmond, CA**

Source	Engine Tier	Size <sup>1,2</sup>		Annual Operation Hours	Pollutant	Emission Factor <sup>1</sup>	Emissions <sup>2</sup>	
		(kW)	(hp)				(g/hp-hr)	(tpy)
Winehaven 1	Tier 4 Final	500	671	50	DPM	0.01	3.7E-04	1.1E-05
Winehaven 2		500	671	50		0.01	3.7E-04	1.1E-05
Winehaven 3		500	671	50		0.01	3.7E-04	1.1E-05
Winehaven 4		500	671	50		0.01	3.7E-04	1.1E-05
Winehaven 5		500	671	50		0.01	3.7E-04	1.1E-05
Emergency Generator - Lift Pump 1		50	67	50		0.02	7.4E-05	2.1E-06
Emergency Generator - Lift Pump 2		50	67	50		0.02	7.4E-05	2.1E-06
Emergency Generator - Lift Pump 3		175	235	50		0.01	1.3E-04	3.7E-06

**Notes:**

- <sup>1</sup> Diesel engine emission factors are based on CARB standards for diesel generator engines. Emission factors for DPM are assumed to be equal to total Particulate Matter.
- <sup>2</sup> Modeled emission rates assume emissions are spread across 8760 hours of operation/year.

**Abbreviations:**

DPM - Diesel Particulate Matter	hr - hour
g/s - grams per second	kW - kilowatt
hp - horsepower	tpy - tons per year

**References:**

California Air Resources Board Non-road Diesel Engine Certification Tier Chart. Available online at:  
<https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart>

**Table 2**  
**Generator Model Source Parameters**  
**Point Molate**  
**Richmond, CA**

<b>Source<sup>1</sup></b>	<b>Stack Height (m)</b>	<b>Temp (K)</b>	<b>Release Velocity (m/s)</b>	<b>Diameter (m)</b>
Winehaven 1	3.66	739.8	45.3	0.18288
Winehaven 2	3.66	739.8	45.3	0.18288
Winehaven 3	3.66	739.8	45.3	0.18288
Winehaven 4	3.66	739.8	45.3	0.18288
Winehaven 5	3.66	739.8	45.3	0.18288
Emergency Generator - Lift Pump 1	3.66	739.8	45.3	0.18288
Emergency Generator - Lift Pump 2	3.66	739.8	45.3	0.18288
Emergency Generator - Lift Pump 3	3.66	739.8	45.3	0.18288

**Notes:**

- <sup>1</sup>. Release parameters are assumed based on default parameters from BAAQMD given in the San Francisco Citywide Health Risk Assessment: Technical Support Documentation.

**Abbreviations:**

K - Kelvin  
m - meters  
m/s - meters per second  
WWTP - Waste Water Treatment Plant

**References:**

San Francisco Department of Public Health. 2020. San Francisco Citywide Health Risk Assessment: Technical Support Documentation (Table 7). February 2020. Available online at:  
[https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air\\_Pollutant\\_Exposure\\_Zone\\_Technical\\_Documentation\\_2020.pdf](https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf)

**Table 3  
Cancer Risk Exposure Parameters  
Point Molate  
Richmond, California**

Receptor Type	Receptor Age Group	Exposure Parameters									
		Daily Breathing Rate (DBR) <sup>1</sup> (L/kg-day)	Exposure Duration (ED) <sup>2</sup> (years)	Fraction of Time at Home (FAH) <sup>3</sup> (unitless)	Exposure Frequency (EF) <sup>4</sup> (days/year)	Conversion Factor (CF) (m <sup>3</sup> /L)	Averaging Time (AT) (days)	Modeling Adjustment Factor (MAF) <sup>5</sup> (unitless)	Intake Factor, Inhalation (IF <sub>inh</sub> ) (m <sup>3</sup> /kg-day)	Age Sensitivity Factor (ASF)	Cumulative Intake Factor, Inhalation (IF <sub>inh</sub> ) (m <sup>3</sup> /kg-day)
Resident (Onsite & Offsite)	3rd Trimester	361	0.25	1	350	0.001	25,550	1	0.0012	10	0.68
	Age 0-<2 Years	1,090	2	1	350	0.001	25,550	1	0.030	10	
	Age 2-<16 Years	572	14	1	350	0.001	25,550	1	0.11	3	
	Age 16-30 Years	261	14	0.73	350	0.001	25,550	1	0.037	1	

**Notes:**

- Daily breathing rates for residents reflect breathing rates from Cal/EPA 2015 as follows: 95th percentile for 3rd trimester and age 0-<2 years; 80th percentile for ages 2-<9 years, 2-<16 years, and 16-30 years.
- The total exposure duration for operation reflects the default residential exposure duration from Cal/EPA 2015.
- Fraction of time at home for residential receptors was conservatively assumed to be 1 for age groups younger than 16 years old (100%). The FAH of 0.73 for age group 16 and above is the default value from Cal/EPA 2015.
- Exposure frequency is the default exposure frequency for residents from Cal/EPA 2015.

**Calculation:**

Resident:

$$IF_{inh} = DBR * ED * FAH * EF * CF / AT$$

$$CF = 0.001 \text{ (m}^3\text{/L)}$$

$$\text{Unit Risk Factor} = \text{Cumulative IF}_{inh} \times \text{Inhalation CPF}/1000$$

**Abbreviations:**

Cal/EPA - California Environmental Protection Agency

DPM - Diesel Particulate Matter

L - liter

kg - kilogram

m<sup>3</sup> - cubic meter

**Reference:**

Cal/EPA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment (OEHHA). February. Available online at: [http://oehha.ca.gov/air/hot\\_spots/hotspots2015.html](http://oehha.ca.gov/air/hot_spots/hotspots2015.html).



