

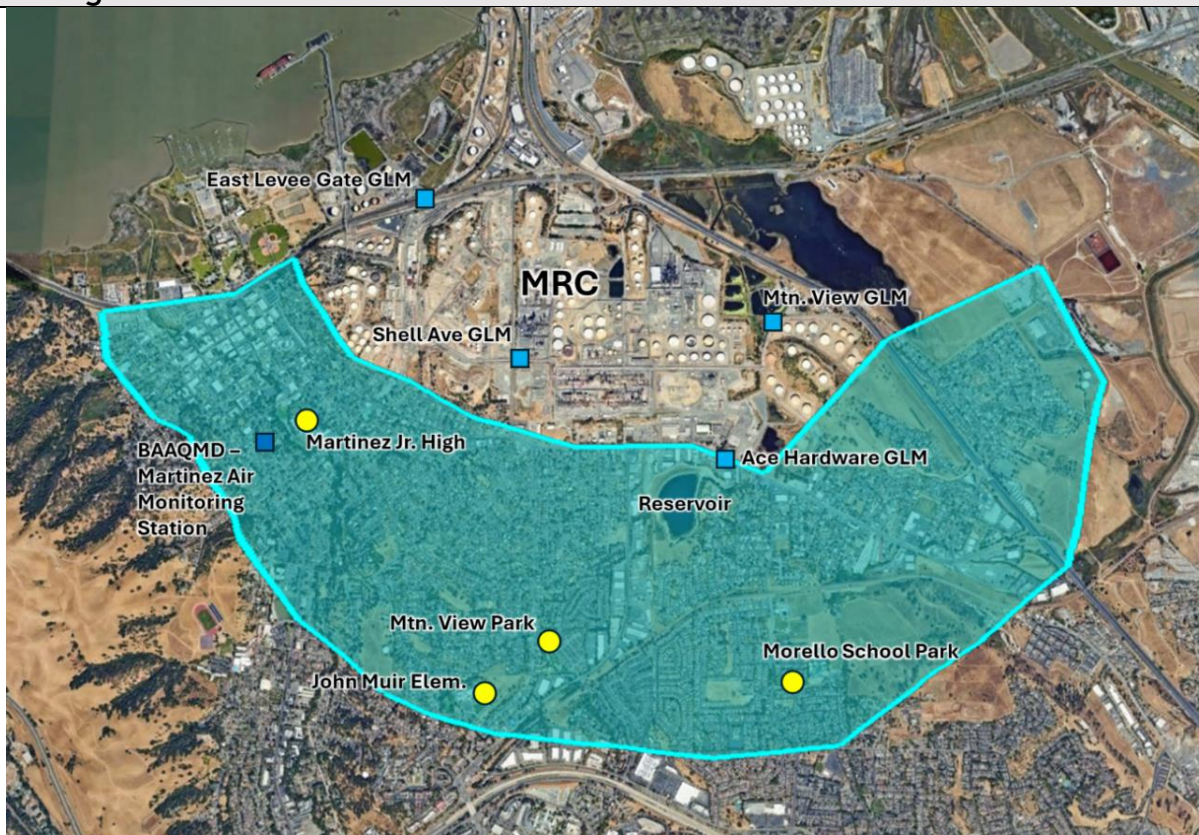
Appendix D – Site Analysis for the Martinez Refining Company (MRC) Community Air Monitoring Station

Executive Summary

This Appendix describes the factors and analyses used to identify a geographic area for siting a community air quality monitoring site near the Martinez Refining Company (MRC) facility in Martinez as part of the Major Stationary Source Community Air Monitoring Program (Schedule X).¹ The goal in siting monitors under Schedule X is to select a location that will reflect typical conditions in impacted areas of the community based on a broad range of factors and the weight of available evidence associated with those factors. Importantly, no single fixed monitoring location will capture all the emissions from a given facility. Air District staff considered several factors for this evaluation, including emissions sources, available meteorological and air quality data, area geography and topographical features, results from health risk assessments and air quality modeling, environmental justice indicators, and stakeholder input.

On balance, these factors indicate that multiple locations may be acceptable candidates. A new monitoring station sited immediately southeast, south, or southwest (within 1-2 km) of MRC, as shown in the highlighted recommended search area in Figure D-1, would be downwind of the facility for at least some of the time. This area includes some of the properties owned by the City of Martinez, including near the John Muir Elementary School, Morello School Park, Martinez Reservoir, and Mountain View Park. Other locations within the highlighted area may also be acceptable candidates for an air monitoring site. Roughly the eastern half of this highlighted area, including the Vine Hill neighborhood, has a higher composite score for environmental justice indicators.

Figure D-1 - Recommended Search Area for the MRC Major Stationary Source Community Air Monitoring Station



¹ Overview of the Major Stationary Source Community Air Monitoring Program: https://www.baaqmd.gov/~media/files/technical-services/community-air-monitoring/01_refinery-camp-v7-mainapp-a-pdf.pdf

Study Area

A neighborhood-scale monitoring station located within a few kilometers of the Martinez Refining Company (MRC) is most appropriate given the objectives of Schedule X. In Figure D-2 below, MRC is shown in gray with concentric buffers around the facility in 1-km increments. Portions of the buffers intersect the communities of Benicia, Martinez, Mountain View, Pacheco, and Vine Hill, and uninhabited areas of Contra Costa County and the Carquinez Strait. Another refinery, Marathon, is located about 5 km east of MRC (see Local Emissions Sources section), for which a separate community air monitoring station is pending under Schedule X.

Figure D-2 - Location of the Martinez Refining Company



■ MRC Refinery

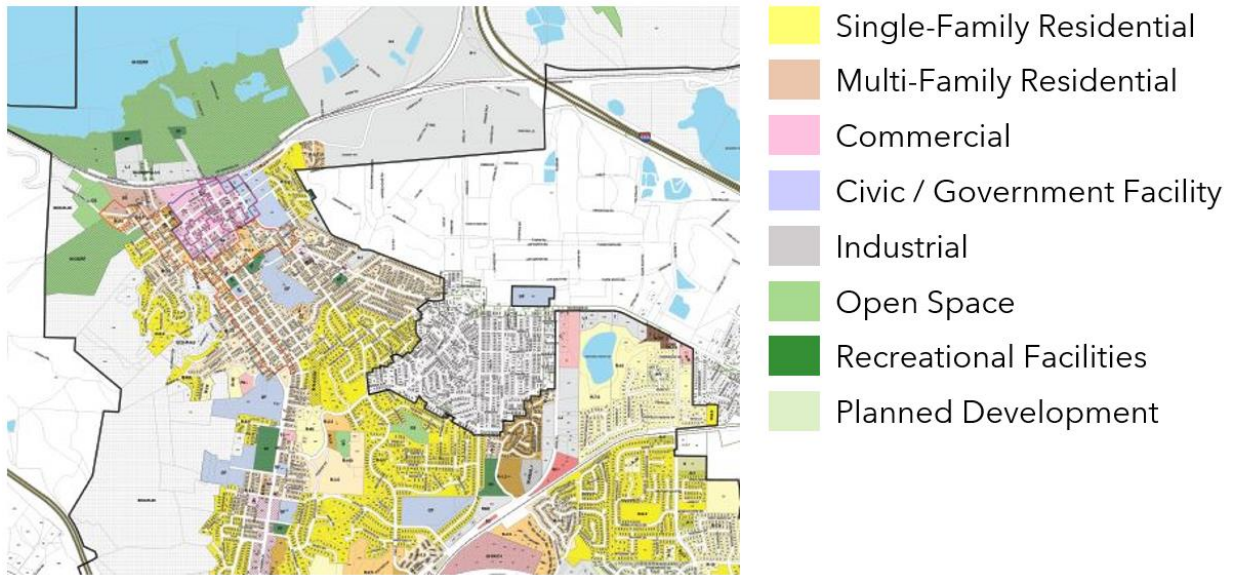
□ Community Boundaries

○ Facility Buffer in 1-km Increments

Population Centers

With an estimated population of 38,290 (US Census Bureau, 2020) the City of Martinez is located in Contra Costa County and is bounded on the north by the Carquinez Strait; on the west and south by elevated, sparsely populated terrain; on the northeast by MRC; on the east by the unincorporated Vine Hill community; and on the southeast by the City of Concord. A zoning map (Figure D-3) from the City of Martinez (2018) shows that the city is largely residential. The unincorporated community of Mountain View has an estimated population of 1,970 (US Census Bureau, 2020) and is located between Martinez and MRC, while the unincorporated community of Vine Hill has an estimated population of 3,886 (US Census Bureau, 2020) and is located southeast of MRC.

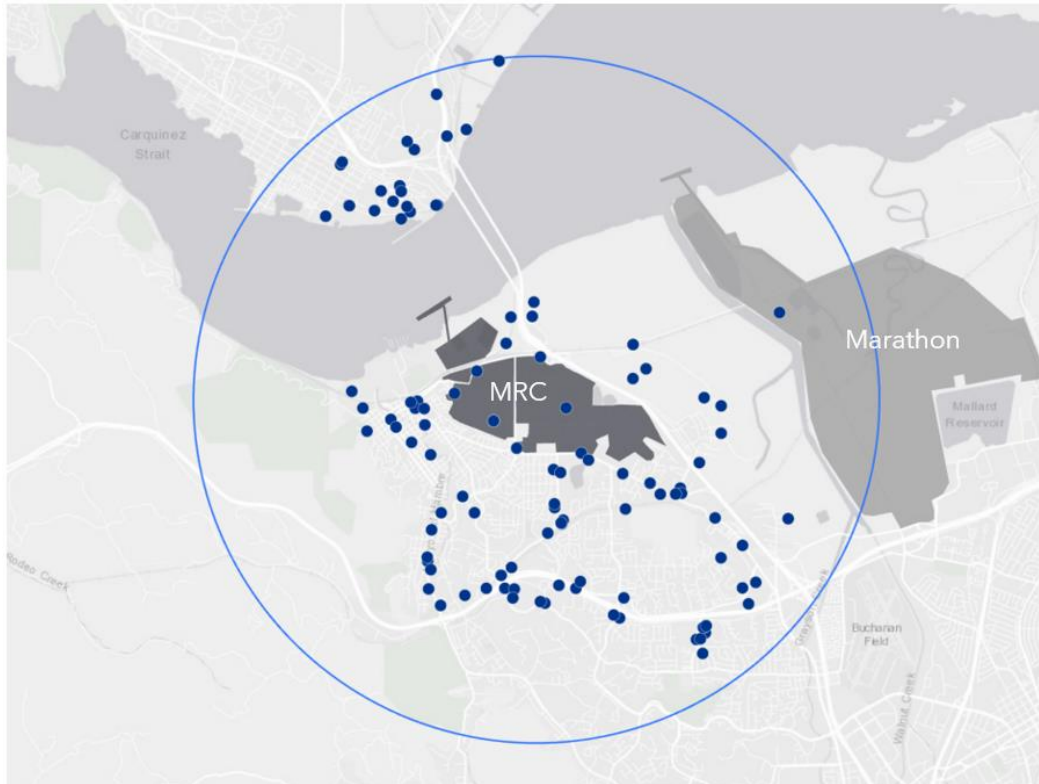
Figure D-3 - City of Martinez Zoning Map (excerpt)



