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COMMUNITY

PATH TO CLEAN AIR

Community Emission Reduction Plan (CERP)
Community Steering Committee Meeting #14

May 16, 2022

Welcome


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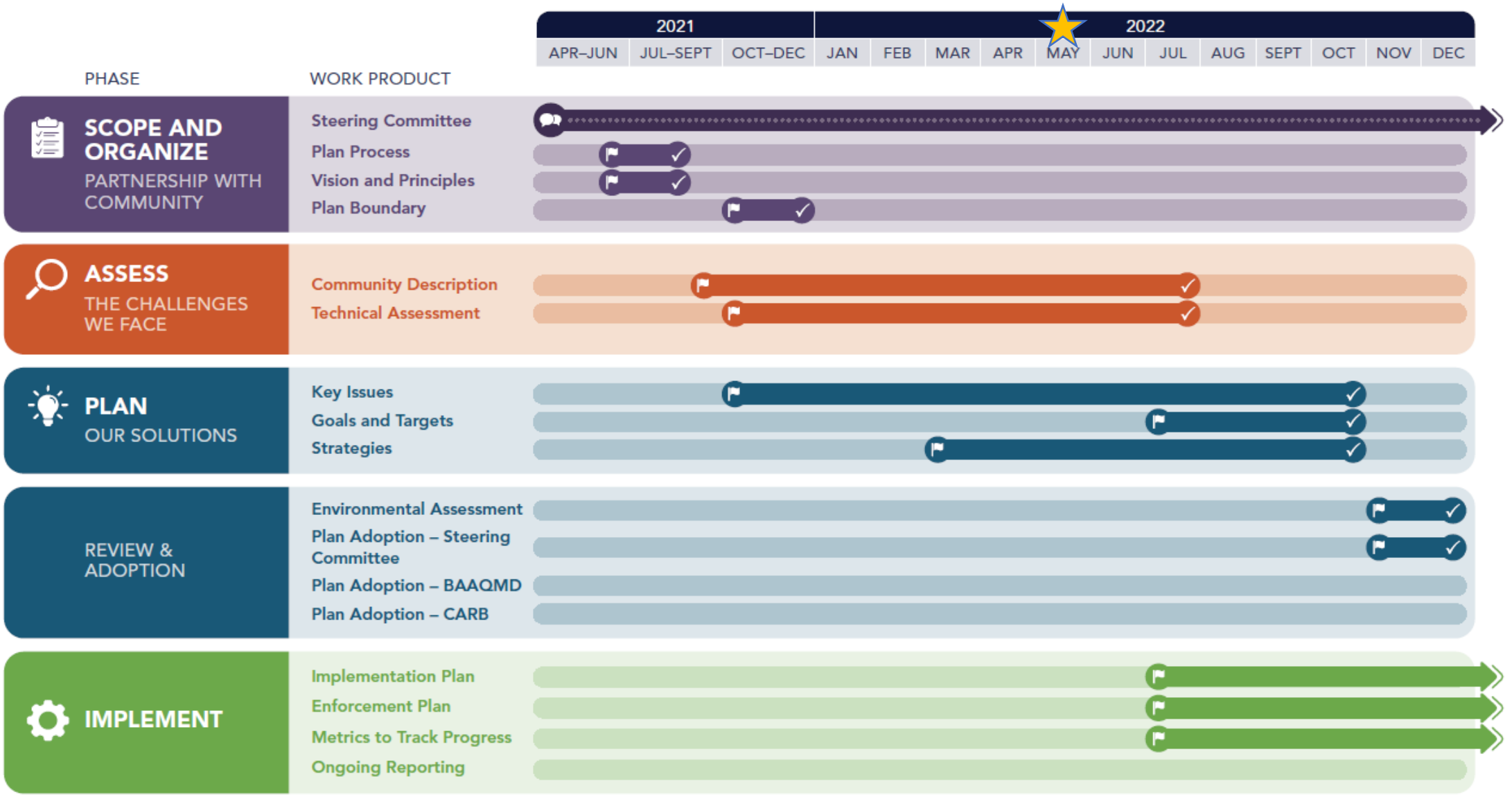
Today's Agenda

1. Roll Call
2. Welcome and Timeline Review
3. Approval of April 25, 2022, Meeting Minutes
4. Updates from Ad Hoc Groups
5. Technical Assessment Insights: Part II
6. Environmental Justice Updates
7. Public Comment on Non-agenda Items and Next Steps

Timeline: Where are We Today?



Approval of April 25, 2022 Meeting Minutes

Public Comment

Updates from Community Description and Technical Assessment Ad Hocs

Community Description Ad Hoc co-leads: Nancy Aguirre

Technical Assessment Ad Hoc co-leads: Jeff Kilbreth

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Public Comment

Technical Assessment Insights: Part II

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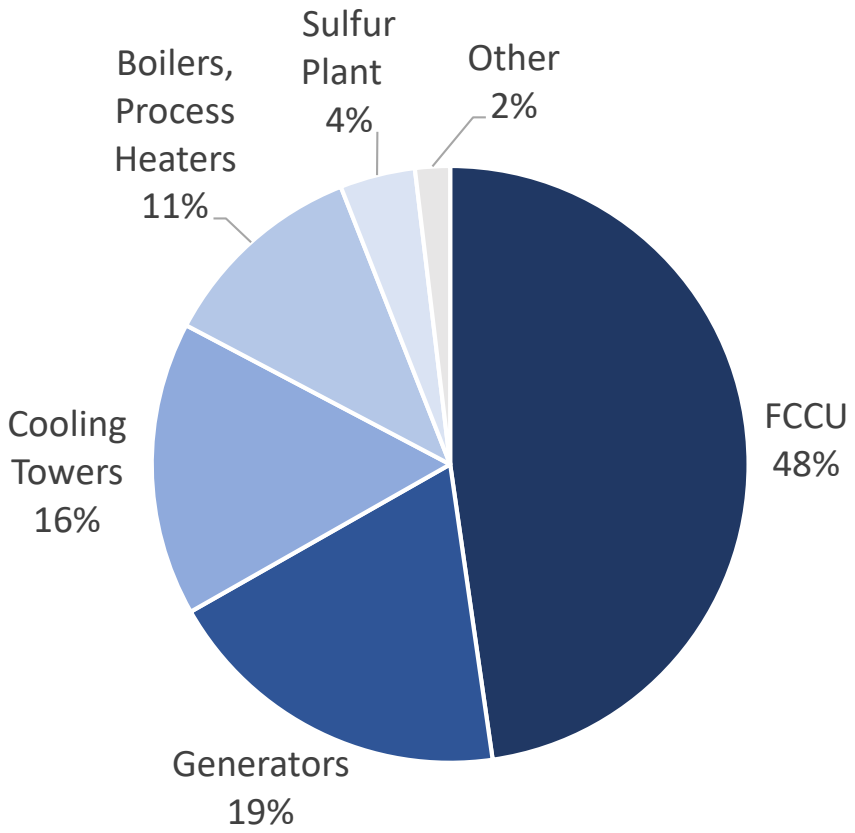
Topics for this Presentation

- Insights from air quality modeling
  - How can exposure information supplement emissions inventory data?
  - What sources are contributing to the problems?
- Insights from air quality measurements
  - Higher levels of several pollutants near roadways
  - Higher levels of $PM_{2.5}$ in and adjacent to industrial areas
  - Examples of shorter-term or recurring air quality impacts
- Connecting community concerns to strategies

Recap: Emissions to Health Effects

Chevron $PM_{2.5}$ (479 tons/year*)