**Table 4**  
**Generator Toxicity Parameters**  
**Point Molate**  
**Richmond, CA**

Chemical	CAS No.	Cancer Potency Factor	Chronic REL
		[mg/kg-day] <sup>-1</sup>	[µg/m <sup>3</sup> ]
DPM	9901	1.1	5.0

**Abbreviations:**

Cal/EPA - California Environmental Protection Agency

DPM - Diesel Particulate Matter

REL - Reference Exposure Level

**Sources:**

California Environmental Protection Agency (Cal/EPA), Air Resources Board (ARB). 2011. Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. February 14. Available at <http://www.arb.ca.gov/toxics/healthval/contable.pdf>.

**Table 5**  
**Generator Health Risk Assessment Summary**  
**Point Molate**  
**Richmond, California**

**Project Risks Assuming On-site Wastewater Treatment<sup>1</sup>**

MEIR Type <sup>2</sup>	Cancer Risk	Chronic HI	PM <sub>2.5</sub>	
	(in a million)	(unitless ratio)	(µg/m <sup>3</sup> )	
Parcel A	0.083	2.2E-05	1.1E-04	
Parcel B	0.15	4.0E-05	2.0E-04	
Parcel C	0.20	5.4E-05	2.7E-04	
Parcel D	0.28	7.4E-05	3.7E-04	
Parcel E	0.064	1.7E-05	8.6E-05	
Parcel F	0.56	1.5E-04	7.5E-04	
Parcel G	0.50	1.4E-04	6.8E-04	
Parcel H	1.5	4.1E-04	0.0021	
Offsite	0.024	6.4E-06	3.2E-05	
<b>Maximum</b>	<b>1.5</b>	<b>4.1E-04</b>	<b>0.0021</b>	
<b>Location of MEIR<sup>3</sup></b>				
Onsite - Parcel H	UTMx	551,137	551,137	551,137
	UTMy	4,200,734	4,200,734	4,200,734
	Height (m)	7.8	7.8	7.8
Offsite	UTMx	552,965	552,965	552,965
	UTMy	4,198,236	4,198,236	4,198,236
	Height (m)	1.8	1.8	1.8

**Project Risks Assuming No On-site Wastewater Treatment<sup>4</sup>**

MEIR Type <sup>2</sup>	Cancer Risk	Chronic HI	PM <sub>2.5</sub>	
	(in a million)	(unitless ratio)	(µg/m <sup>3</sup> )	
Parcel A	0.11	3.0E-05	1.5E-04	
Parcel B	0.16	4.3E-05	2.1E-04	
Parcel C	0.21	5.6E-05	2.8E-04	
Parcel D	0.29	7.7E-05	3.9E-04	
Parcel E	0.068	1.8E-05	9.1E-05	
Parcel F	0.57	1.5E-04	7.6E-04	
Parcel G	0.51	1.4E-04	6.9E-04	
Parcel H	1.5	4.1E-04	0.0021	
Offsite	0.21	5.8E-05	2.9E-04	
<b>Maximum</b>	<b>1.5</b>	<b>4.1E-04</b>	<b>0.0021</b>	
<b>Location of MEIR<sup>3</sup></b>				
Onsite - Parcel H	UTMx	551,137	551,137	551,137
	UTMy	4,200,734	4,200,734	4,200,734
	Height (m)	7.8	7.8	7.8
Offsite	UTMx	553,265	553,265	553,265
	UTMy	4,197,996	4,197,996	4,197,996
	Height (m)	1.8	1.8	1.8