Local Emissions Sources

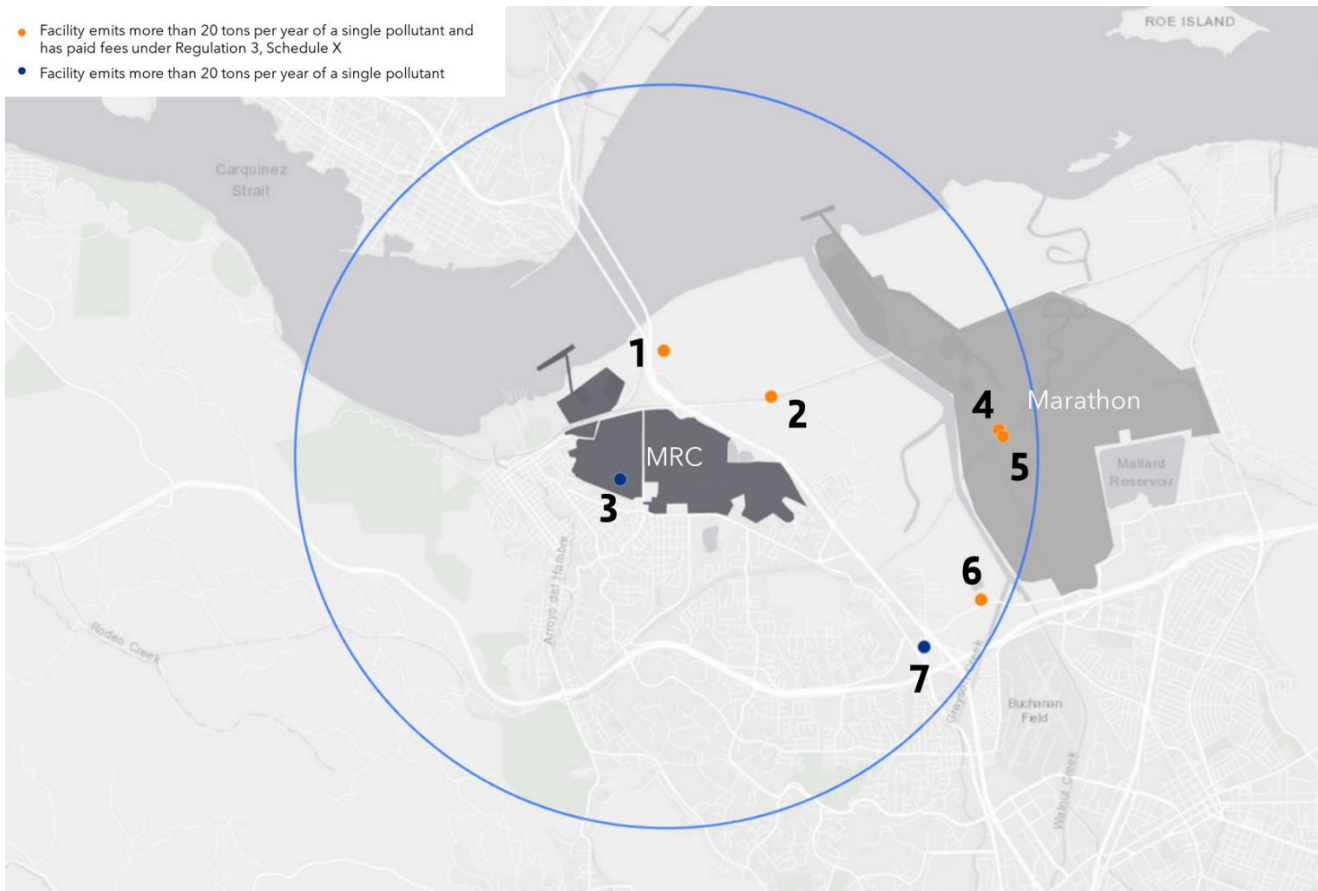
According to the Air District’s database of regulated facilities, there are 107 permitted sources within a 5 km radius of MRC (Figure D-4).

Figure D-4 - Permitted Facilities Near MRC



To highlight some of the larger stationary sources of air pollution in the area in addition to the MRC Refinery, stationary sources with more than 20 tons per year of emissions of a single pollutant are shown in Figure D-5, and their emissions are summarized in Table D-1. Among those facilities, Eco Services Operations Corp, TransMontaigne Operating LP, Martinez Cogen Limited Partnership at Tesoro, Air Products & Chemicals Inc, and Central Contra Costa Sanitary District have paid major stationary source community air monitoring fees under Regulation 3, Schedule X. Other notable emissions sources in the area include Interstate 680, State Route 4, State Route 242, and Buchanan Field Airport, as well as ship and other maritime traffic through the Carquinez Strait.

Figure D-5 - Stationary Sources Near MRC Emitting More Than 20 Tons per Year of a Single Pollutant



- 1 - Eco Services Operations Corp⁽¹⁾
- 2 - TransMontaigne Operating LP⁽¹⁾
- 3 - Shell Chemical LP
- 4 - Martinez Cogen Limited Partnership at Tesoro^(1,2)

- 5 - Air Products & Chemicals, Inc⁽¹⁾
- 6 - Central Contra Costa Sanitary District⁽¹⁾
- 7 - California Highway Patrol

Notes: (1) The Eco Services Operations Corp, TransMontaigne Operating LP, Martinez Cogen Limited Partnership at Tesoro, Air Products & Chemicals Inc, and Central Contra Costa Sanitary District have paid fees for Major Stationary Source Community Air Monitoring under Regulation 3, Schedule X. (2) Marathon has proposed to modify the refinery into a repurposed facility that would produce renewable diesel fuel, naphtha, propane and treated fuel gas.

Table D-1 - Annual Emissions from Stationary Sources Near MRC Emitting More Than 20 Tons per Year of a Single Pollutant)⁽¹⁾⁽²⁾

Facility (CEIDARS ID)	Annual Emissions (tons/year)					
	CO	NO _x	PM ₁₀	PM _{2.5}	ROG	SO _x
MRC (24726)	1,597.1	1,015	705.2	621.7	1,375.9	1,133.4
Marathon (14628)	52.5	11.1	10.9	10.9	134.5	0.6
California Highway Patrol (13758)	23.5	10	0	0	0.1	0
Central Contra Costa Sanitary District (907)	121.4	66.1	6.7	6.5	17.6	0.9
Eco Services Operations Corp (22789)	23.6	38.8	17.9	13.4	0.7	342.6
Martinez Cogen Limited Partnership at Tesoro (1820)	17.5	67.7	10.7	10.7	3.7	1.3
Shell Chemical LP (12870)	36.1	18.1	0.4	0.4	9.2	0.1
TransMontaigne Operating LP (24089)	0.3	1.2	0	0	43.2	0

Notes: (1) Criteria pollutant emissions are for the 2021 reporting year, obtained from the California Emissions Inventory Data Analysis and Reporting System (CEIDARS). (2) Air Products & Chemicals, Inc did not report emissions during the 2021 reporting year. However, the facility's emissions previously exceeded thresholds and the company paid fees under Schedule X between 2017 and 2019.

Wind Climatology and Topography

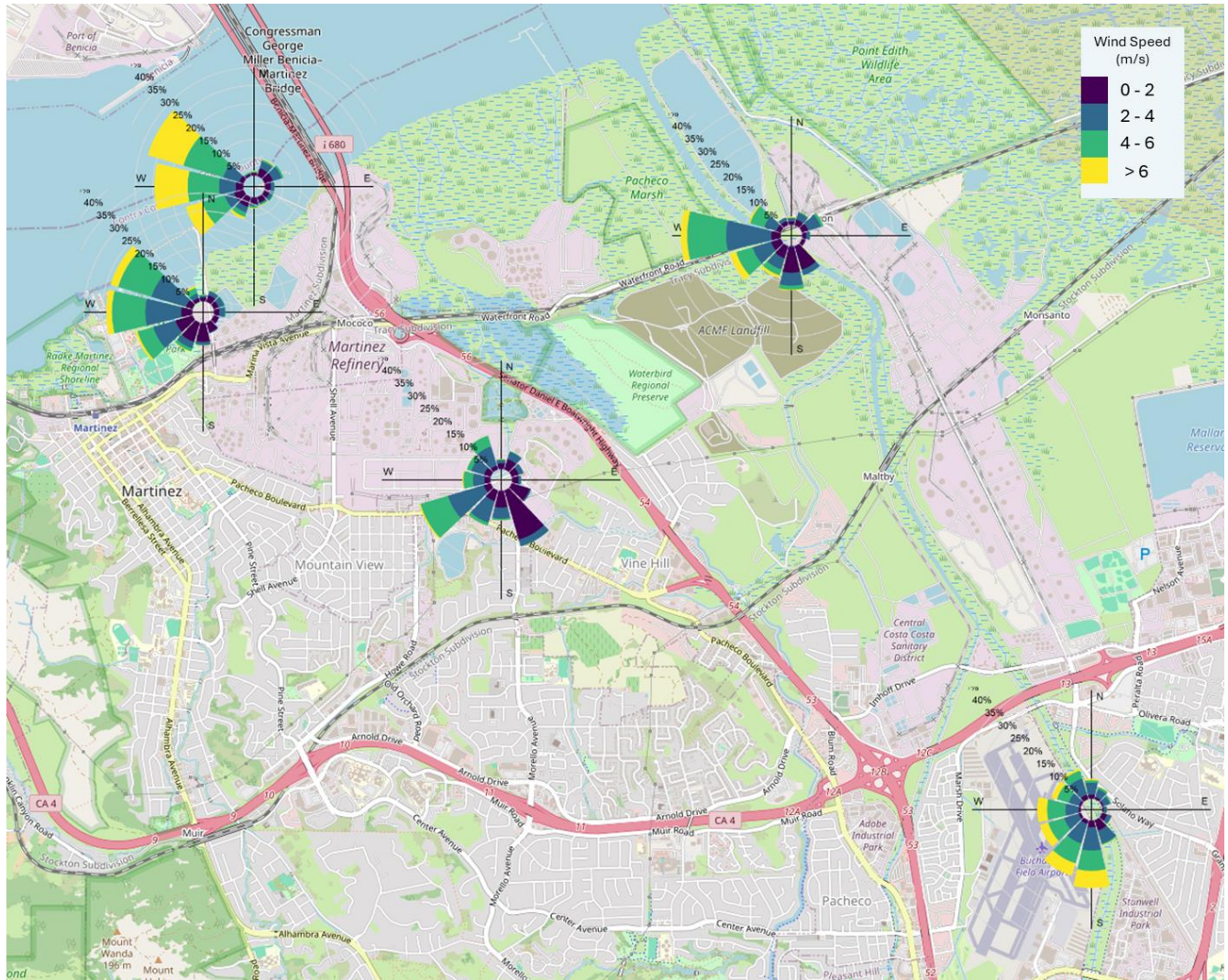
The movement of air and topography (such as hills or valleys) significantly affect where emitted air pollutants end up and get concentrated. Therefore, when identifying potential locations for an air monitoring station to capture the effects of these emissions on ambient concentrations, it is necessary to consider historical wind patterns and topographical features in the area. In this case, the Air District performed a multi-year (2018 - 2022) assessment of wind data from nearby refinery Ground Level Monitors (GLMs) and NOAA-affiliated meteorological stations.²

Typical year-round wind patterns are summarized by the wind roses in Figure D-6. A wind rose shows the general wind direction and speed for a particular sampling period. The circular structure of the wind rose shows the direction the winds blew from, and the length of each "spoke" around the circle shows how often the wind blew from that direction. The different colors of each spoke provide details on the wind speed.

As shown by the wind roses, prevailing winds vary somewhat by location, due in part to this region's complex topography. Nearer the Carquinez Strait, winds are typically stronger and predominantly from the west and west-northwest, consistent with onshore winds that prevail for much of the year in the Bay Area. Farther south (and inland) from the Carquinez Strait and MRC, winds are comparatively lighter and from variable directions, with southerly winds also occurring relatively frequently.

² Data from NOAA-affiliated meteorological stations were obtained through MesoWest: <https://mesowest.utah.edu/>

Figure D-6 - Wind Roses for Nearby Meteorological Stations (2018-2022)



Winds also vary by season and by time of day (Figure D-7 through Figure D-12). Overall, winds are stronger in the daytime and during the spring and summer and prevail from an onshore direction (west to east), channeled through the Carquinez Strait, and would tend to transport pollutants eastward away from Martinez and Concord, but potentially impact smaller communities such as Vine Hill and Clyde.

During the cool season, observed winds are typically lighter (under 2 m/s) for a greater portion of the time compared to the warm season. Similarly, lighter and more variable winds occur more frequently during nighttime hours compared to daytime hours. Calm or light winds from variable directions can limit dispersion and allow pollutants to build up in the local area. Periods of offshore winds (winds from the east and northeast) also occur more frequently during the cool season, which may transport pollutants associated with MRC westward or southwestward into the communities of Martinez and Mountain View. Periods of offshore winds also can transport pollutants into the region from the Central Valley. Some recent incidents at MRC occurred during offshore wind patterns in the cool season and resulted in air quality impacts (such as intermittent peaks in SO₂ concentrations, odors, and dust) in Martinez.