- Emissions are the first step (CERP = *Community **Emissions Reduction** Plan*)
- Understanding exposures and health impacts can help identify and prioritize strategies to include in the CERP

*Includes OGV berthing emissions

Community Concerns (1 of 2)

Fuel Refining, Support Facilities, Storage, and Distribution	Industrial and Commercial Sources Near Communities	Vehicles and Trucks, Streets and Freeways, and Logistics
Chevron Chemtrade Kinder Morgan Phillips 66 Transmontaigne IMTT Richmond Products Terminal Qualawash Holdings LLC Gas Stations	Permitted sources not included under *Fuel Refining* (e.g., Levin Terminal, autobody shops, food processing facilities) Construction activities Restaurants	Cars and trucks operating on freeways and surface streets (incl. road dust) Warehouses and truck-related businesses Diesel truck idling and congestion

Community Concerns (2 of 2)

Marine and Rail	Odors and Smells	Addressing Public Health and Reducing Exposure
Ocean going vessels	Fuel Refining	Wildfire smoke
Harbor craft (e.g., tugs)	City of Richmond Wastewater Treatment Plant	Residential wood smoke
Ferries	West Contra Costa County Landfill	Accessible health data
Cargo handling equipment	AAK Oil	Sensitive receptor sites
Railyards	Others (e.g., cannabis growing and processing)	Incompatible land use development
Rail lines		

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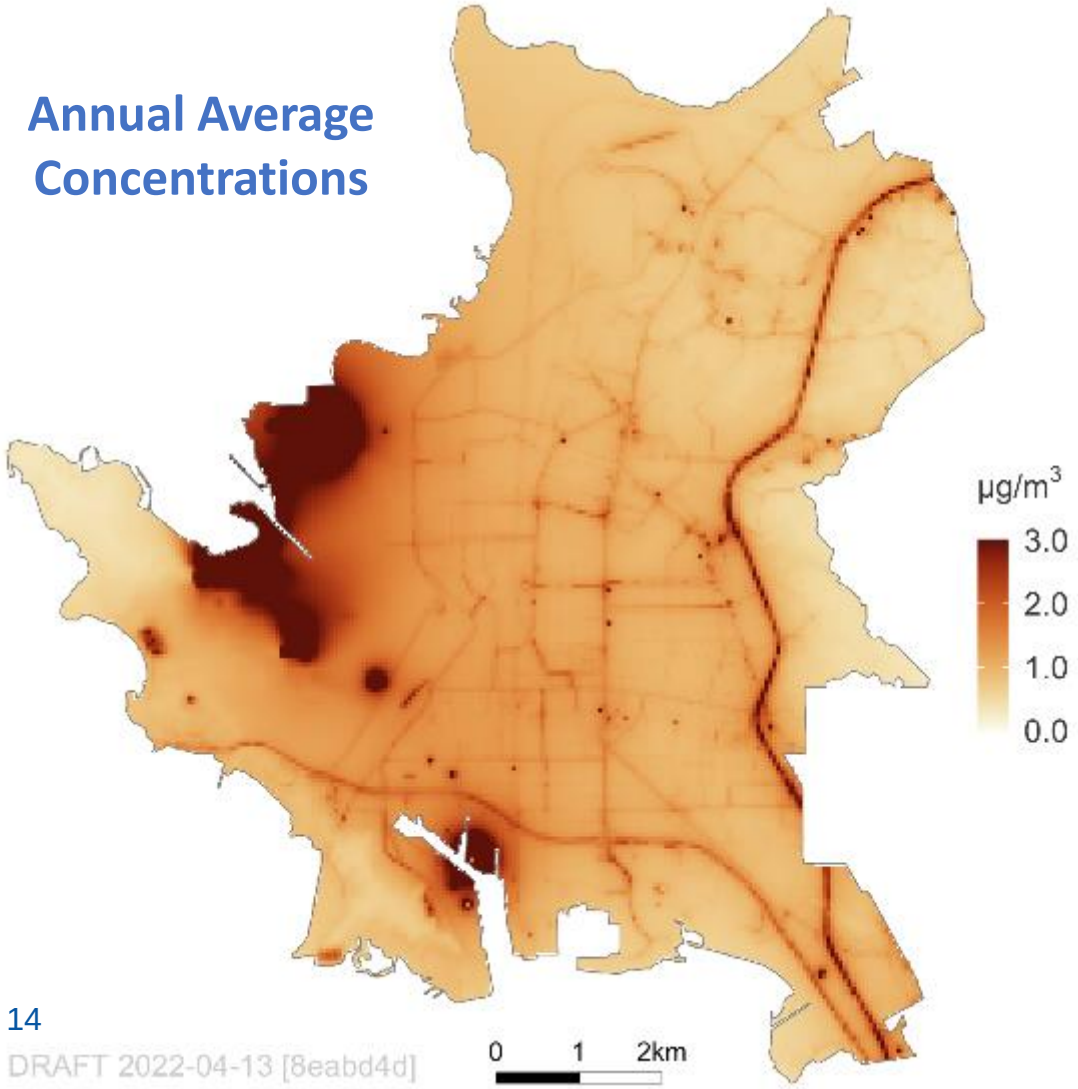
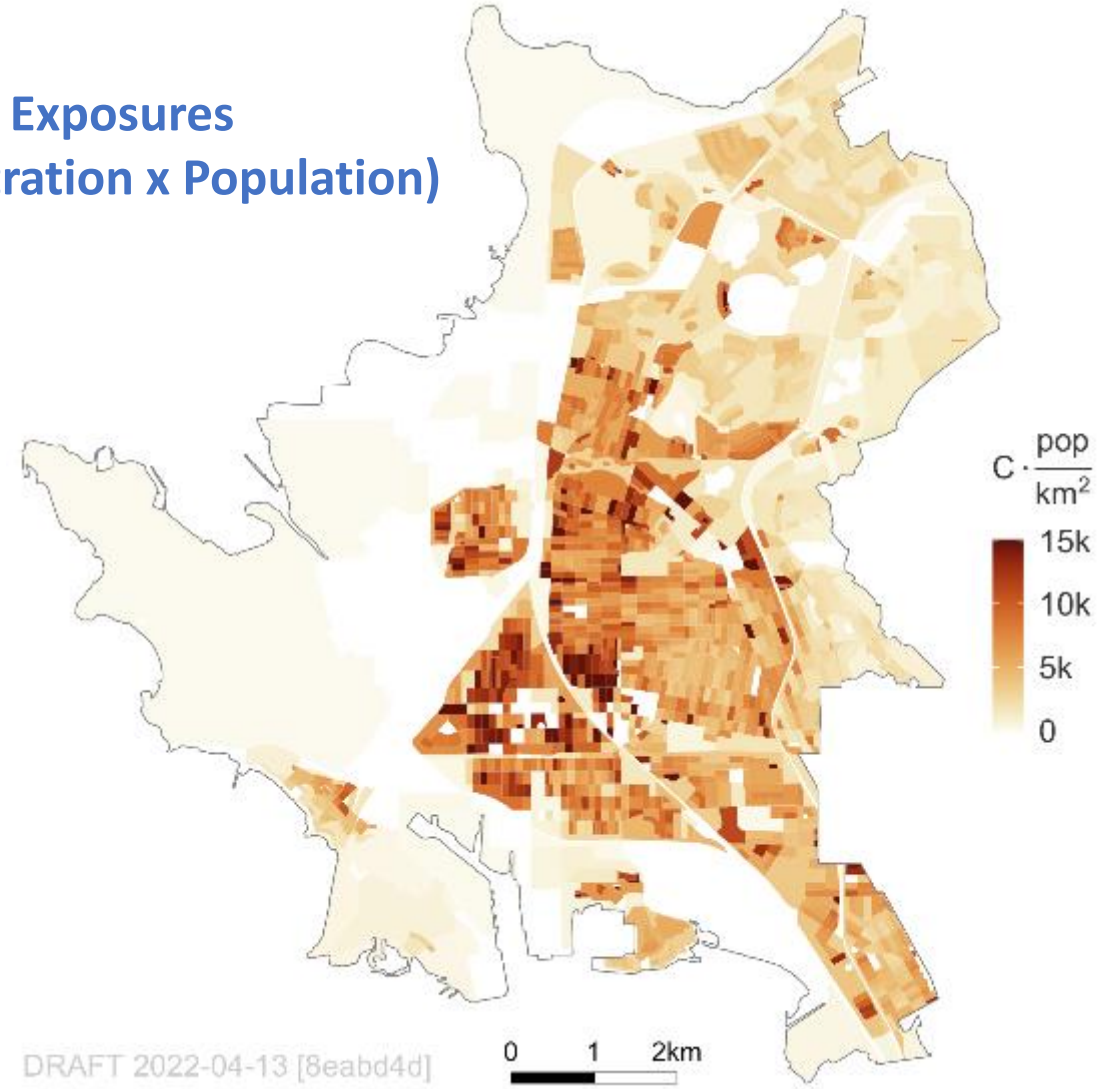
Modeled $PM_{2.5}$ Impacts from Local Sources