**Table 5**  
**Generator Health Risk Assessment Summary**  
**Point Molate**  
**Richmond, California**

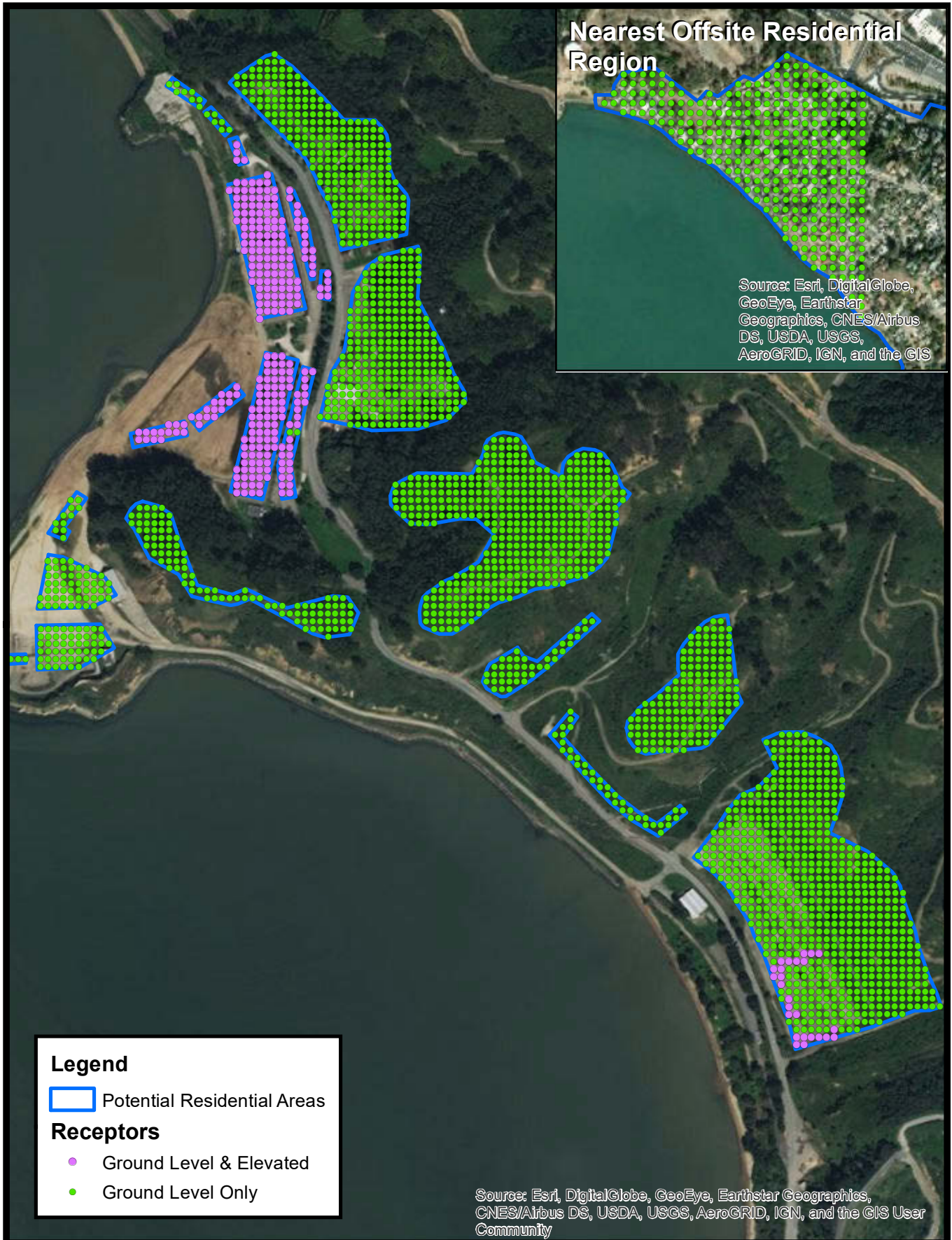
**Notes**

1. The Project scenario assuming on-site wastewater treatment includes five generators in the Winehaven Historic District. Under this scenario, two additional emergency generators would be needed at on-site lift stations along the sewage pipeline. However, the impact of these two lift generators will be modeled in the WWTP health risk assessment, and are therefore not included in the emergency generator analysis.
2. Risks were calculated at receptors covering all on-site buildings, as well as at the nearest off-site residences. All on-site receptors were modeled as potential residents exposed to risks for 30 years beginning during the third trimester. Risks are reported for the maximum-risk receptor found in each parcel or off-site area.
3. The location is given for the overall maximally-exposed individual resident (MEIR) both on-site and off-site.