Figure D-7 - Wind Roses for Winter (Dec-Jan-Feb 2018-2022)

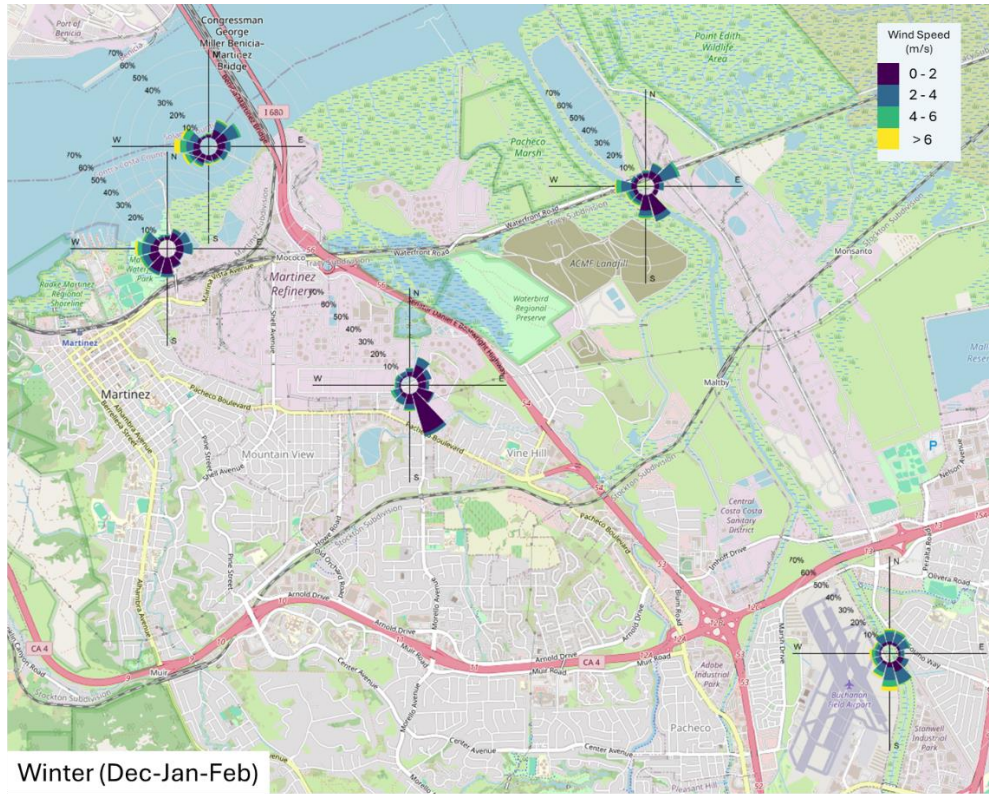


Figure D-8 - Wind Roses for Spring (Mar-Apr-May 2018-2022)

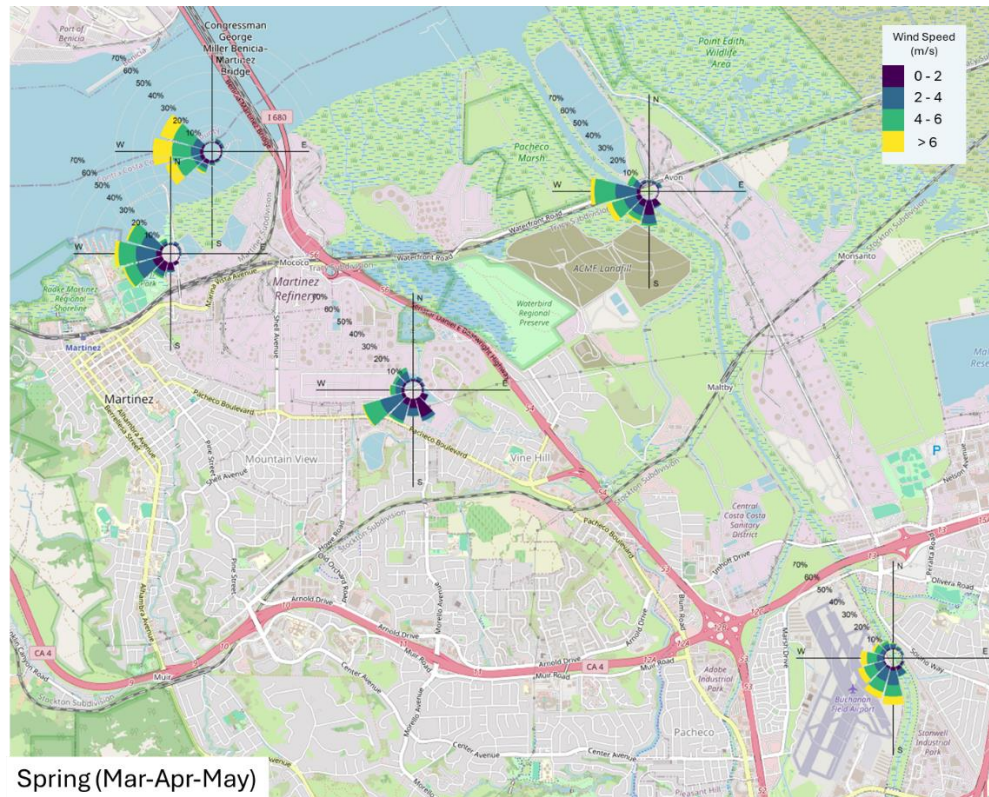


Figure D-9 - Wind Roses for Summer (Jun-Jul-Aug 2018-2022)

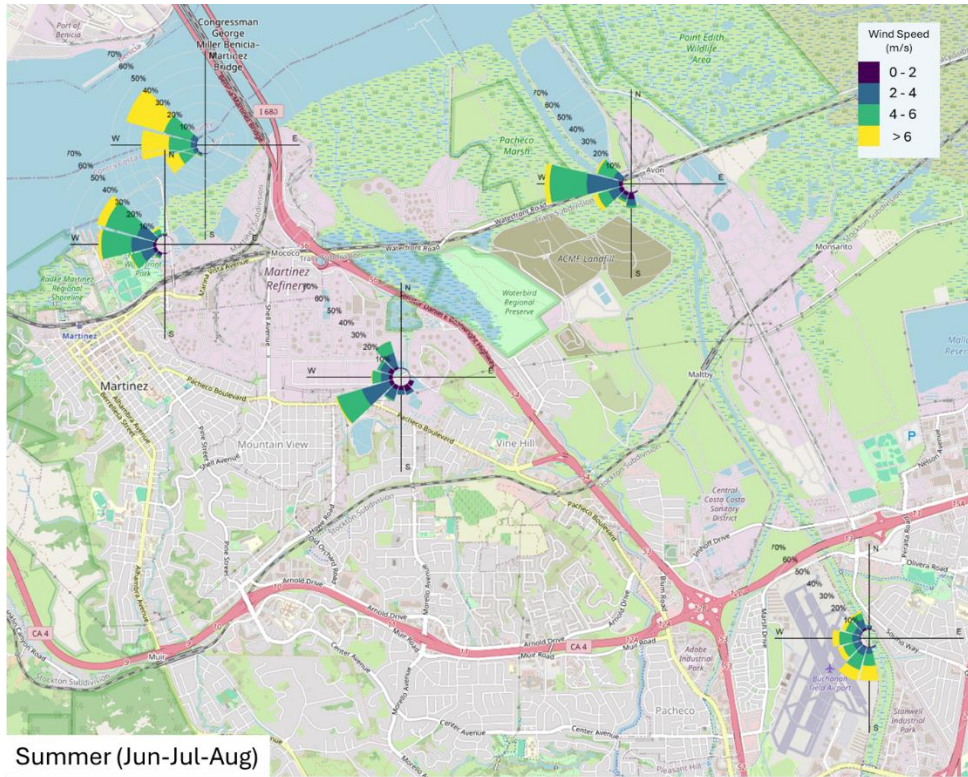


Figure D-10 - Wind Roses for Autumn (Sep-Oct-Nov 2018-2022)

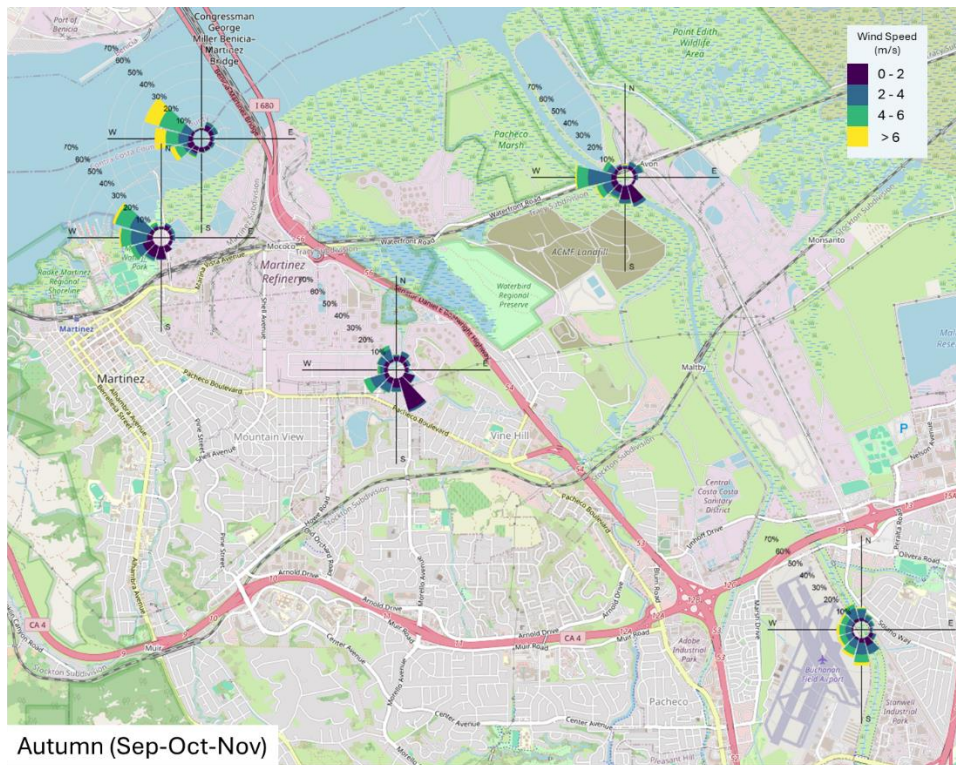


Figure D-11 - Wind Roses for Nighttime (2018-2022)