Annual Average Concentrations



Exposures (Concentration x Population)



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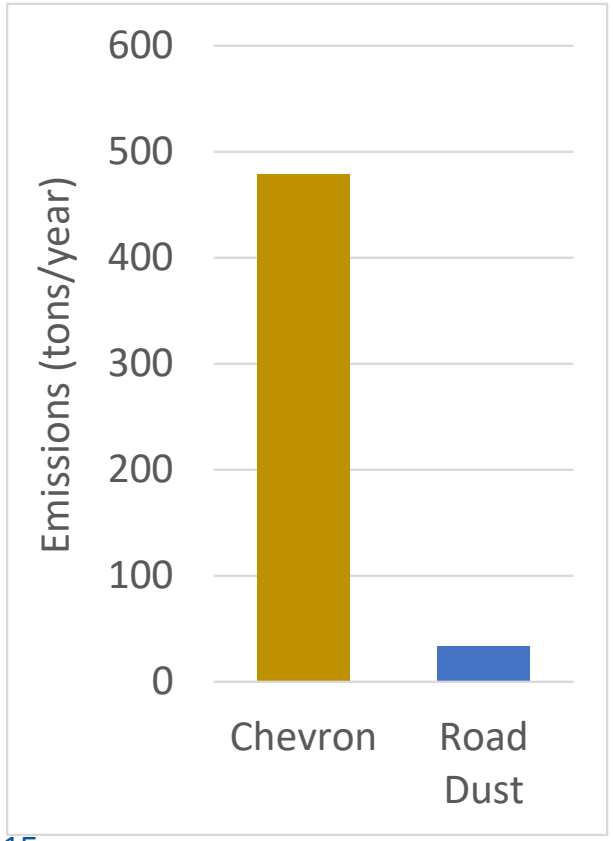
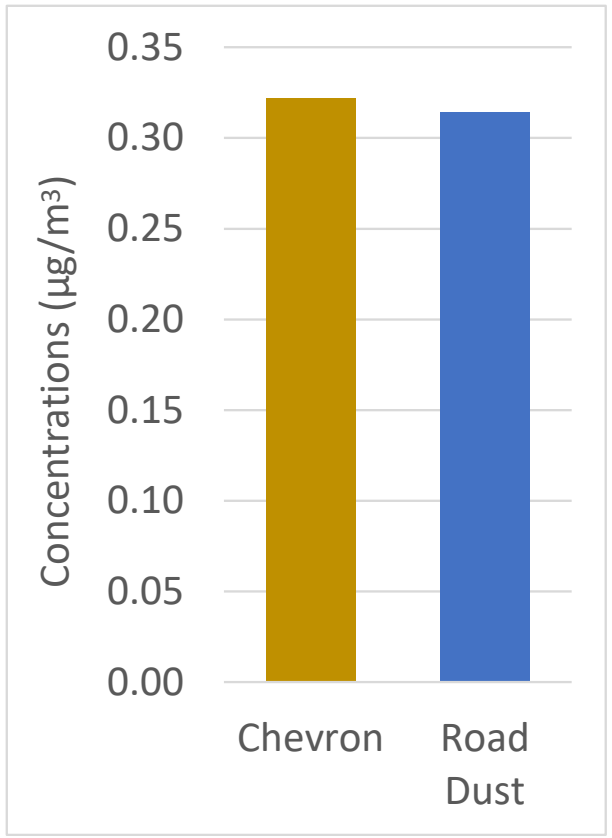
Modeled $PM_{2.5}$ Impacts
Emissions vs. Exposure

$PM_{2.5}$ Emissions



Impacts on Average Residential $PM_{2.5}$ Exposure

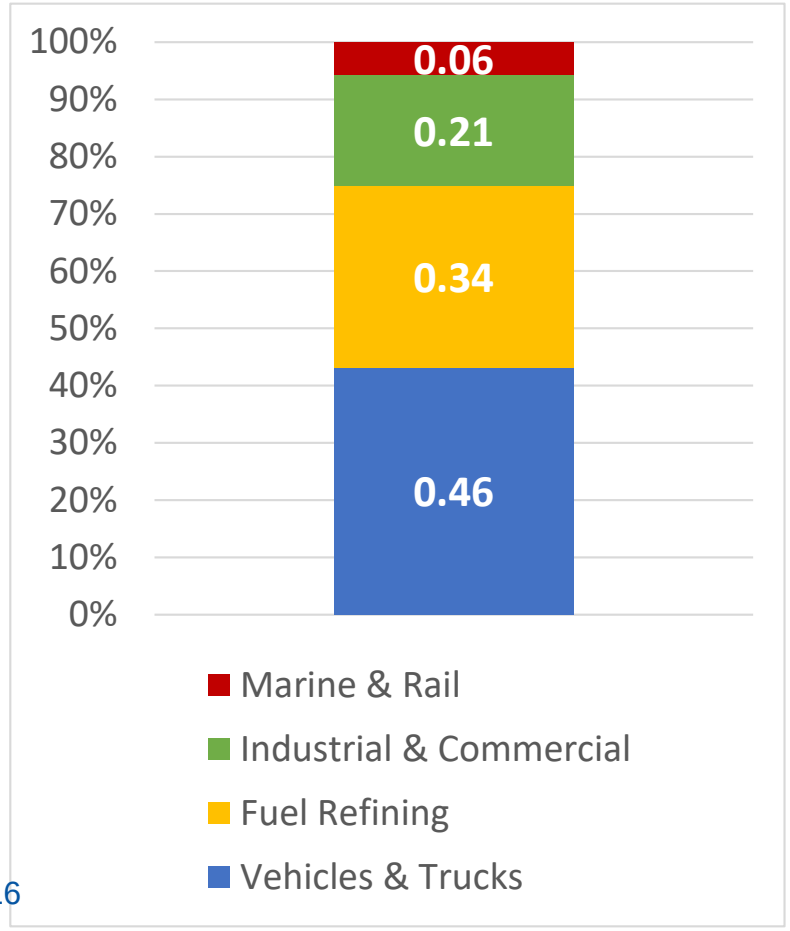


Why do they differ?