4. The Project scenario assuming no on-site wastewater treatment includes five generators in the Winehaven Historic District and three additional emergency generators along the sewage pipeline connecting to the municipal wastewater treatment plant. Impacts from all eight generators are included in this scenario.

**Abbreviations**

µg - micrograms  
HI - health index  
m<sup>3</sup> - cubic meter  
MEIR - maximally exposed individual receptor  
PM<sub>2.5</sub> - particulate matter with diameter < 2.5 micrometers  
UTMx - universal transverse mercator x coordinate  
UTMy - universal transverse mercator y coordinate  
WWTP - wastewater treatment plant

## FIGURES



**Nearest Offsite Residential Region**

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS

**Legend**

Potential Residential Areas

**Receptors**

- Ground Level & Elevated
- Ground Level Only

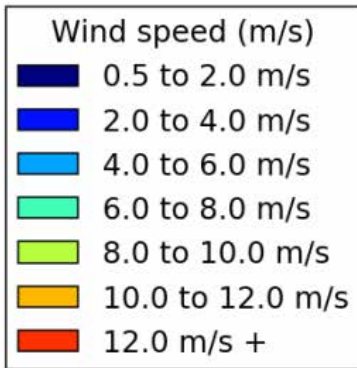
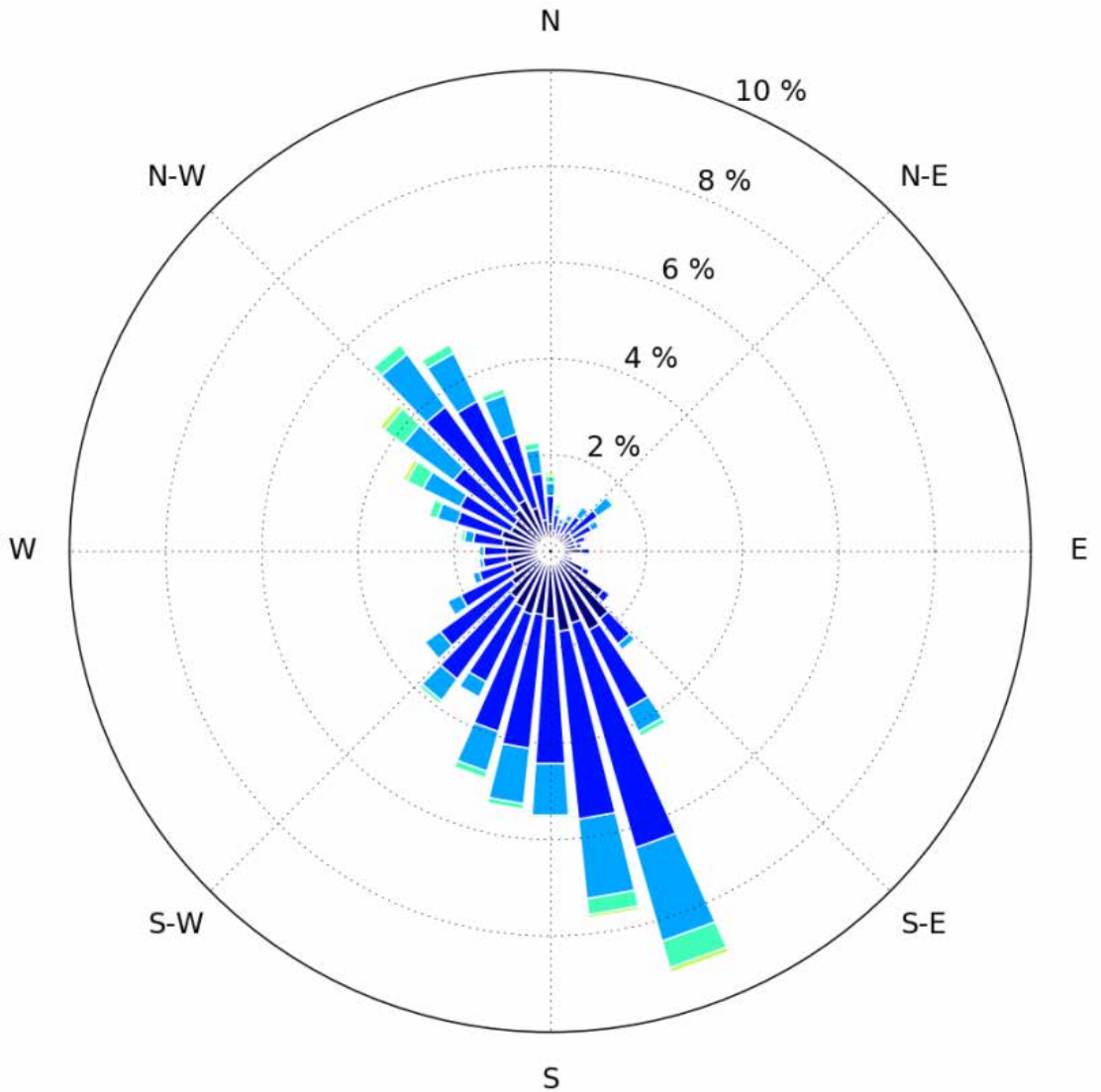
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Modeled Receptors**  
 Point Molate  
 Richmond, California