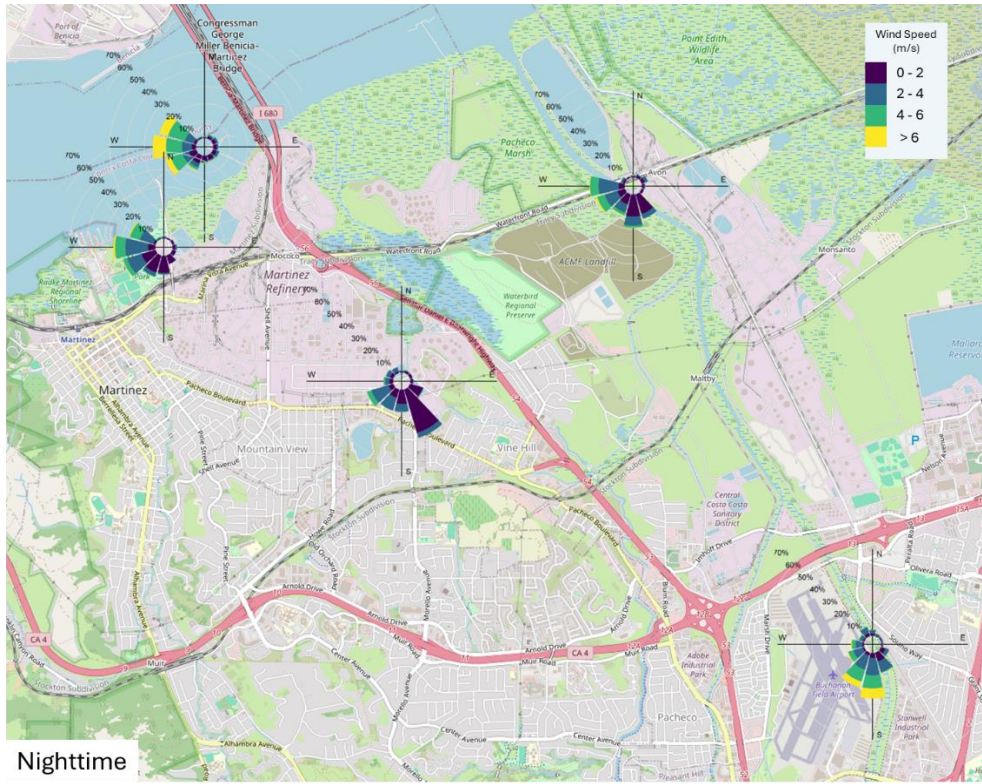
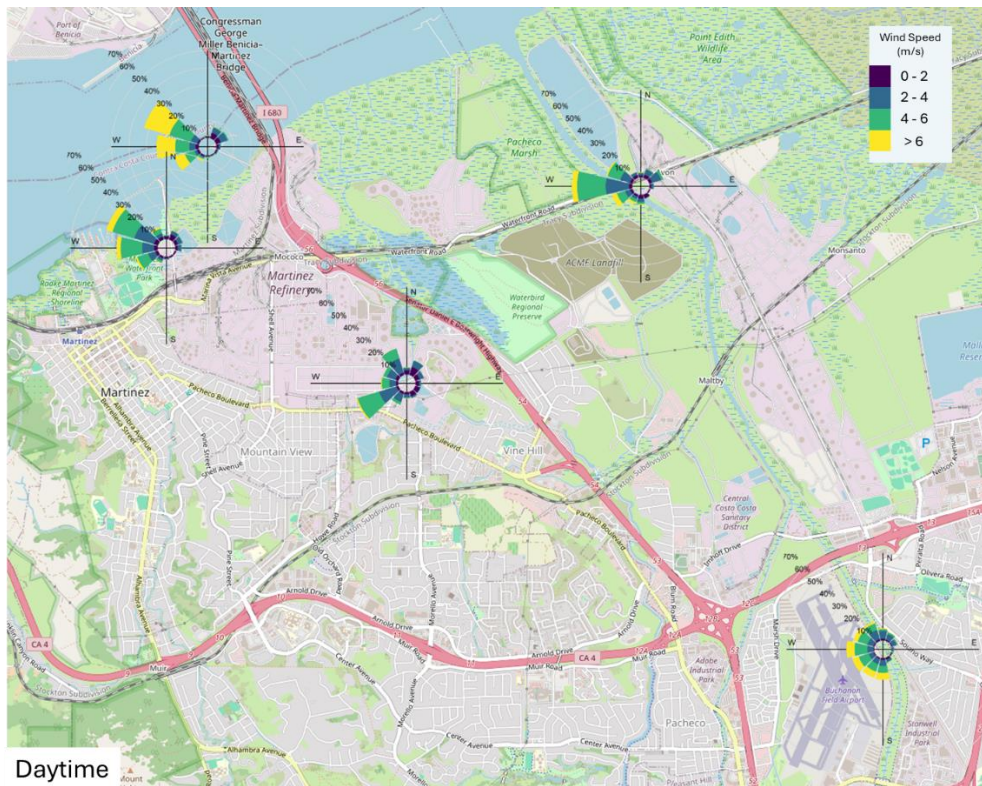


Figure D-12 - Wind Roses for Daytime (2018-2022)



While some wind patterns are driven by global or regional phenomena, topography can drive additional circulation at the local level, which may impact the dispersion and transport of pollution; the nature and degree of this impact depends on the specific arrangement of physical features in the area.

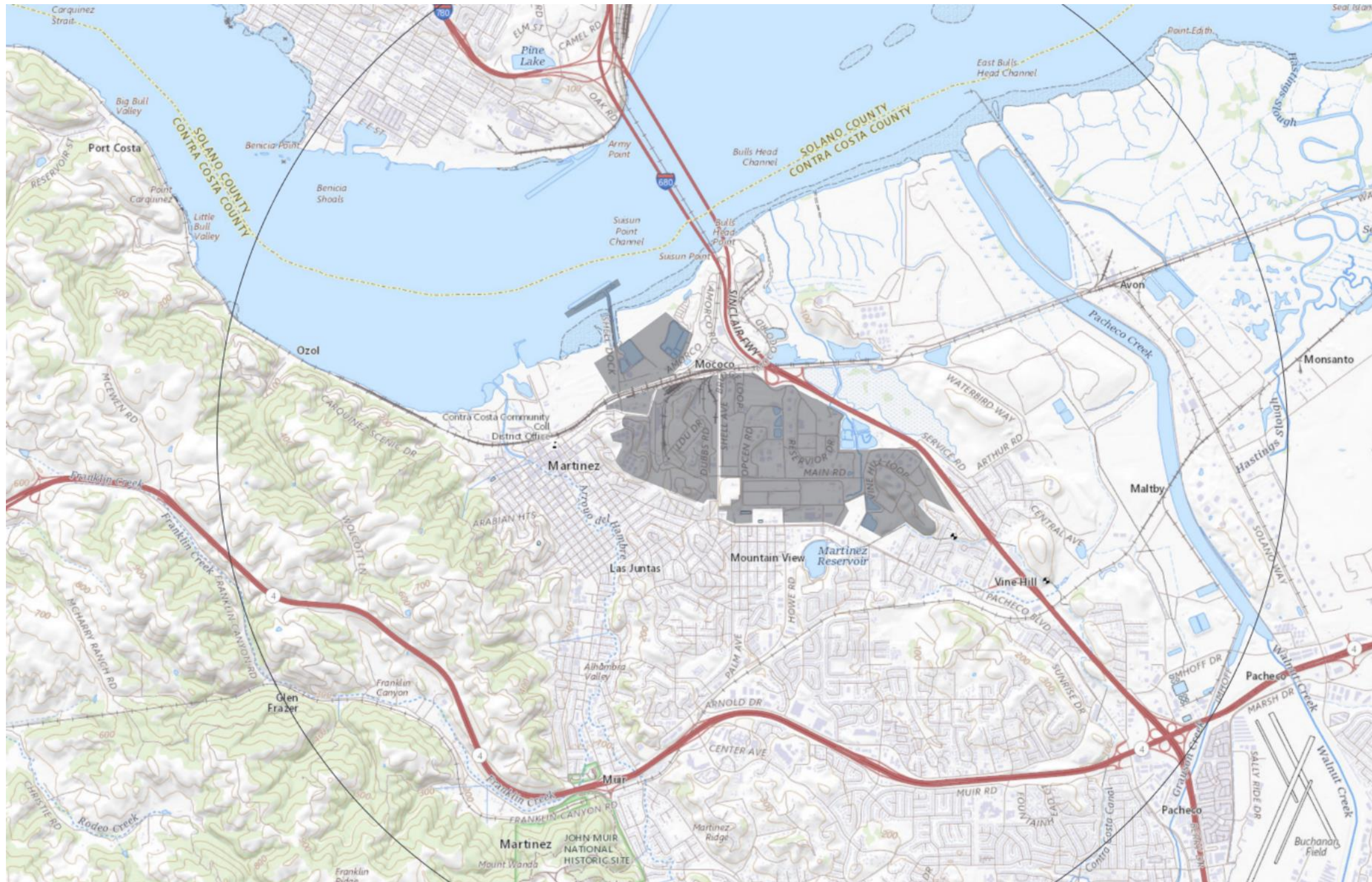
The shaded relief maps in Figure D-13 and Figure D-14 below show complex terrain surrounding MRC. Located at the northern edge of the Diablo Valley, the area is bounded to the west and southwest by the Franklin Ridge and Briones Hills, which have local peak elevations of around 1,020 and 1,410 feet, respectively. To the east and southeast lie the Diablo Range and Mt. Diablo, which has a peak elevation of 3,849 feet. Hills also lie north of the area across the Carquinez Strait, creating a high-pressure gradient causing high wind flows through the Carquinez Strait.

When the wind blows from the west or south, winds channeled through the Carquinez Strait would tend to transport pollutants east. However, when winds are lighter and more variable, periods of stagnation may develop in the communities around the refineries.

Figure D-13 - Topography Around MRC



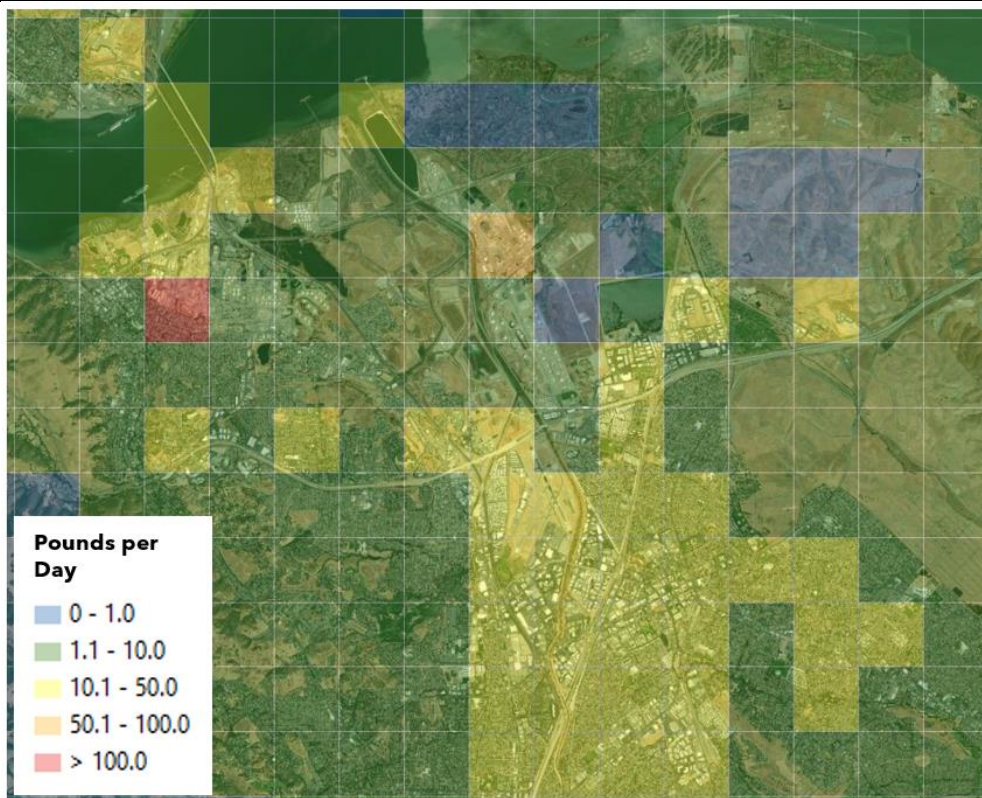
Figure D-14 - Topography Around MRC (detail)



Health Risk Data, Sensitive Populations, and Environmental Justice Considerations

In an analysis for the Air District's Community Air Risk Evaluation (CARE)³ project, estimated emissions of certain toxic air contaminants (TACs) from permitted stationary sources, on-road mobile sources, and distributed area sources in 2015 were allocated to a grid of cells with a spatial resolution of 1-km for use in cancer risk modeling. This modeling effort found that five compounds (diesel PM, acetaldehyde, benzene, 1,3-butadiene, and formaldehyde) were responsible for more than 90% of the cancer risk attributed to emissions. The estimated combined TAC emissions of these compounds for the area near MRC is shown in Figure D-15. The greatest estimated emissions of TACs in the area are associated with the Marathon and MRC refineries. However, elevated levels of TAC emissions are also indicated around Interstate 680, the Buchanan Filed Airport, State Route 242, and roughly along State Route 4 due to transportation sources.