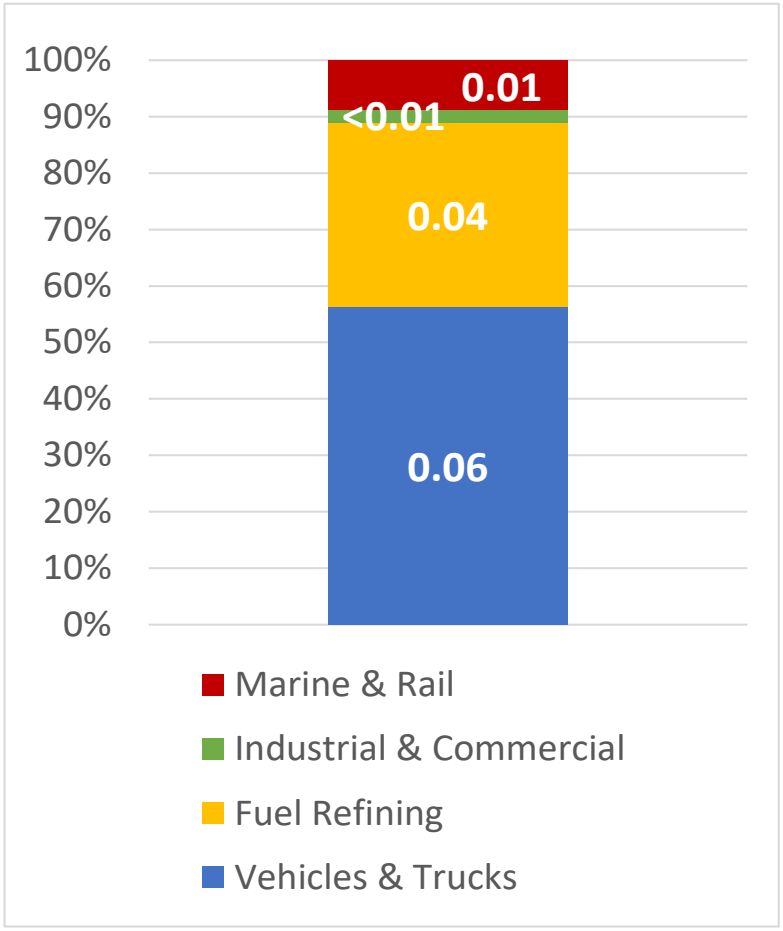
- Source **release characteristics** (e.g., low-level vs. high stacks)
- **Proximity** to emissions sources
- Only showing **local impacts** on $PM_{2.5}$ exposures (within the PTCA study area)

Modeled Impacts: Source Contributions

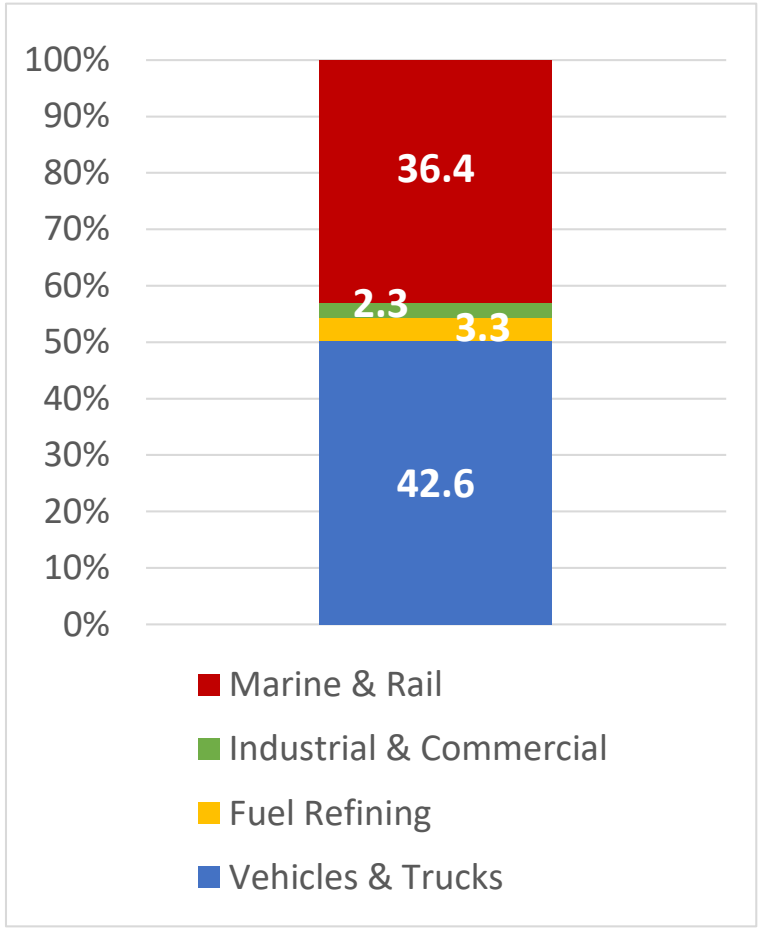
Source Contributions to Average Residential $PM_{2.5}$ Exposures
(stacked bar total = 1.06 µg/m³)



Source Contributions to Average Residential Chronic Hazard Index
(stacked bar total = 0.11)