**FIGURE**  
**1**





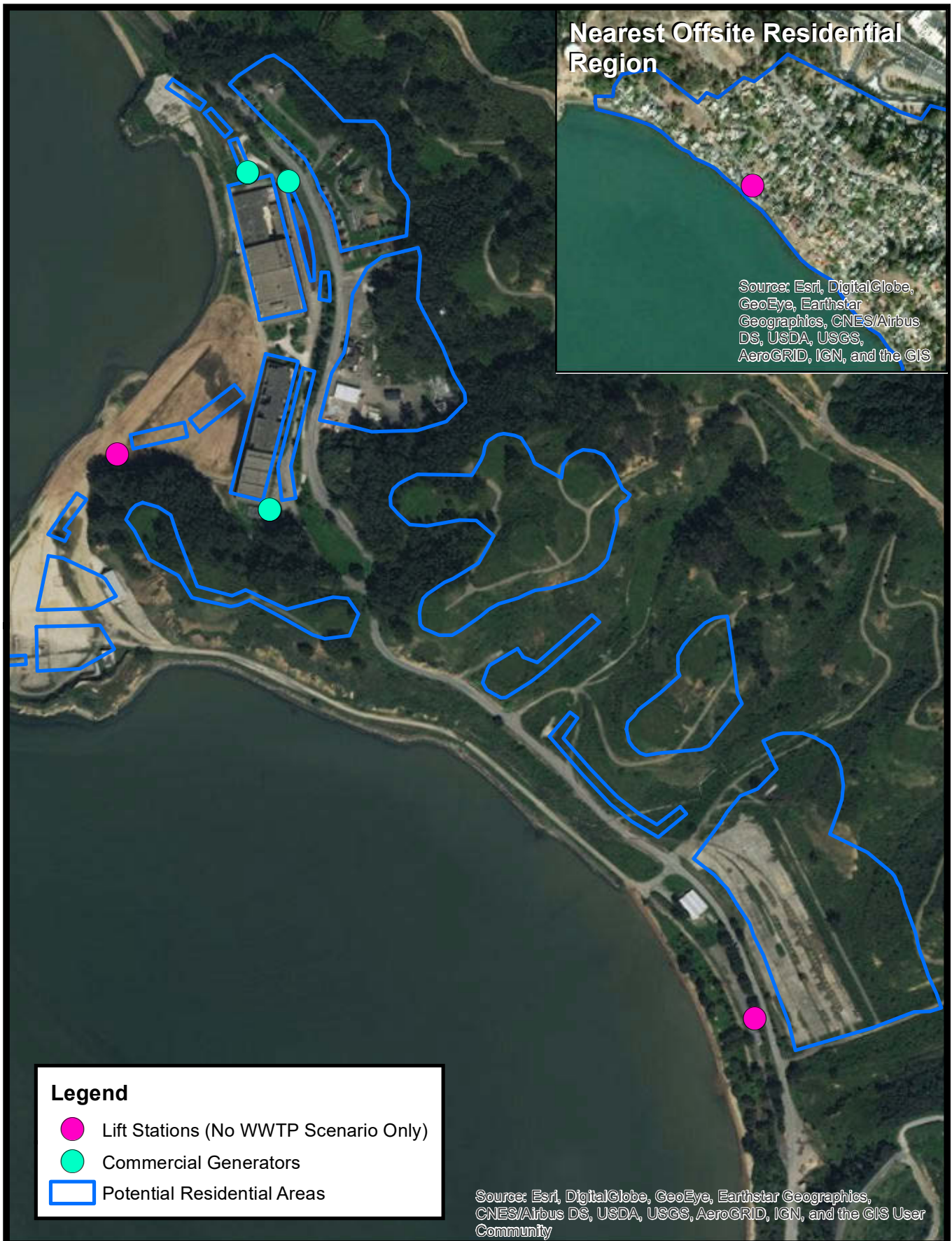
Dataset information: (wind speed in m/s)	
43800	total count
70	total calm
0.2 %	calm
0	missing
0.0 %	missing
2.9	wind speed avg.
0.5	min. wind speed
17.6	max. wind speed