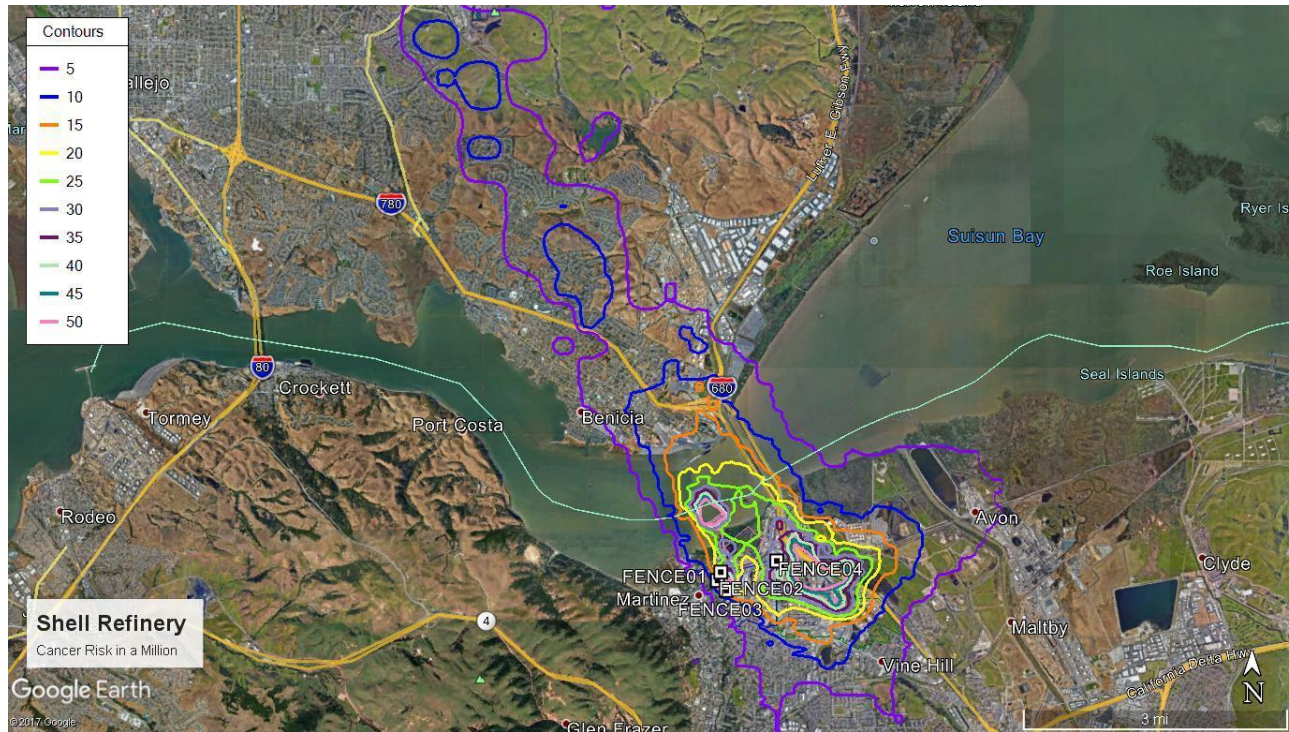
Figure D-15 - Estimated Total Emissions of Diesel PM, Acetaldehyde, Benzene, 1,3-butadiene, and Formaldehyde Near MRC (2015)



In a separate analysis, the Air District estimated health impacts from air contaminants by reviewing a Health Risk Screening Assessment (HRSA) from 2015 for the areas around MRC using toxic emissions inventories provided by Bay Area refineries and meteorological data generated through AERMOD. Figure D-16 shows the estimated cancer risk (in one million) for the area due to emissions from MRC (which was the Shell Refinery at the time the HRSA was conducted). The contours generally exhibit a pattern extending from the refinery toward Benicia. The areas with the greatest estimated elevated cancer risk extend from MRC eastward to I-680 and northward toward the Carquinez Strait. The Air District is conducting new air toxics evaluations for MRC under Rule 11-18, but that work is not expected to impact the general results of this siting analysis.

³ Website for the Air District's CARE Program: <https://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program>

Figure D-16 - Estimated Cancer Risk (in one million) from a 2015 Health Risk Assessment of Emissions from MRC



When considering the health impacts from air pollution, it is also instructive to consider biological traits, health status, or other community characteristics that can result in increased vulnerability to pollution. A number of these population characteristics have been incorporated into the CalEnviroScreen (CES)⁴ model (version 4.0), which identifies California communities by census tract that are disproportionately burdened by, and vulnerable to, multiple sources of pollution. CalEnviroScreen uses 21 statewide indicators to characterize pollution burden and population characteristics. Individual indicator scores are provided along with composite scores based on a specified formula. The population characteristics used by CalEnviroScreen are: emergency department visits associated with asthma, cardiovascular disease (emergency department visits for heart attacks), low birth-weight infants, educational attainment, housing-burdened low-income households, linguistic isolation, poverty, and unemployment. The percentiles for the 15 census tracts that intersect the 5 km buffer around MRC as labeled below in Figure D-17 are summarized in Table D-2.

Overall, tracts 1 and 2 (east of MRC) had the highest composite CES score between the 70th and 80th percentiles. Tract 2 had the highest asthma rate falling above the 90th percentile and the highest cardiovascular rate falling between the 80th and 90th percentiles. Other high indicators falling above the 90th percentile include low birth-weight in tract 9 (unincorporated Contra Costa County west of Martinez), poverty in tract 5 (west of MRC), and unemployment in tract 7 (southwest of MRC).

⁴ Website for CalEnviroScreen 4.0: <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40>

Figure D-17 - Percentiles for CES Composite Score and Selected CES Indicators in Census Tracts Near MRC

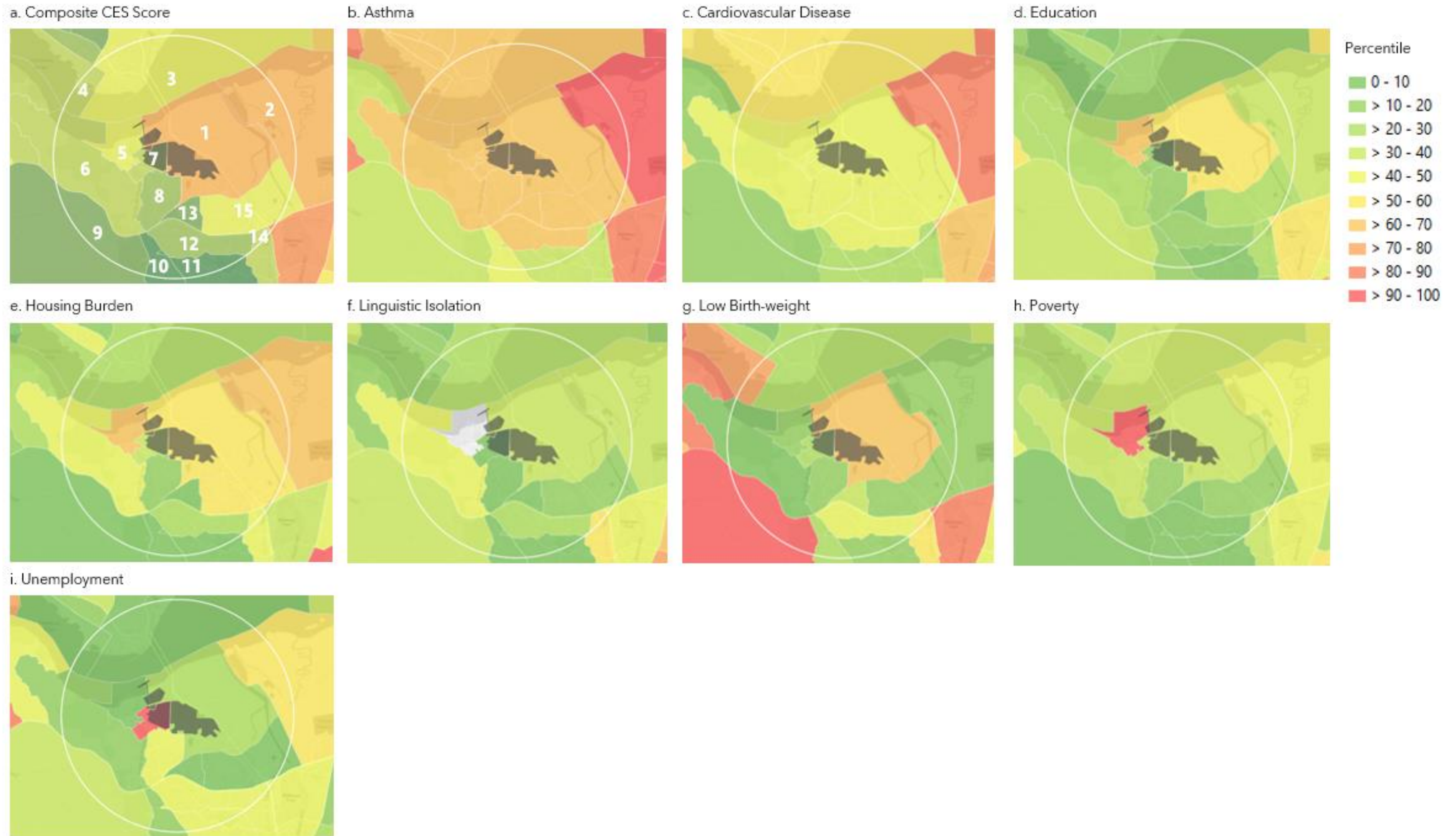


Table D-2 - Percentiles for CES Composite Score and Selected CES Indicators in Census Tracts Near MRC

	Indicator								
	Composite CES Score	Asthma	Cardiovascular Disease	Education	Housing Burden	Linguistic Isolation	Low Birth-weight	Poverty	Unemployment
Tract 1	70-80	60-70	40-50	50-60	50-60	30-40	60-70	30-40	20-30
Tract 2	70-80	90-100	80-90	30-40	60-70	30-40	10-20	40-50	50-60
Tract 3	40-50	60-70	50-60	10-20	20-30	20-30	20-30	30-40	0-10
Tract 4	30-40	60-70	50-60	0-10	20-30	10-20	70-80	20-30	0-10
Tract 5	40-50	60-70	40-50	60-70	60-70	NA	10-20	90-100	0-10
Tract 6	30-40	60-70	40-50	20-30	40-50	40-50	0-10	30-40	10-20
Tract 7	30-40	60-70	40-50	10-20	30-40	0-10	20-30	30-40	90-100
Tract 8	20-30	60-70	40-50	10-20	10-20	0-10	10-20	10-20	40-50
Tract 9	10-20	30-40	10-20	30-40	0-10	30-40	90-100	0-10	30-40
Tract 10	0-10	40-50	20-30	10-20	0-10	0-10	20-30	0-10	10-20
Tract 11	0-10	30-40	20-30	0-10	0-10	0-10	10-20	0-10	40-50
Tract 12	20-30	60-70	40-50	10-20	20-30	20-30	40-50	0-10	40-50
Tract 13	10-20	60-70	40-50	0-10	0-10	0-10	30-40	0-10	0-10
Tract 14	30-40	30-40	20-30	20-30	40-50	50-60	50-60	30-40	40-50
Tract 15	40-50	60-70	40-50	20-30	50-60	10-20	10-20	10-20	0-10

Air Monitoring Stations & Monitoring Data

The locations of existing air quality monitors and historical data from those monitors are important considerations when establishing new monitoring sites. Table D-3 summarizes the recent history of air monitoring in the area, and Figure D-18 shows the location of the relevant monitoring stations.

The MRC and Marathon refineries both monitor H₂S and SO₂ as part of their Ground-Level Monitoring (GLM) networks. This type of monitoring is required at all five Bay Area refineries by Air District Regulation 9, Rule 1 and Regulation 9, Rule 2.^{5,6} The Air District oversees the monitoring conducted by the refineries, including conducting site evaluations and performance audits of the monitors. Measurements in excess of rule limits are reviewed and investigated by Air District staff. Currently, Marathon operates four stations that monitor H₂S and three that monitor SO₂, while MRC operates four stations that monitor H₂S and one that monitors SO₂. Meteorological monitoring is currently performed at one additional station at the Marathon refinery and two additional stations at MRC.

In addition to the refinery GLM network, the Air District currently operates two monitoring stations in the area: one in Martinez, which monitors SO₂ and air toxics, and one in Concord, which monitors CO, NO, NO₂, O₃, SO₂, PM₁₀, PM_{2.5}, and air toxics.⁷ Air toxics monitoring has been performed at additional stations in Concord and Martinez in the past but those stations are no longer in operation.