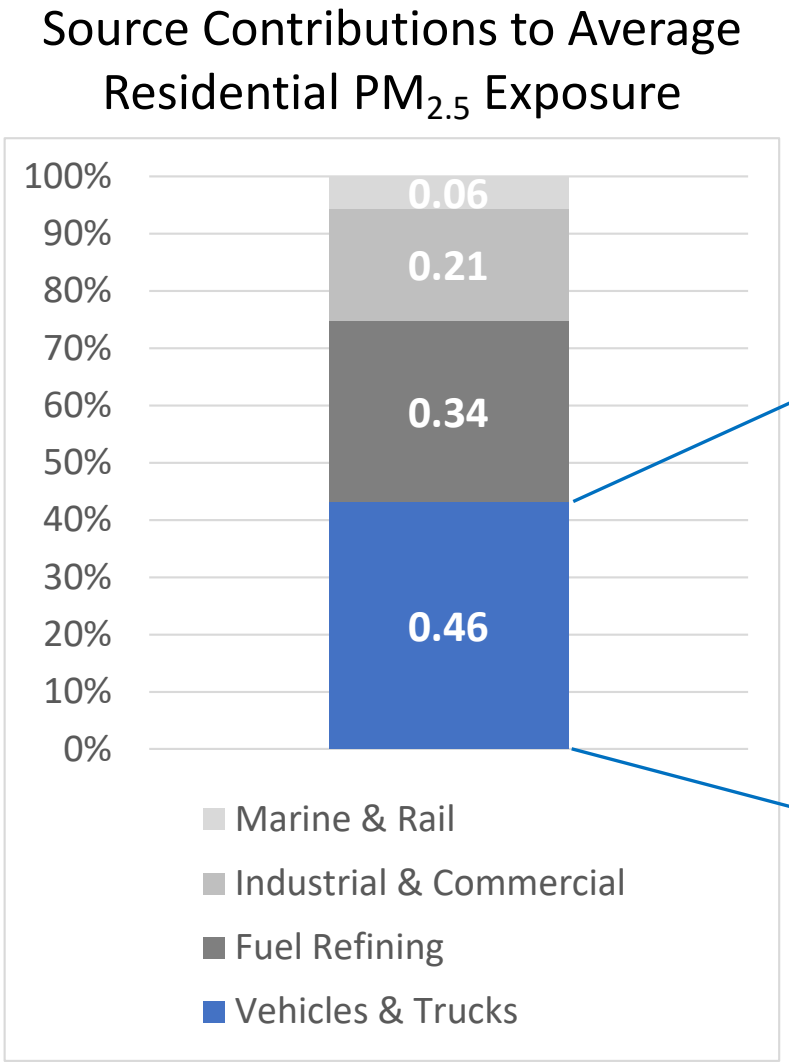


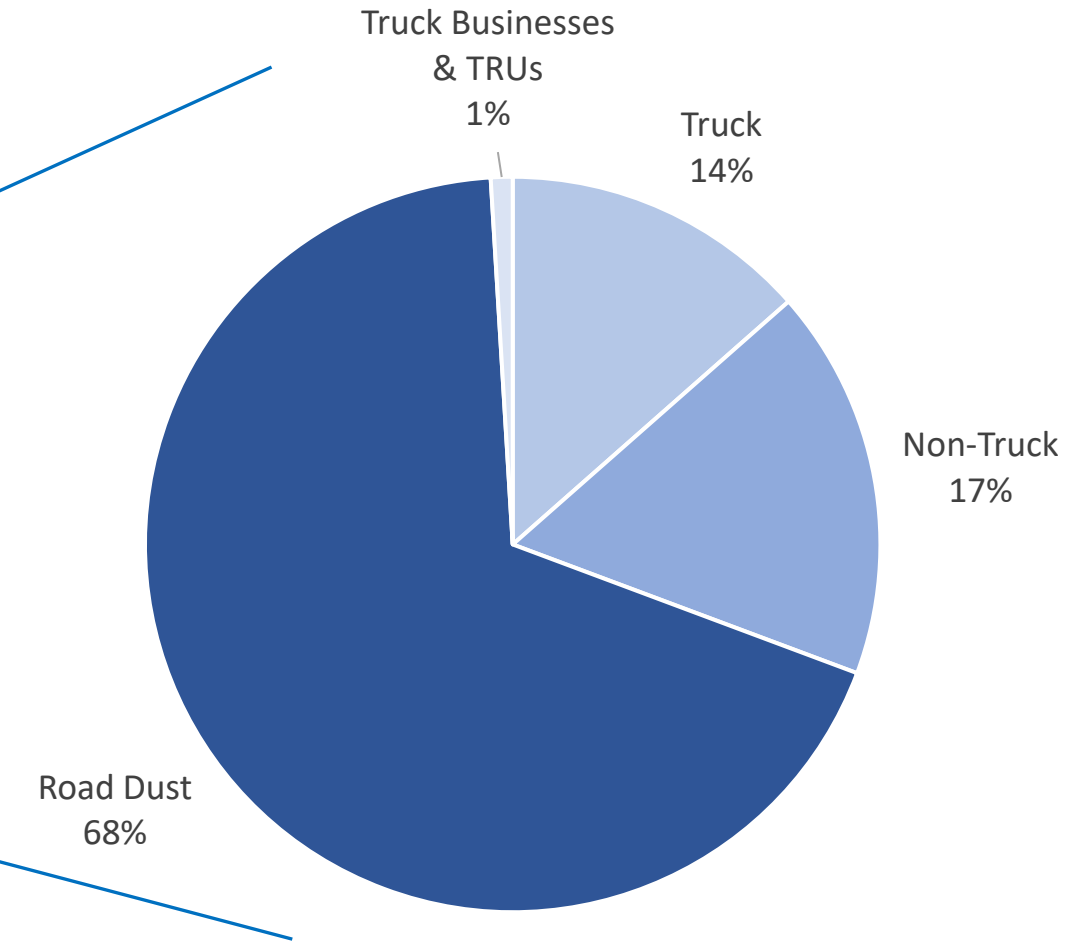
Source Contributions to Average Residential Cancer Risk
(stacked bar total = 84.3 per million)