### Windrose for Chevron Long Wharf

Point Molate  
Richmond, California

FIGURE  
**2**



**Model Generator Configuration**

Point Molate  
Richmond, California

**FIGURE  
3**

DRAFTED BY: EGR

DATE: 4/9/2020

PROJECT: 1690014031



**Nearest Offsite Residential Region**

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS

**Legend**

- Modeled Buildings
- Potential Residential Areas

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Modeled Project and Offsite Buildings**

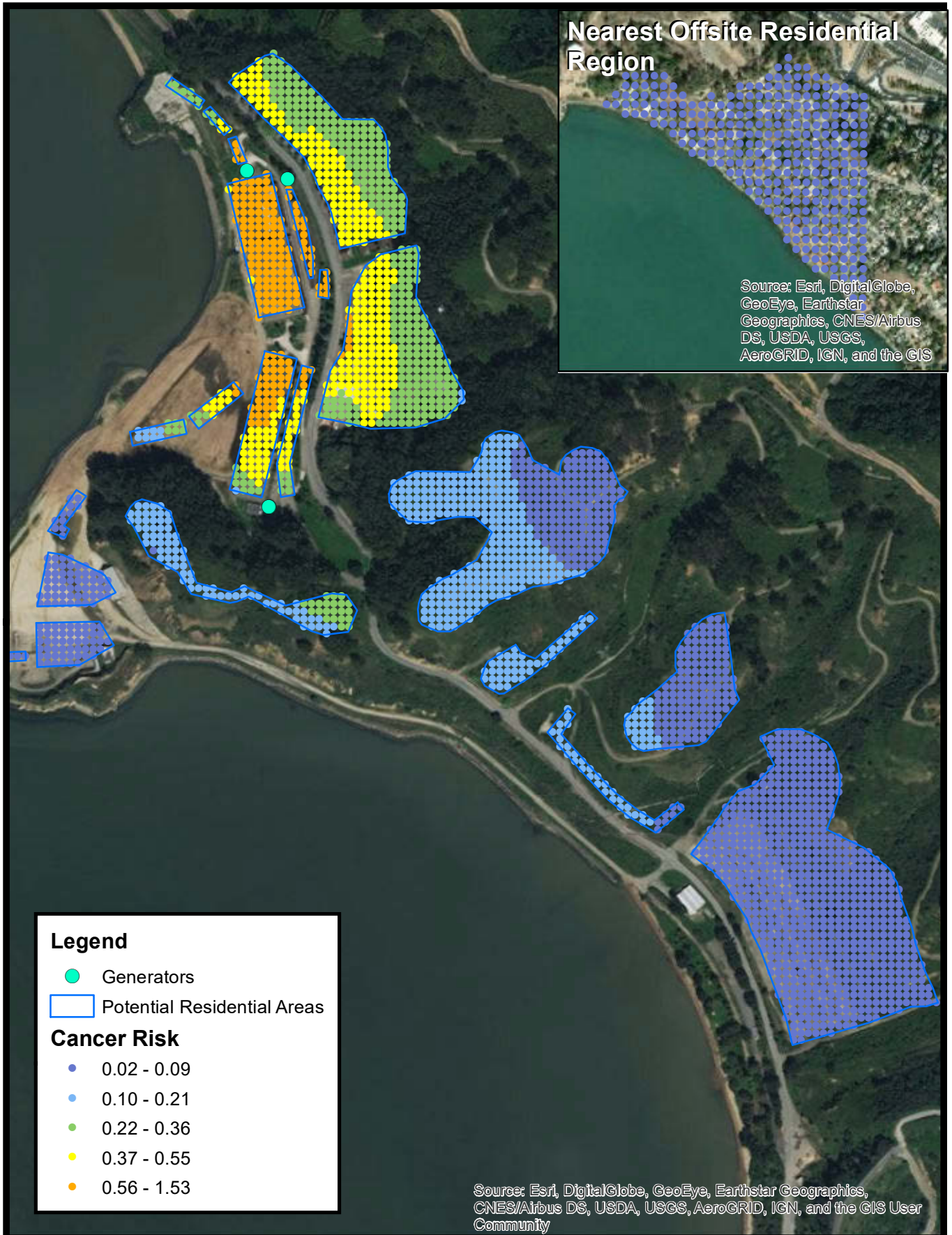
Point Molate  
Richmond, California

**FIGURE  
4**

DRAFTED BY: EGR

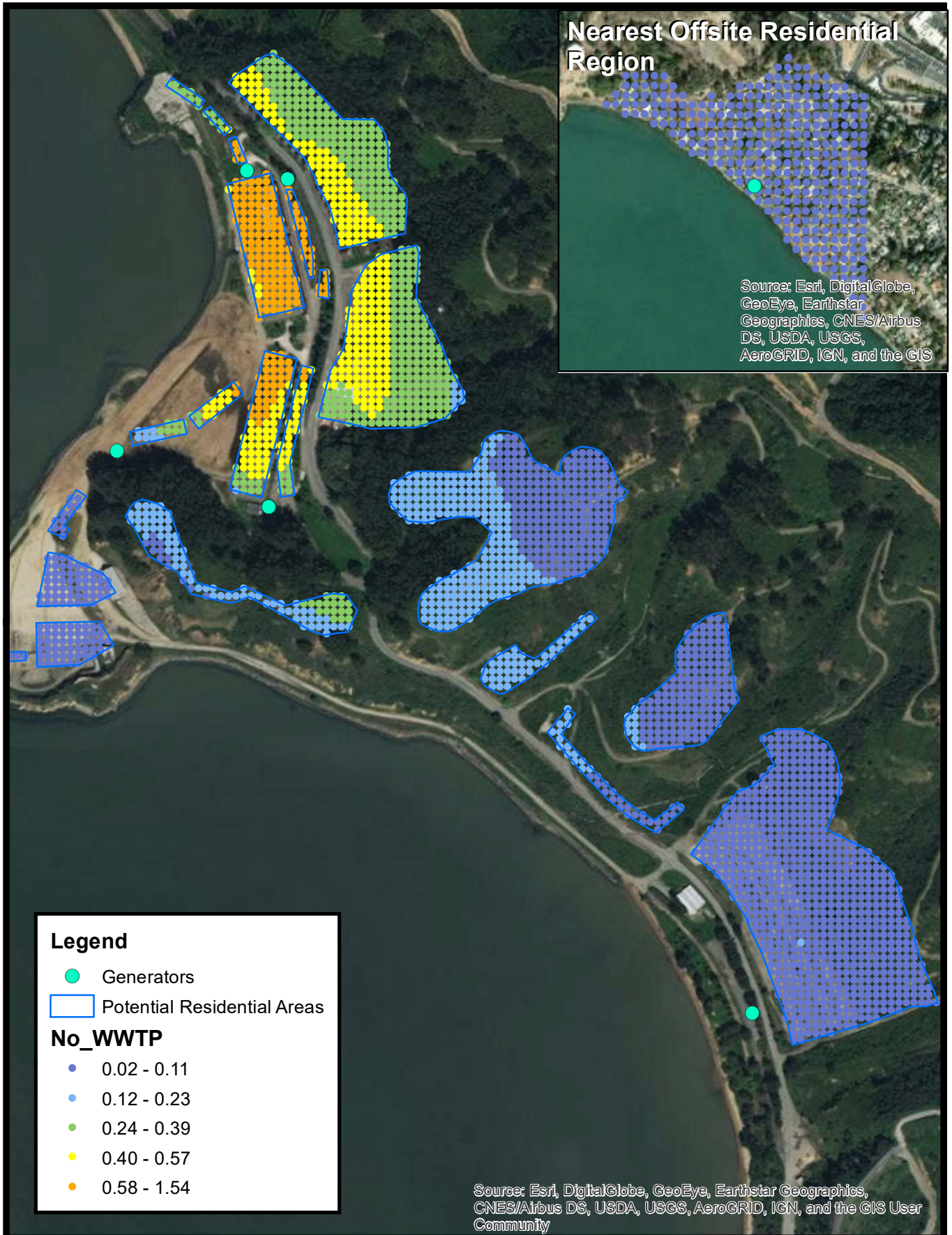
DATE: 4/9/2020

PROJECT: 1690014031



**Generator Cancer Risks  
With WWTP Scenario  
Point Molate  
Richmond, California**

**FIGURE  
5**



**Generator Cancer Risks  
No WWTP Scenario  
Point Molate  
Richmond, California**

**FIGURE  
6**

**APPENDIX A**  
**SENSITIVE RECEPTOR SEARCH RESULTS**

**Point Molate**

2100 Stenmark Dr  
Richmond, CA 94801

Inquiry Number: 5744904.1s  
August 07, 2019

# EDR Offsite Receptor Report



6 Armstrong Road, 4th floor  
Shelton, CT 06484  
Toll Free: 800.352.0050  
[www.edrnet.com](http://www.edrnet.com)

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**Thank you for your business**  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

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## EXECUTIVE SUMMARY

A search of available records was conducted by Environmental Data Resources, Inc. (EDR). The EDR Offsite Receptor Report provides information which may be used to comply with the Clean Air Act Risk Management Program 112-R. *"The rule requires that you estimate in the RMP residential populations within the circle defined by the endpoint for your worst-case and alternative release scenarios (i.e., the center of the circle is the point of release and the radius is the distance to the endpoint). In addition, you must report in the RMP whether certain types of public receptors and environmental receptors are within the circles."*

The address of the subject property, for which the search was intended, is:

POINT MOLATE  
2100 STENMARK DR  
RICHMOND, CA 94801

Distance Searched: 1.000 miles from subject property

### RECEPTOR SUMMARY

An X indicates the presence of the receptor within the search radius.

#### Residential Population

Estimated population within search radius: 804 persons.