Table D-3 - Current and Historical Air Quality Monitoring Near the Marathon and MRC Refineries

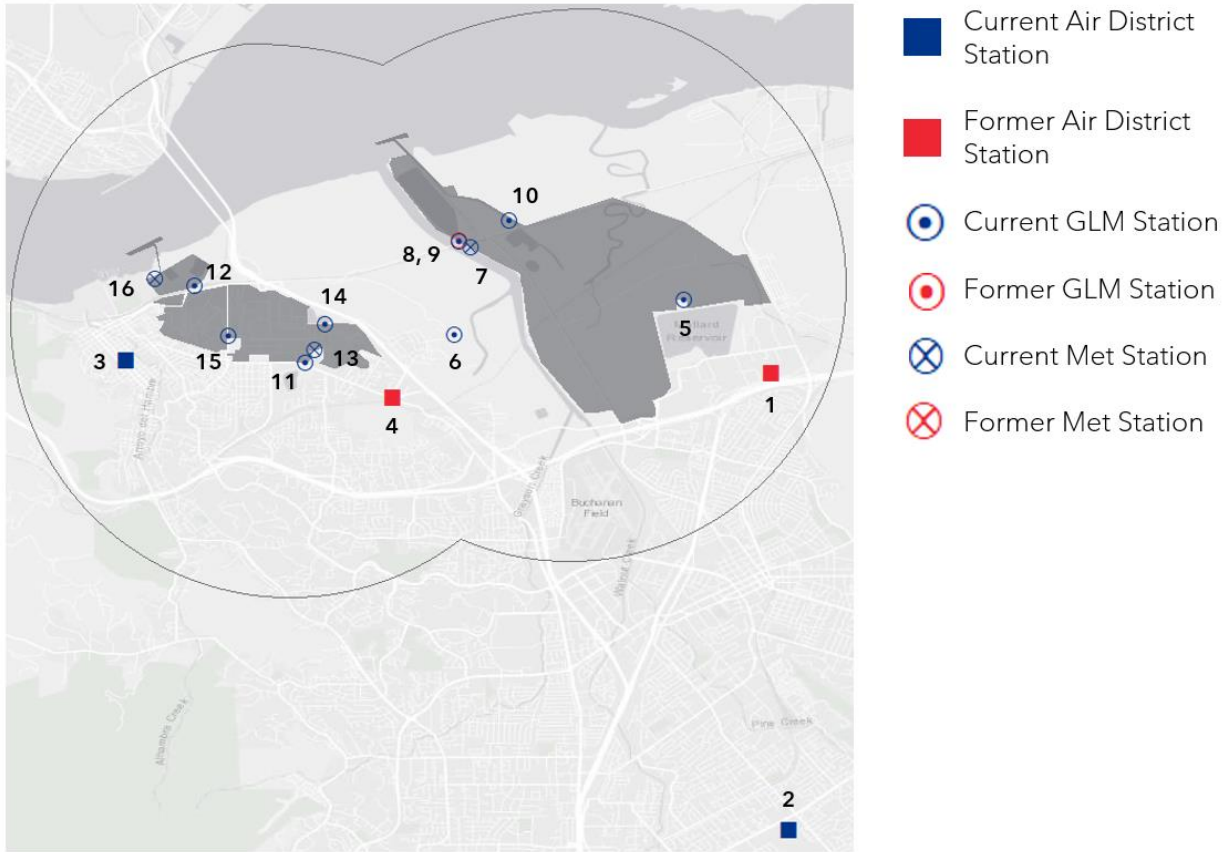
Station (map label)	Operator	Operation	Parameters Measured
AQMD-Concord-Arnold Ind Way (1)	BAAQMD	Historical	Air Toxics
AQMD-Concord-Treat Blvd (2)	BAAQMD	Current	CO, NO, NO ₂ , O ₃ , SO ₂ , PM ₁₀ , PM _{2.5}
			Air Toxics
AQMD-Martinez-Jones St (3)	BAAQMD	Current	SO ₂
			Air Toxics
AQMD-Martinez-Pacheco Blvd (4)	BAAQMD	Historical	Air Toxics
Marathon-Chenery (5)	Marathon	Current	H ₂ S, SO ₂
Marathon-Gun Club (6)	Marathon	Current	H ₂ S
			SO ₂
Marathon-Meteorology (7)	Marathon	Current	Meteorology
Marathon-Pacheco Slough (8)	Marathon	Historical	H ₂ S
Marathon-Pacheco Slough 2 (9)	Marathon	Current	H ₂ S
Marathon-Waterfront (10)	Marathon	Current	H ₂ S, SO ₂
MRC-Ace Hardware (11)	MRC	Current	H ₂ S, SO ₂
MRC-East Levee Gate (12)	MRC	Current	H ₂ S
MRC-East Met (13)	MRC	Current	Meteorology
MRC-Mountain View (14)	MRC	Current	H ₂ S
MRC-Shell Avenue (15)	MRC	Current	H ₂ S
MRC-West Met (16)	MRC	Current	Meteorology

⁵ Air District Regulation 9, Rule 1: Sulfur Dioxide: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-1-sulfur-dioxide>

⁶ Air District Regulation 9, Rule 2: Hydrogen Sulfide: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-2-hydrogen-sulfide>

⁷ Although the Concord monitoring station is outside of the 5-km buffer around the Marathon and MRC refineries, data from that station are included in the analyses below for reference.

Figure D-18 - Location of Current and Recent Monitoring Stations Near the Marathon and MRC Refineries



Notes:

- 1) See Table D-3 for the names corresponding to the numbered labels
- 2) In 2017, the Marathon-Pacheco Slough monitor was moved a short distance and renamed to Pacheco Slough 2.

A review of historical hourly SO₂ and H₂S measurements around the Marathon and MRC refineries over the period 2019 to 2021 shows that while concentrations have been low generally, variability is noted among the stations and occasional higher concentrations do occur. Figure D-19 shows distributions of hourly SO₂ concentrations by monitoring site, where each smaller dot represents an hourly SO₂ concentration, and the larger black dot represents the three-year average concentration. SO₂ is a criteria air pollutant regulated under the Clean Air Act and the National Ambient Air Quality Standard (NAAQS) for SO₂ is also shown for reference; however, refinery GLMs are not subject to the NAAQS since they operate within a facility fenceline. The data distributions are color-coded to match the site locations on the adjacent map. There were more occurrences of relatively higher SO₂ concentrations (above 25 ppb) at the MRC - Ace Hardware GLM compared to other nearby locations and other SO₂ monitors in the Bay Area. SO₂ concentrations at Air District monitoring sites, which are located outside the refinery fenceline, were comparatively lower and were well below the NAAQS. Data from the Oakland West monitoring site (near the Port of Oakland) and the San Jose-Jackson (urban area without refinery or port related SO₂ sources) are also shown for context.

Figure D-19 - Historical SO₂ Concentrations and Map of SO₂ Monitor Locations

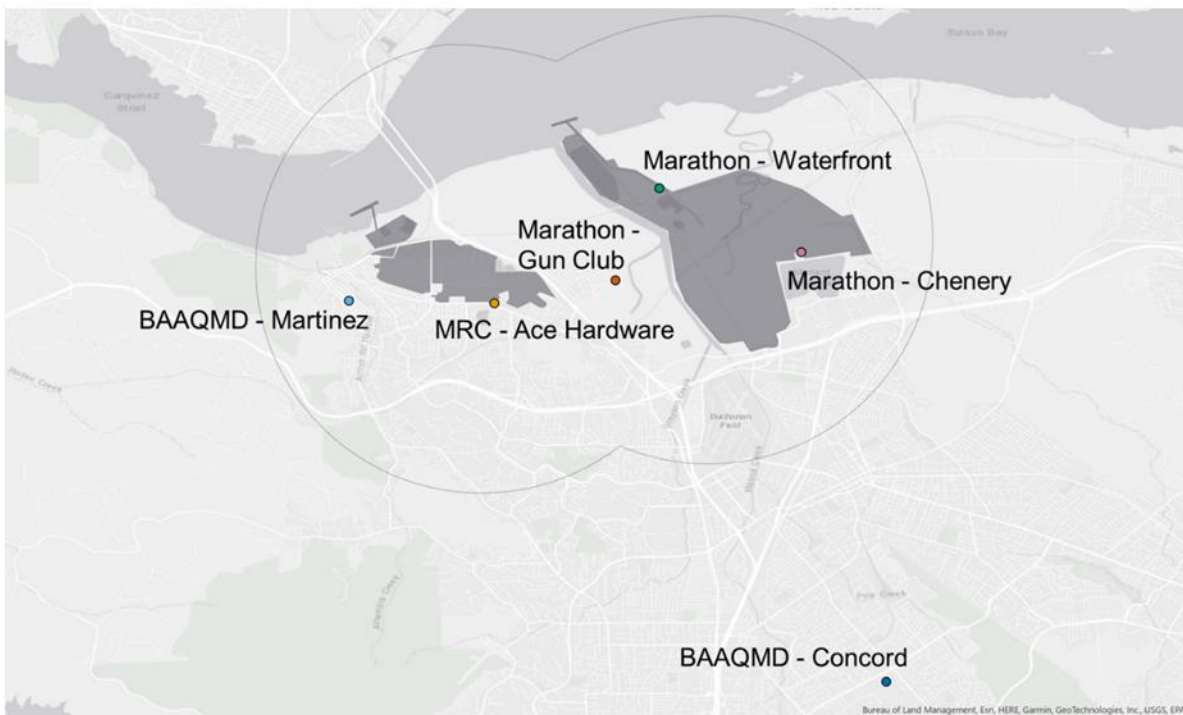
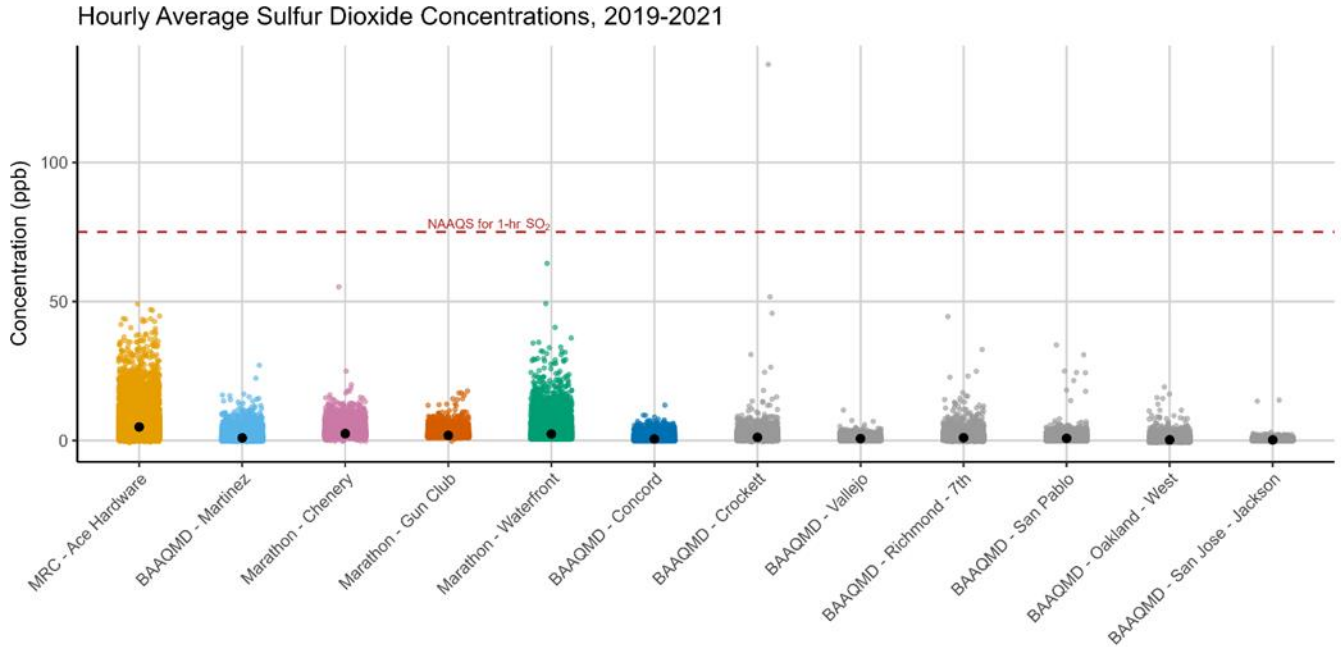
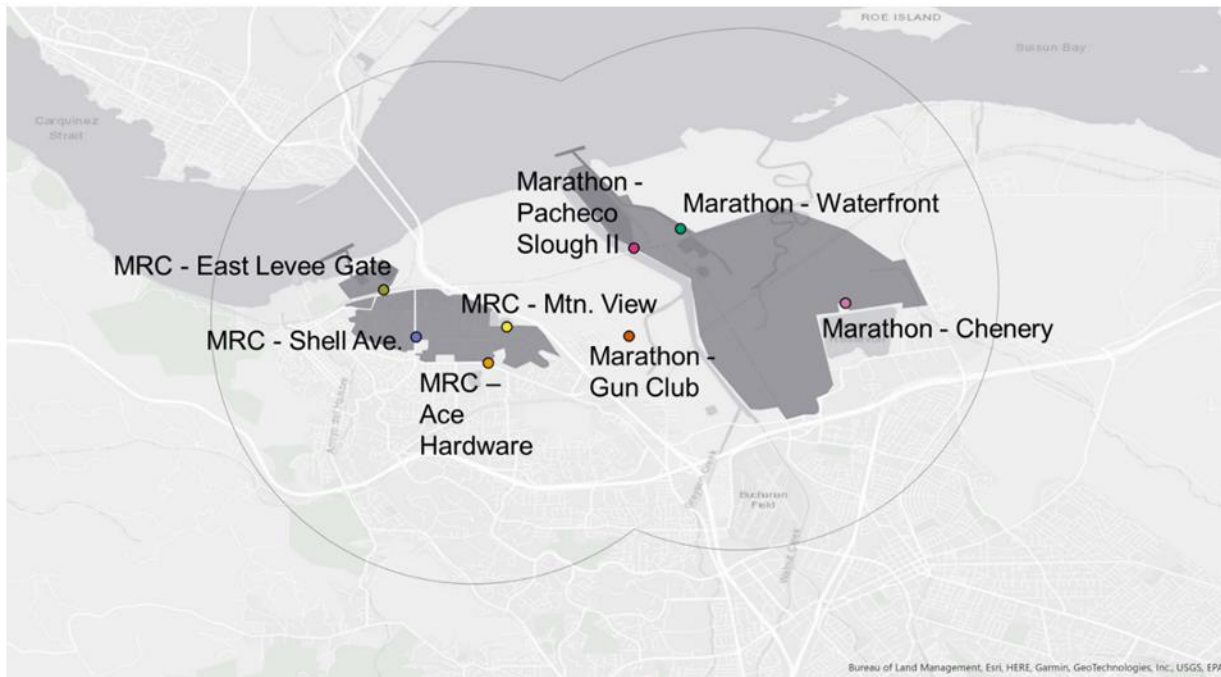
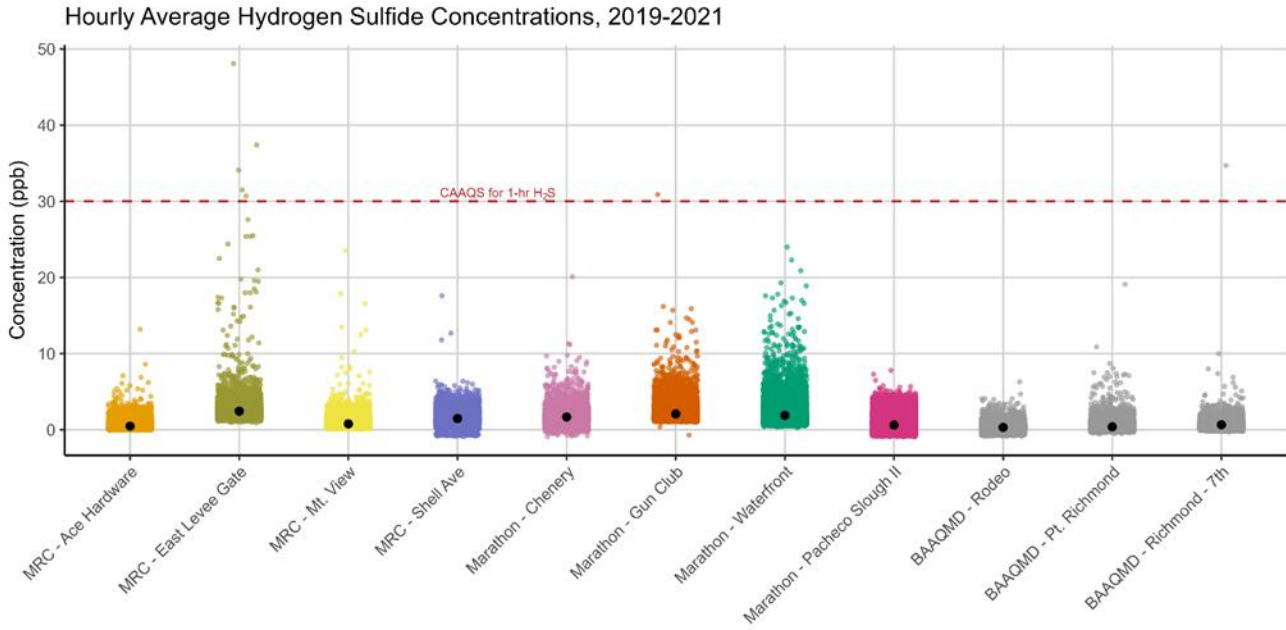