Vehicles and Trucks

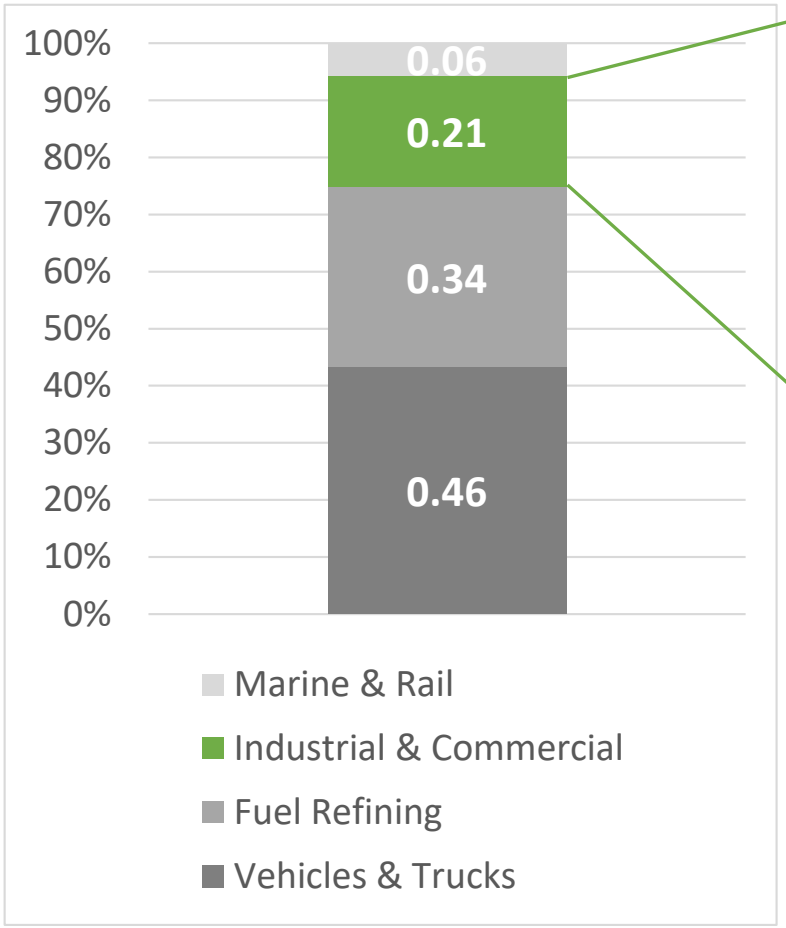
A Closer Look at $PM_{2.5}$

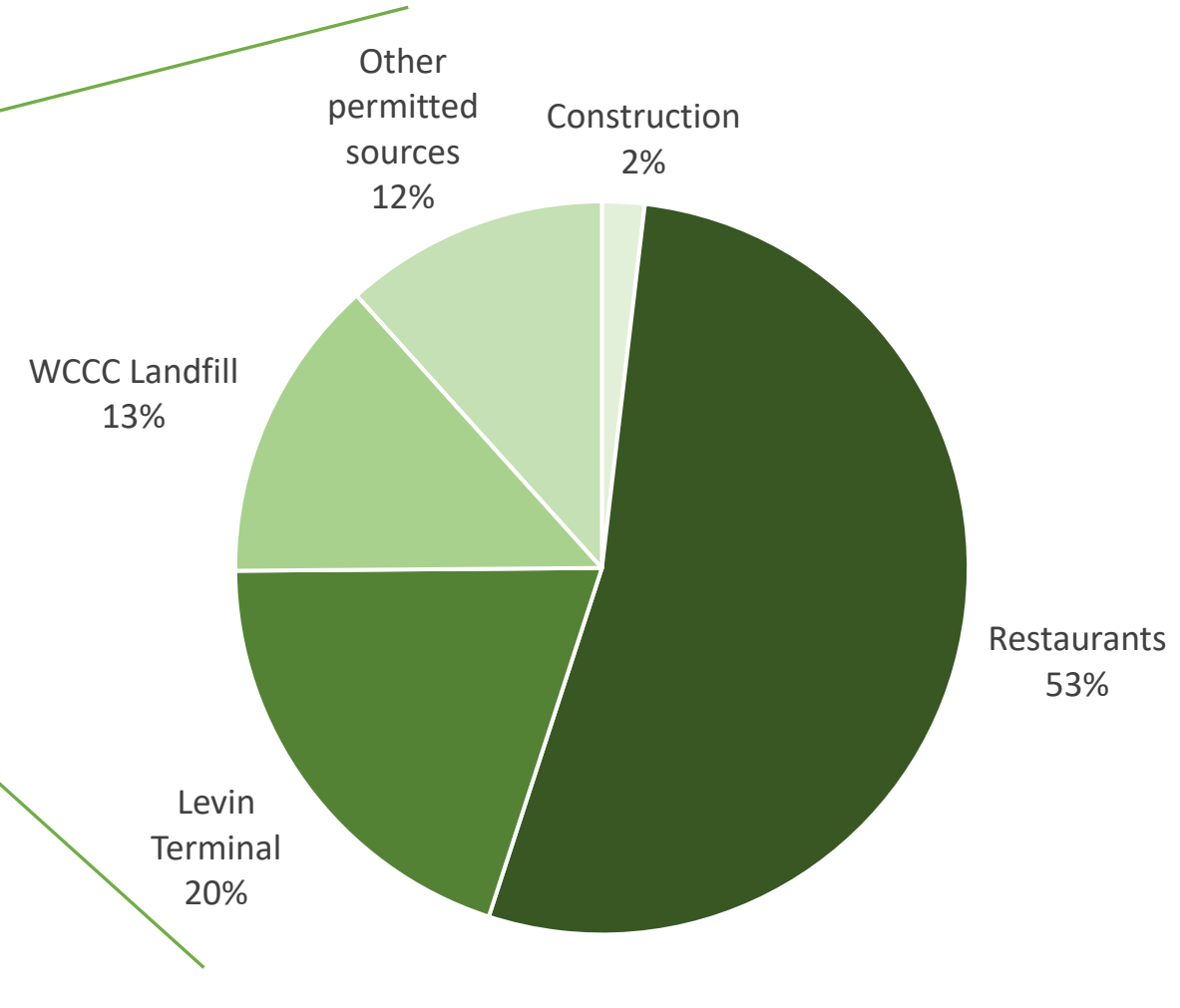




Industrial & Commercial Sources

A Closer Look at $PM_{2.5}$



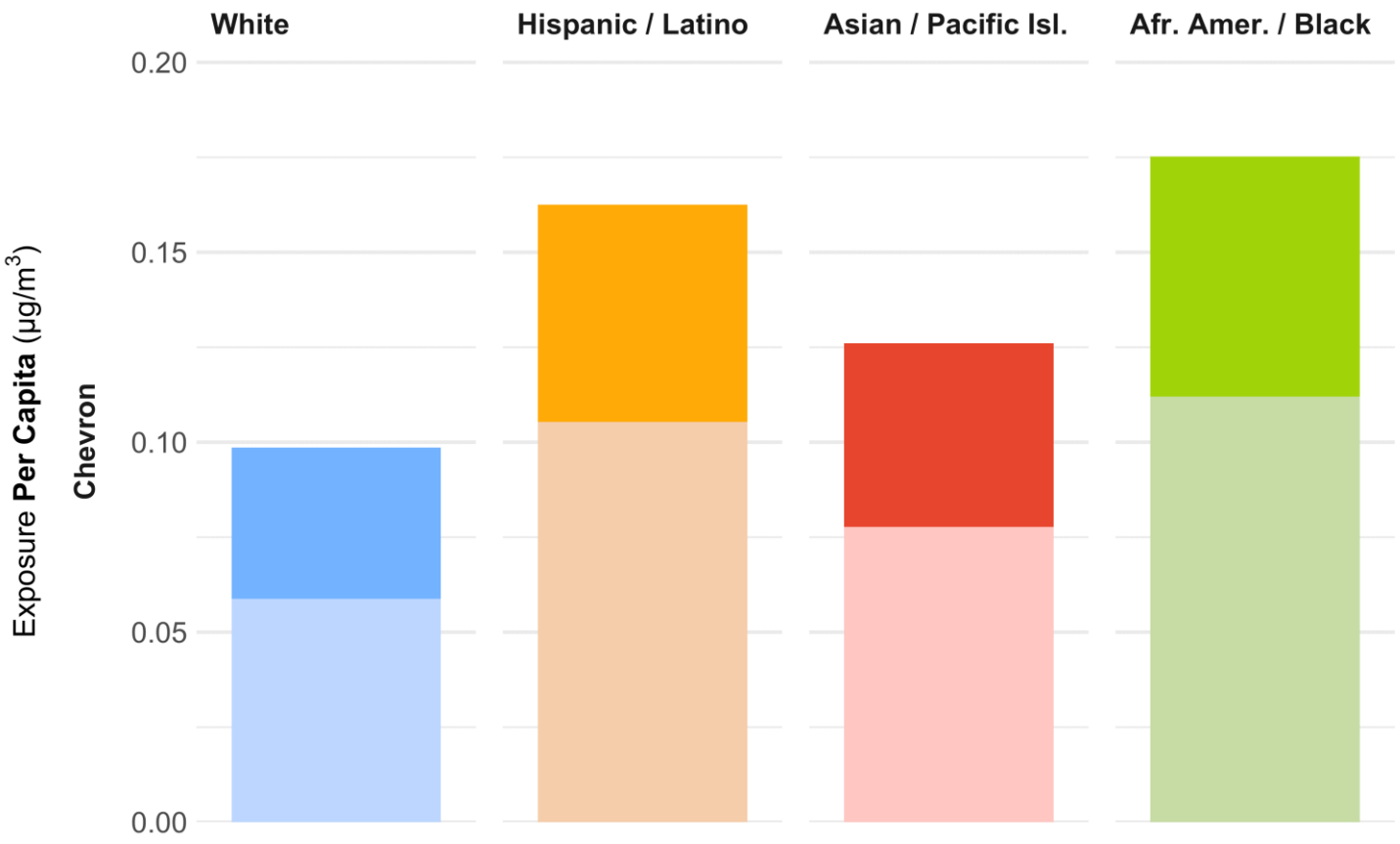


Fuel Refining

A Closer Look at $PM_{2.5}$ from the Rule 6-5 Analyses

Disparities in $PM_{2.5}$ Exposure

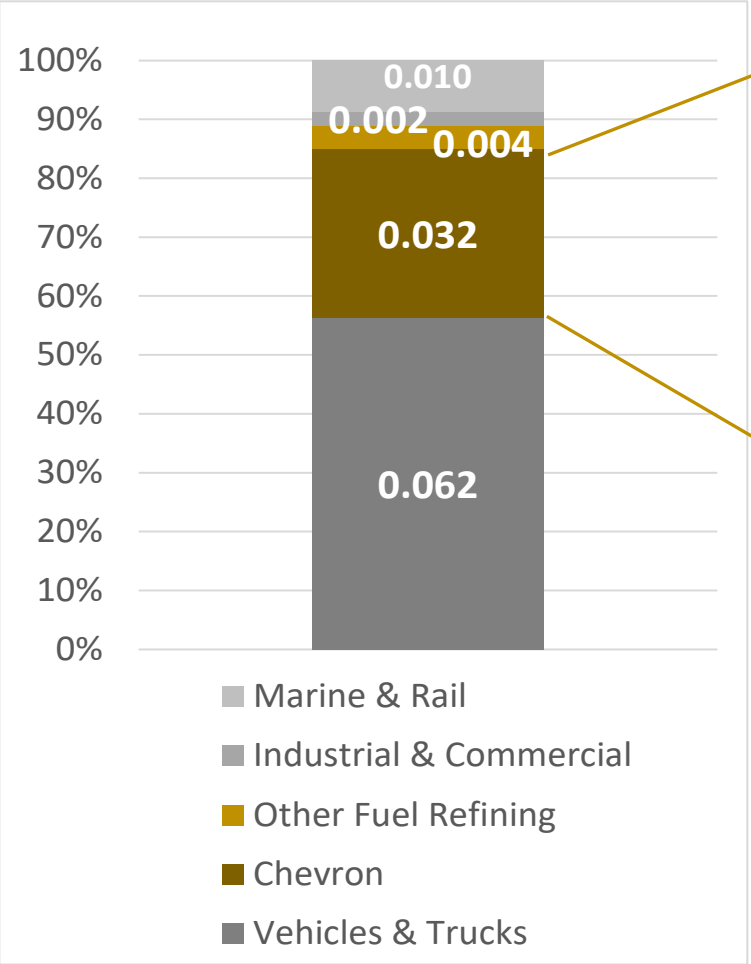