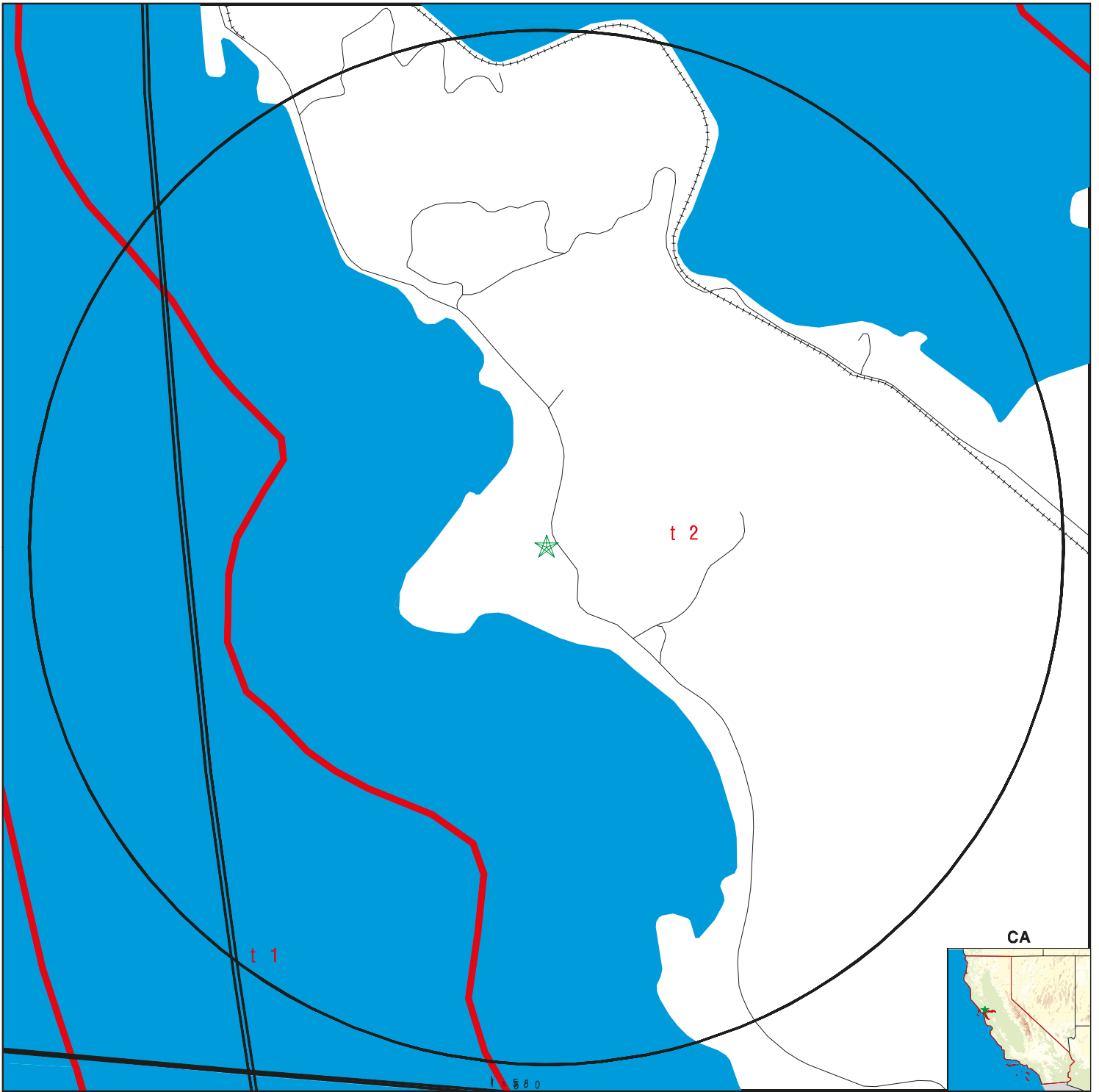
#### Other Public Receptors

Type	Within Search Radius	Sites Total
Day Care Centers:	<input type="checkbox"/>	
Medical Centers:	<input type="checkbox"/>	
Nursing Homes:	<input type="checkbox"/>	
Schools:	<input type="checkbox"/>	
Hospitals:	<input type="checkbox"/>	
Colleges:	<input type="checkbox"/>	
Arena:	<input type="checkbox"/>	
Prison:	<input type="checkbox"/>	