Figure D-20 is similar to the previous figure but shows measured hourly H₂S concentrations. While H₂S is not a criteria pollutant regulated under the Clean Air Act, CARB has established a California Ambient Air Quality Standard (CAAQS) for 1-hr hydrogen sulfide of 30 ppb for the purpose of odor control, though some people may detect odors at lower concentrations. H₂S data from the refinery ground-level monitors and Air District monitoring sites were mostly below 30 ppb, except for several occurrences of concentrations greater than 30 ppb at the MRC - East Levee Gate GLM. A period of higher concentrations was also noted at the MRC-East Levee Gate station in late 2017, before the period shown in Figure D-20, and the cause of those exceedances was attributed to an issue at a nearby effluent treatment plant.

Figure D-20 - Historical H₂S Concentrations and Map of H₂S Monitor Locations



The Air District measures selected volatile organic compounds (VOCs), many of which are TACs, at its Martinez and Concord monitoring sites. These VOCs are measured by collecting air into a canister over 24 hours, and the collected samples are then analyzed at the Air District’s laboratory. VOC samples are collected at these monitoring sites every twelfth day. VOCs can come from many kinds of facilities, operations, processes, and consumer products, as well as smoke from wildfires and other combustion.

Measurements for selected VOCs from Air District monitoring sites from 2016 to 2020 are provided below in Figure D-21 and Figure D-22. Benzene and 1,3-butadiene are among the five compounds found to be responsible for more than 90% of the cancer risk attributed to emissions as part of the previously mentioned CARE study.

Figure D-21 - Historical Benzene Concentrations

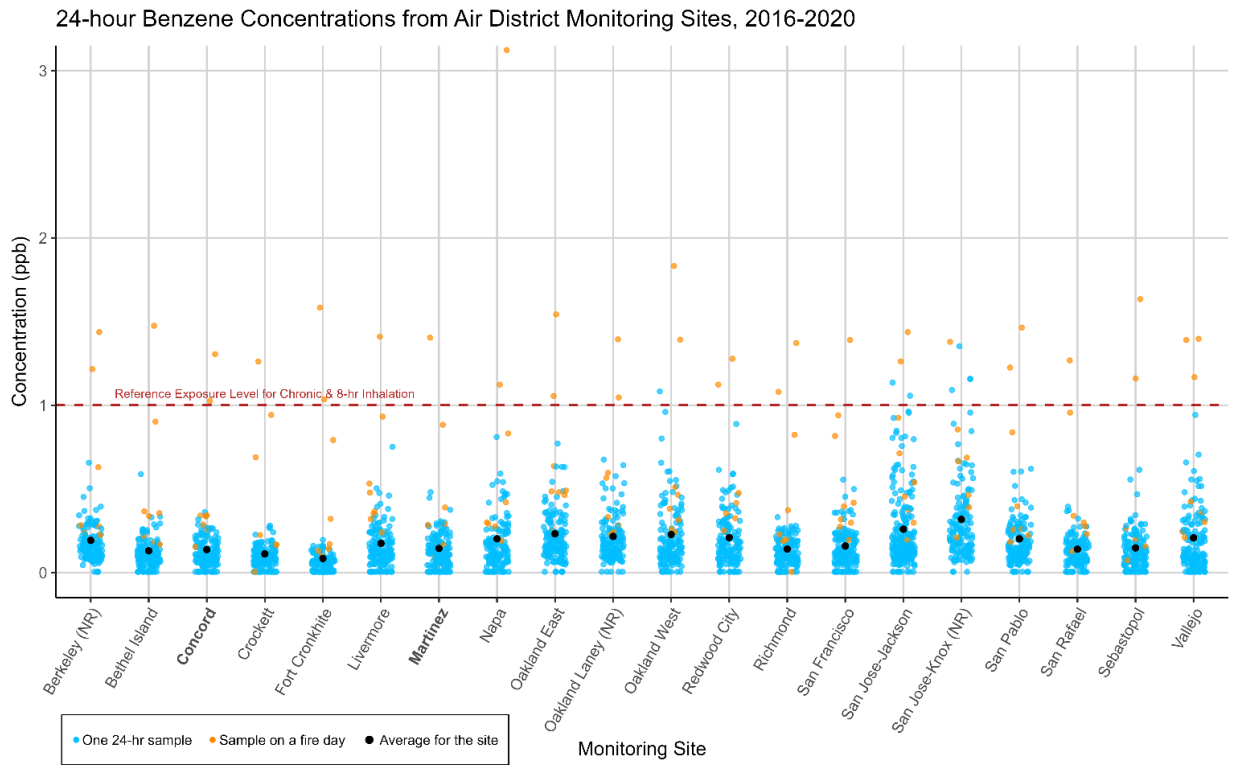
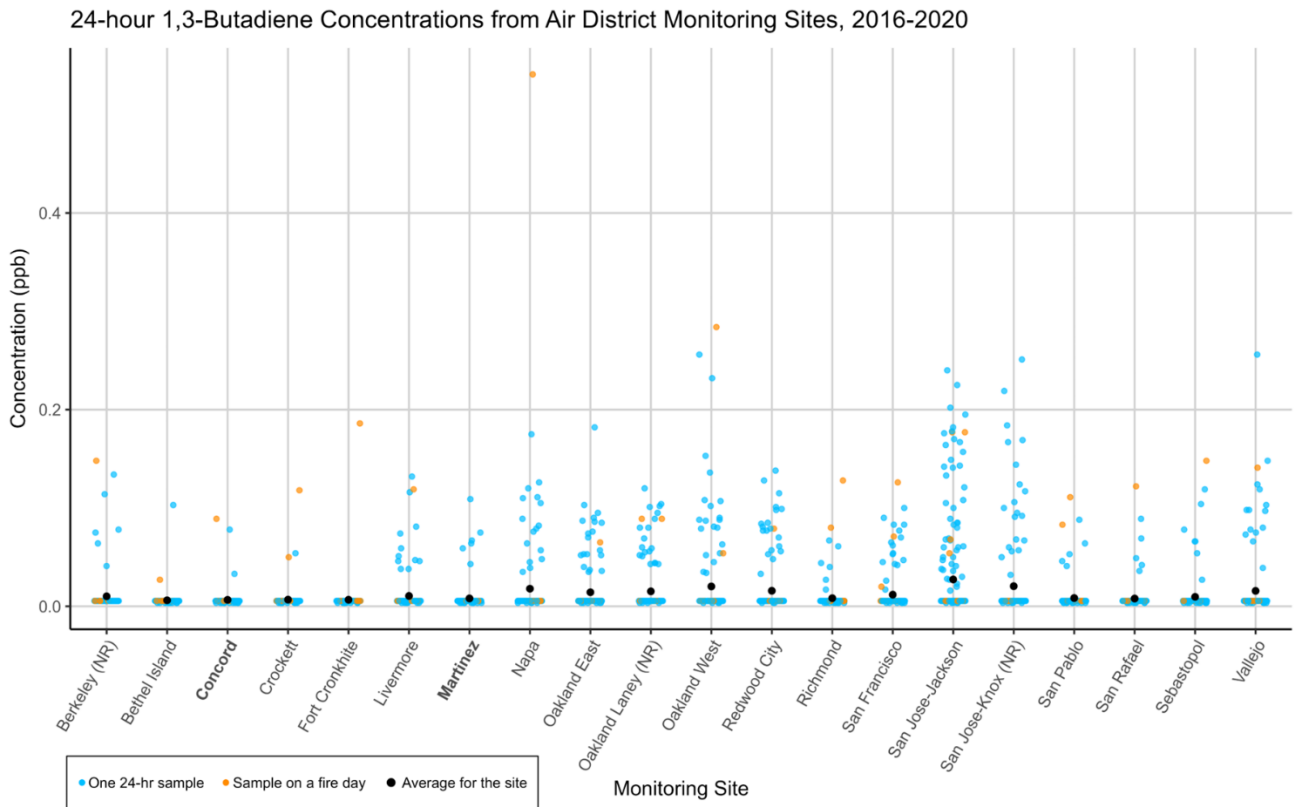


Figure D-22 - Historical 1,3-Butadiene Concentrations



Most of the measured benzene concentrations have been below 0.5 ppb across the Air District's monitoring network, which is below the California Office of Environmental Health Hazard's chronic Reference Exposure Level (REL) for benzene of 1 ppb. Most measurements above 1 ppb occurred during periods of wildfire smoke. Overall, levels of measured benzene concentrations at the Martinez and Concord monitoring sites have been similar to each other and show fewer occurrences of relatively higher levels of benzene compared to San Jose - Knox, San Jose - Jackson, Oakland West, and Vallejo (and other air monitoring sites). Benzene is emitted during the processing of crude oil and through other refinery operations, but a primary source of benzene in the atmosphere is vehicle exhaust.