- On average, Hispanic/Latino and African American/Black residents are exposed to more $PM_{2.5}$ from Chevron in all modeled results
- Sources other than the refinery Fluidized Catalytic Cracking Unit (FCCU) drive these disparities
- These results include impacts beyond the PCTA study area (a larger modeling domain was used for Rule 6-5)



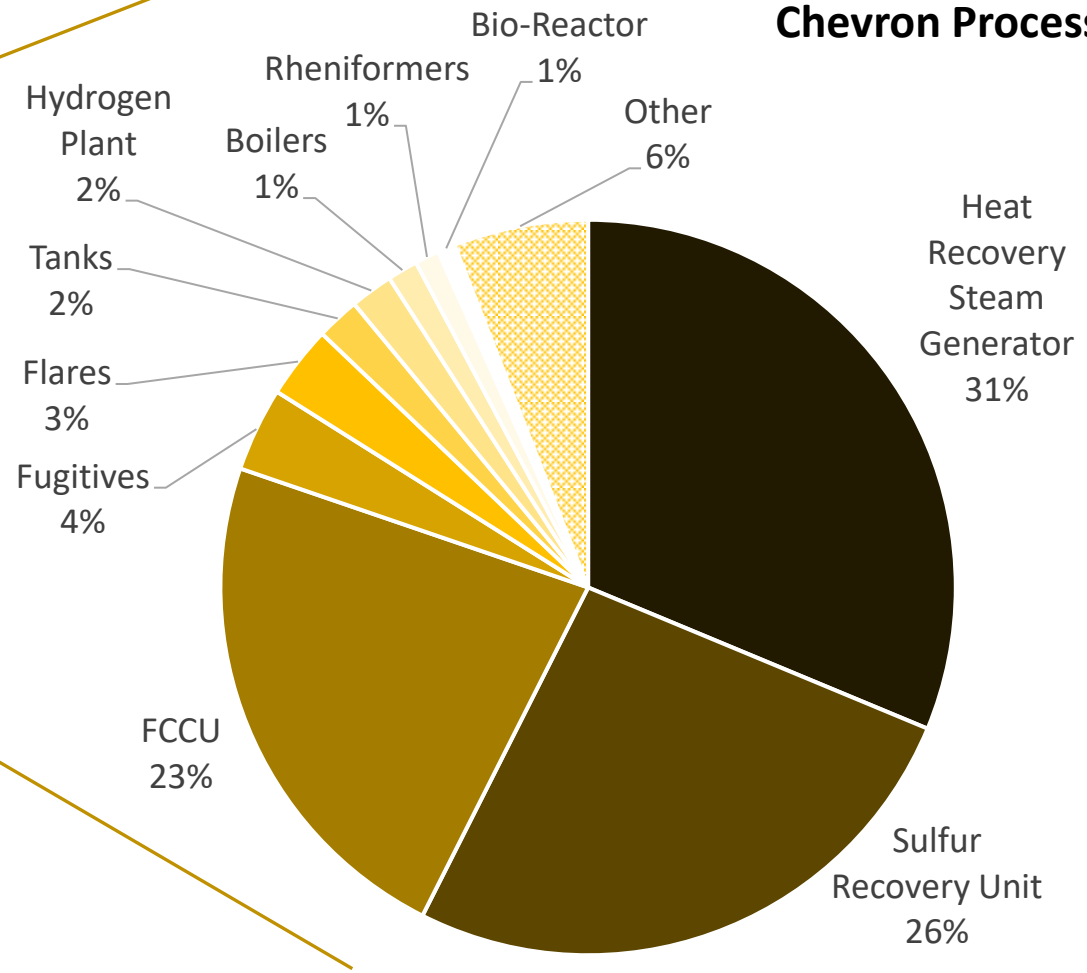
FCCU impacts shown in darker colors
Bar heights = total impacts (FCCU + Non-FCCU)