#### Environmental Receptors

Type	Within Search Radius	Sites Total
Federal Land:	<input type="checkbox"/>	

# CENSUS MAP - 5744904.1s



- ★ Target Property
- ⚡ Roads
- ⚡ Waterways
- ⚡ Census Tracts



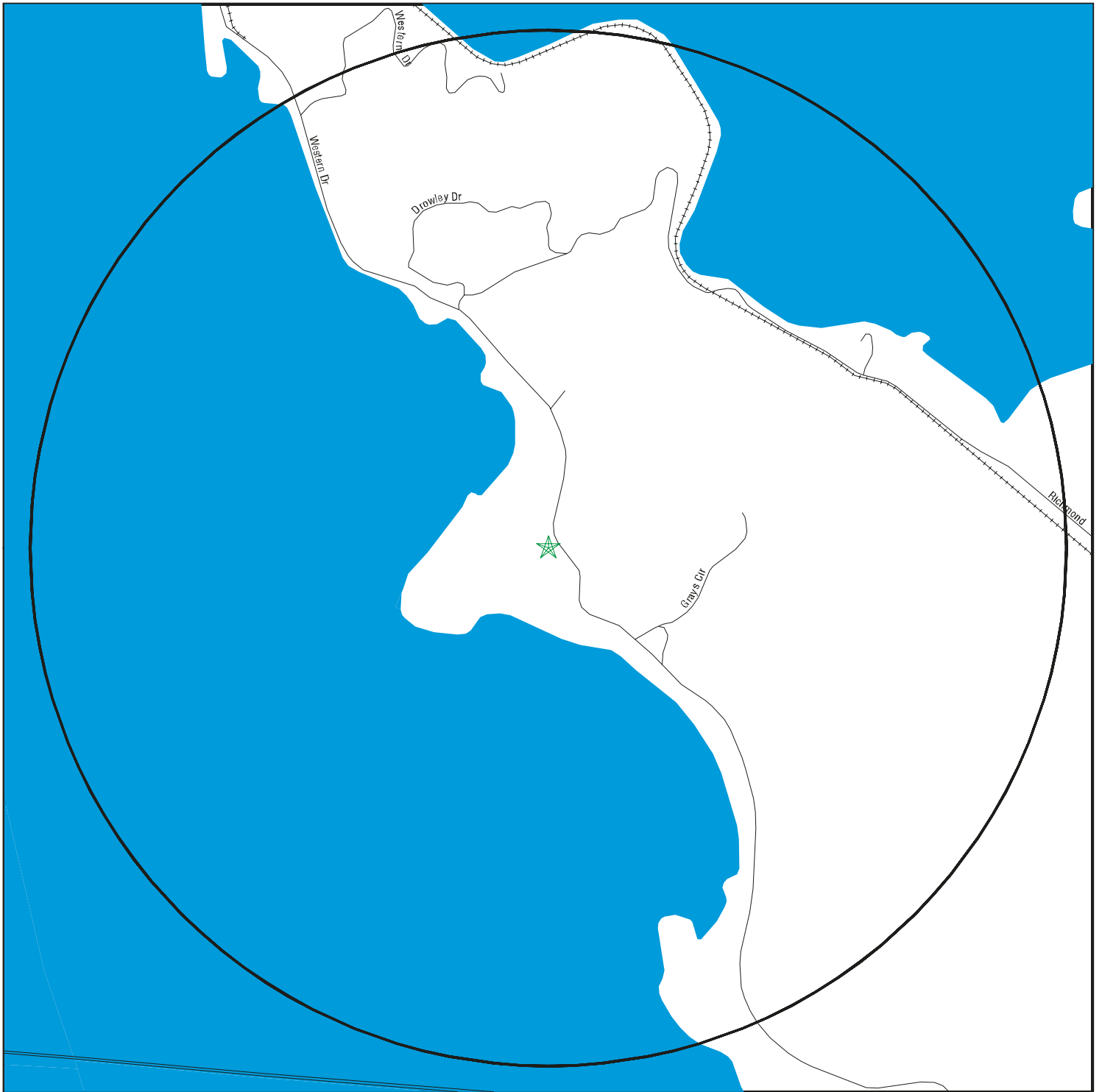
TARGET PROPERTY: Point Molate  
ADDRESS: 2100 Stenmark Dr  
CITY/STATE/ZIP: Richmond CA 94801  
LAT/LONG: 37.9486 / 122.4171

CUSTOMER: Ramboll  
CONTACT: Varsha Gopalakrishnan  
INQUIRY #: 5744904.1s  
DATE: August 07, 2019 4:44 pm

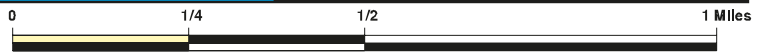
# CENSUS FINDINGS

<u>Map ID</u>	<u>Tract Number</u>	<u>Total Population</u>	<u>Population in Radius</u>	<u>Total Area(sq.mi.)</u>	<u>Area in Radius(sq.mi.)</u>
T1	9900.00	0	0.0	33.20	0.62
T2	3780.00	3435	804.4	10.68	2.50

# RECEPTOR MAP - 5744904.1s



- ★ Target Property
- ∩ Roads
- ∩ Waterways
- ⊠ Environmental or Public Receptor
- ∩ Federal Lands Linear Features
- ∩ Federal Lands Area



TARGET PROPERTY:	Point Molate	CUSTOMER:	Ramboll
ADDRESS:	2100 Stenmark Dr	CONTACT:	Varsha Gopalakrishnan
CITY/STATE/ZIP:	Richmond CA 94801	INQUIRY #:	5744904.1s
LAT/LONG:	37.9486 / 122.4171	DATE:	August 07, 2019 4:45 pm

## MAP FINDINGS

Map ID  
Direction  
Distance  
Distance (ft.)  
Elevation

Site

EDR ID  
Database

---

No Sites Reported.

# RECORDS SEARCHED/DATA CURRENCY TRACKING

## **Census**

Source: U.S. Census Bureau  
Telephone: 301-763-4636

2010 U.S. Census data was used to estimate residential population following these EPA guidelines:  
*"Census data are presented by Census tract. If your circle covers only a portion of the tract, you should develop an estimate for that portion...Determine the population density per square mile (total population of the Census tract divided by the number of square miles in the tract) and apply that density figure to the number of square miles within your circle."*

## **FED\_LAND: Federal Lands**

Source: USGS  
Telephone: 888-275-8747

Federal lands data. Includes data from several Federal land management agencies, including Fish and Wildlife Service, Bureau of Land Management, National Park Service, and Forest Service. Includes National Parks, Forests, Monuments; Wildlife Sanctuaries, Preserves, Refuges; Federal Wilderness Areas.

## **AHA Hospitals:**

Source: American Hospital Association, Inc.  
Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

## **Medical Centers: Provider of Services Listing**

Source: Centers for Medicare & Medicaid Services  
Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

## **Nursing Homes**

Source: National Institutes of Health  
Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

## **Public Schools**

Source: National Center for Education Statistics  
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

## **Private Schools**

Source: National Center for Education Statistics  
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

## **Colleges - Integrated Postsecondary Education Data**

Source: National Center for Education Statistics  
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on integrated postsecondary education in the United States.

## **Arenas**

Source: Dunhill International

EDR indicates the location of buildings and facilities - arenas - where individuals who are public receptors are likely to be located.

## **Prisons: Bureau of Prisons Facilities**

Source: Federal Bureau of Prisons  
Telephone: 202-307-3198

List of facilities operated by the Federal Bureau of Prisons.

## **Daycare Centers: Licensed Facilities**

Source: Department of Social Services  
Telephone: 916-657-4041

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**APPENDIX B**  
**AERMOD INPUT FILES (PROVIDED ELECTRONICALLY)**