Most of the 1,3-butadiene samples (over 95% of the samples at the Martinez and Concord monitoring sites) yielded no detectable concentration. Of the few samples with detectable levels of 1,3-butadiene, concentrations were generally low at the Martinez and Concord monitoring sites (less than 0.2 ppb). Several other monitoring sites, such as San Jose - Jackson, San Jose - Knox, Oakland West, and Vallejo (among others) had more frequent occurrences of relatively higher concentrations of 1,3-butadiene. While 1,3-butadiene emissions result from petroleum refining operations, the bulk of 1,3-butadiene in the atmosphere comes from traffic, which is ubiquitous in the Bay Area urban environment.

Stakeholder Input

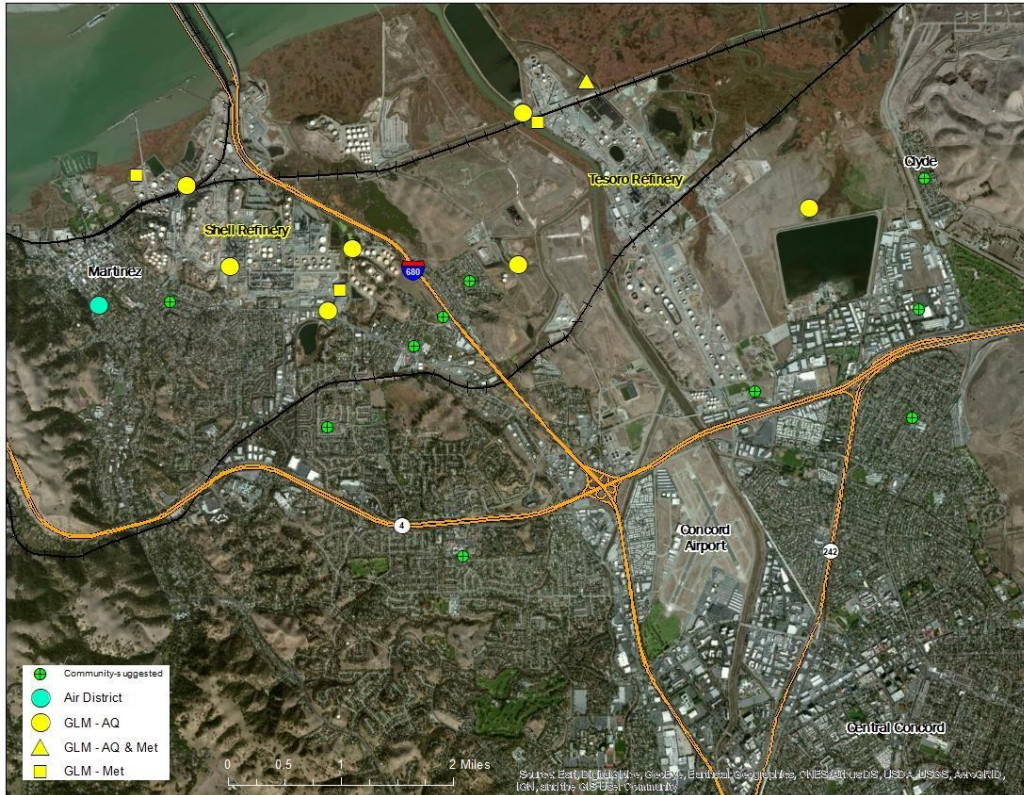
The Air District responds to and investigates all air pollution complaints. We reviewed complaint data between January 1, 2019 and December 31, 2023 for the following zip codes around MRC: 94510, 94519, 94520, 94523, 94529, and 94553. During this time period, the Air District received 591 complaints in these zip codes (none received in the 94529 zip code). Table D-4 shows a breakdown of the number of complaints by zip code and by complaint type. The City of Martinez and MRC are primarily within the 94553 zip code. Based on the data, there were 169 complaints associated with MRC. A number of the MRC-related complaints were recorded for the same event, including the 2022 Thanksgiving release (8 complaints), 12/9/2022 flaring event (17 complaints), 7/11/2023 catalyst release (7 complaints), and 12/15/2023 flaring event (18 complaints).

Table D-4 - Complaints by Zip Code and Type between January 1, 2019 and December 31, 2023

Zip Code	Asbestos	Dust	Indoor Fire	Outdoor Fire	Gas Station Nozzle	Odor	Other	Smoke	Soot	Total
94510	0	13	0	0	0	118	15	38	0	184
94519	3	0	1	2	1	15	1	0	0	23
94520	2	3	0	0	1	88	0	2	0	96
94523	11	2	0	5	1	6	0	1	0	26
94553	4	31	1	12	3	153	37	18	3	262
Total	20	49	2	19	6	380	53	59	3	591

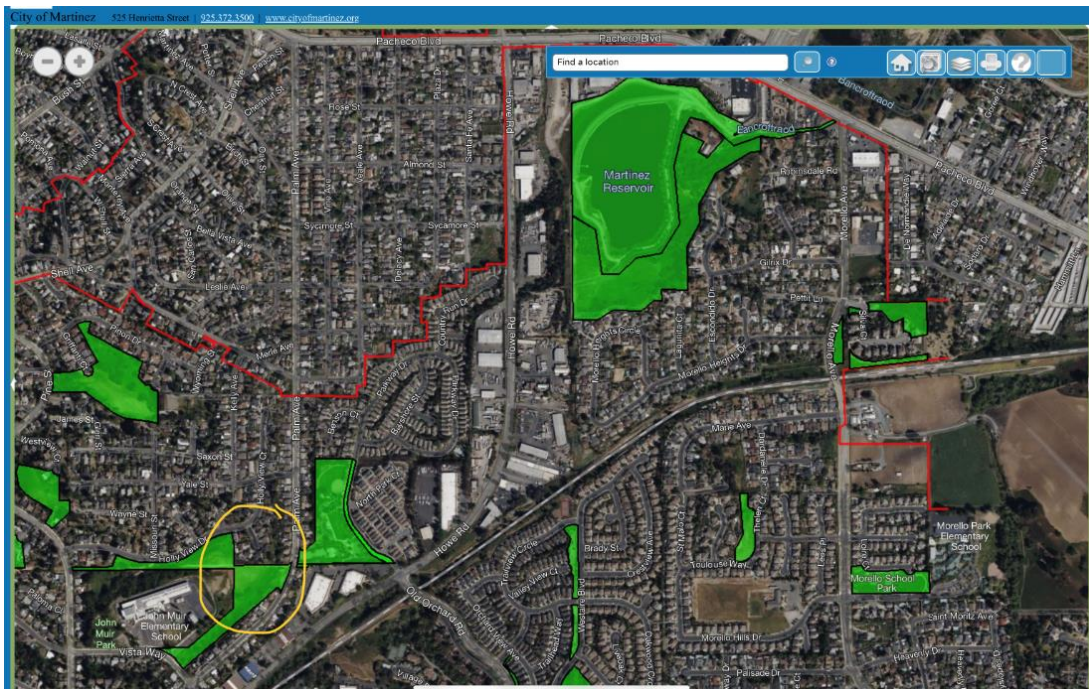
Figure D-23 shows suggested locations for future air monitoring as proposed by community members at a workshop held in Martinez in March 2018. Several locations were suggested, including within the City of Martinez, the unincorporated Vine Hill community east of Martinez and between the two refineries, the far northern part of the City of Concord, and the unincorporated community of Clyde.

Figure D-23 - Monitoring Locations Suggested by Community Members in 2018



The City of Martinez provided suggested city-owned locations as possible candidates for a new monitoring station, and in particular, the John Muir Elementary School, which is located slightly under one mile south of the refinery fenceline. The map provided by the City of Martinez is shown in Figure D-24, and the city-owned property adjacent to John Muir Elementary School is circled in yellow.

Figure D-24 - Map of City-Owned Properties (Provided by the City of Martinez)



Recommended Priority Search Area for the MRC Major Stationary Source Community Air Monitoring Station

As noted in the Executive Summary, no single fixed monitoring location will capture all the emissions from a given facility. Variability in the meteorological conditions coupled with differences in the characteristics (e.g., temperature or height) of emissions mean there is a chance that any area nearby could experience the impacts of the facilities, particularly for short duration emissions or incidents. In this case, several key factors stand out:

- Due to the complex and variable wind patterns in the area around MRC, there is not any one neighborhood or area that is consistently downwind of the refinery.
 - For locations nearer the Carquinez Strait and the refineries, winds have a strong westerly component, which would tend to transport emissions eastward. However, periods of offshore winds (blowing from the east to northeast) that occur mainly in the cool season may transport pollutants from industrial sources into central Martinez.
 - Lighter and more variable winds also occur frequently, and particularly overnight and away from the Carquinez Strait, which can limit dispersion of pollutants.
 - For locations further inland (south) from the Carquinez Strait, winds have a prominent southerly component, which would tend to transport emissions from other sources (such as freeways) northward.
- Air monitoring data show relatively higher SO₂ concentrations at the MRC-Ace Hardware GLM compared to GLMs at the nearby Marathon refinery and to Air District monitors. Per the assessment of meteorological data, the Ace Hardware GLM is likely frequently downwind of MRC, and a new station near this location may be worth considering.
- Consistent with the prevailing wind data, a health risk screening assessment shows estimated cancer risk contours extending from the MRC refinery eastward from the facility to a small degree but primarily extend northward toward Benicia.
- The census tract immediately east and southeast of MRC (including Vine Hill) has the highest composite CalEnviroScreen score among census tracts nearest MRC.
- Other than the refineries, five nearby stationary sources have also paid fees under Regulation 3, Schedule X. Two of those facilities are co-located with the Marathon refinery, and the other three are generally located between the Marathon and MRC refineries.
- Of the ten locations suggested by community members in 2018, seven are in the areas of Vine Hill, northern Concord, and Clyde.

On balance, multiple candidates may be acceptable candidates for a new air monitoring station. Given the complex meteorological patterns in the area, a new community air monitoring station sited immediately southeast, south, or southwest (within 1-2 km) of MRC, as was shown in Figure D-1 in the Executive Summary, as this area would be downwind of the facility for at least some of the time. This highlighted area includes some of the properties owned by the City of Martinez, including near the John Muir Elementary School, Morello School Park, Martinez Reservoir, and Mountain View Park; however, other locations within the highlighted area may also be good candidates for an air monitoring site. Roughly the eastern half of this highlighted area, including the Vine Hill neighborhood, has a higher composite score for environmental justice indicators.