Fuel Refining (cont.)
A Closer Look at Chronic HI

Source Contributions to Average Residential Chronic Hazard Index

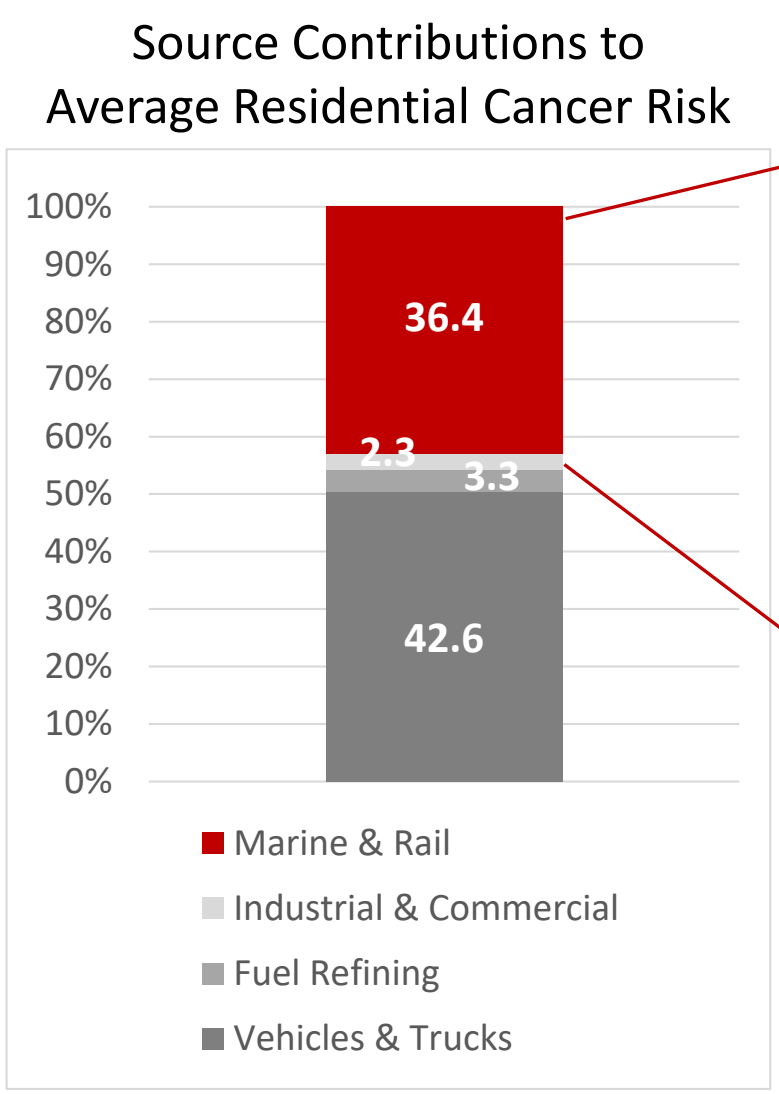


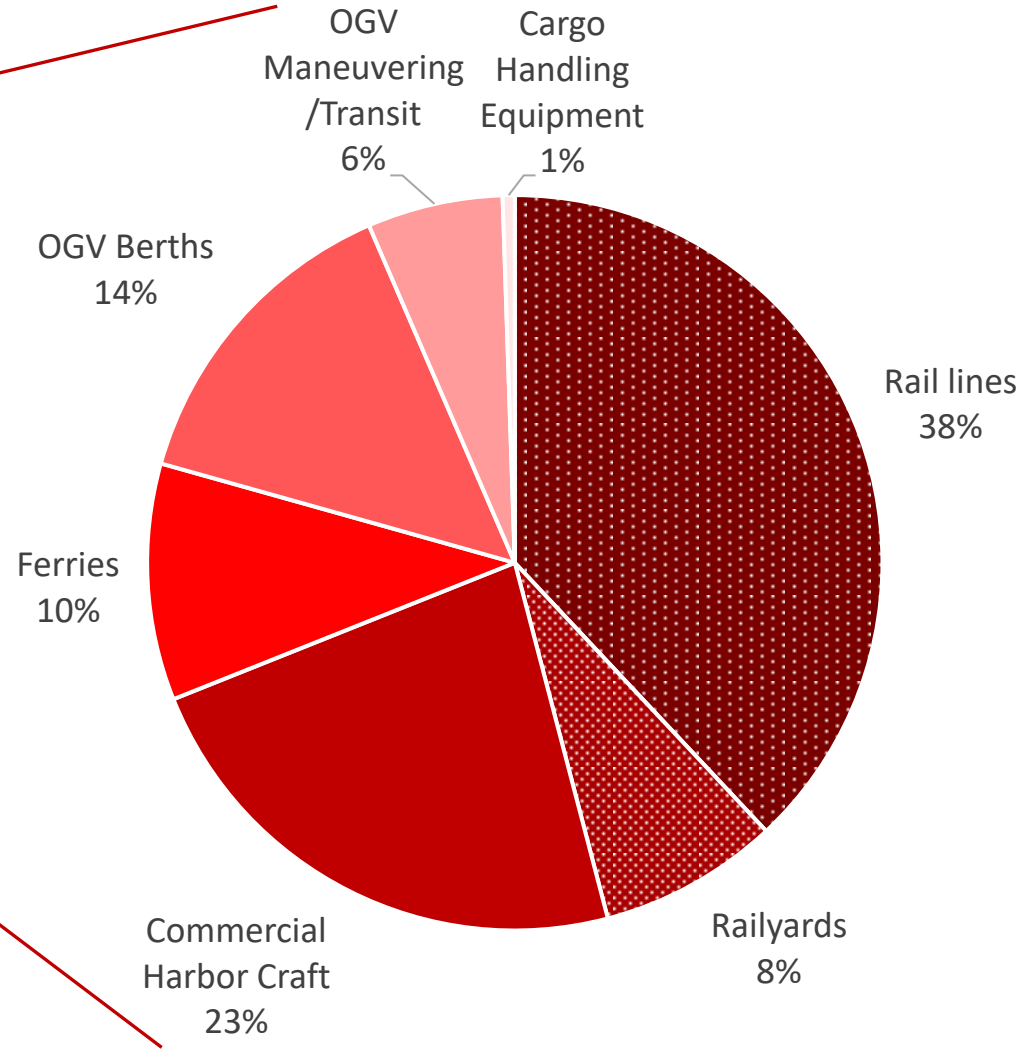
Chevron Processes



Marine and Rail

A Closer Look at Cancer Risk

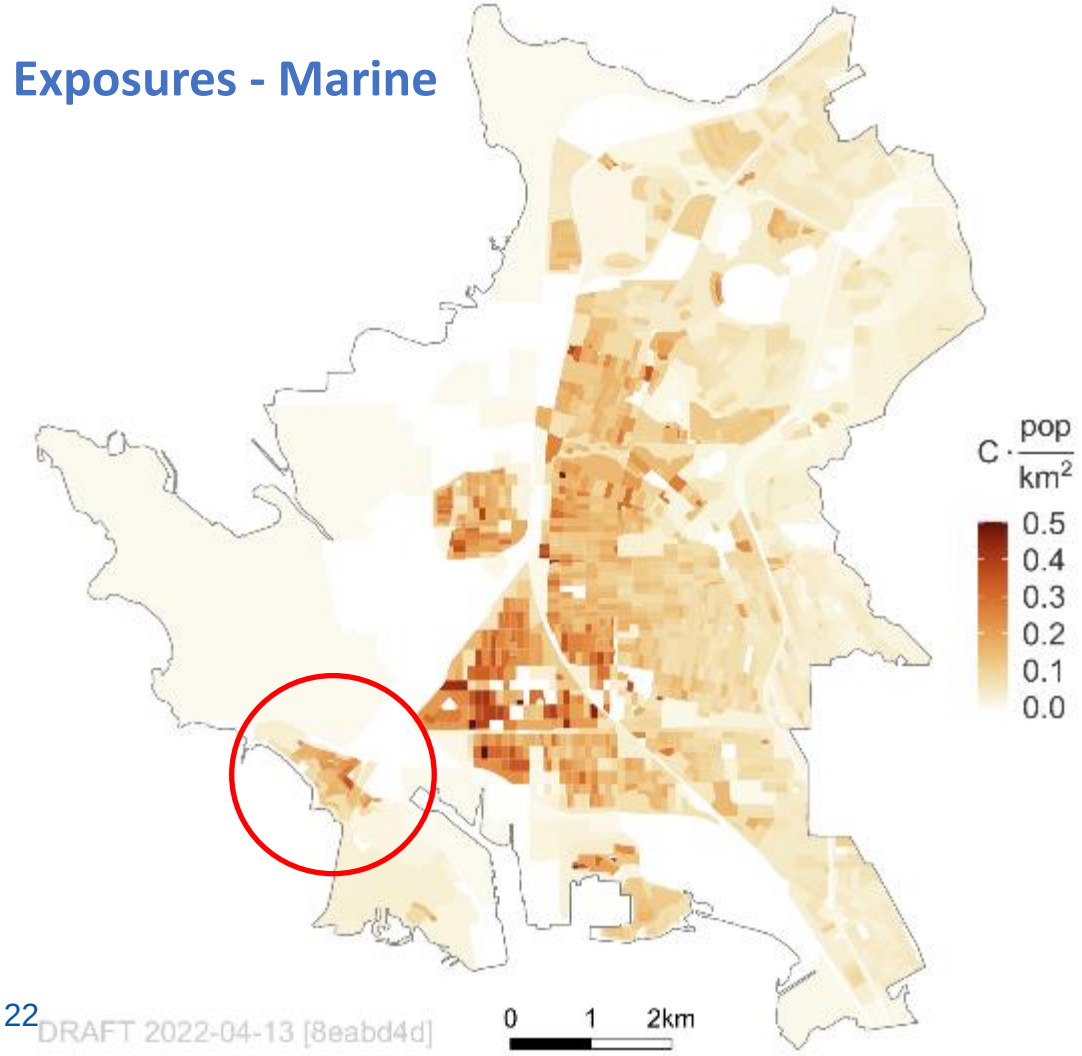




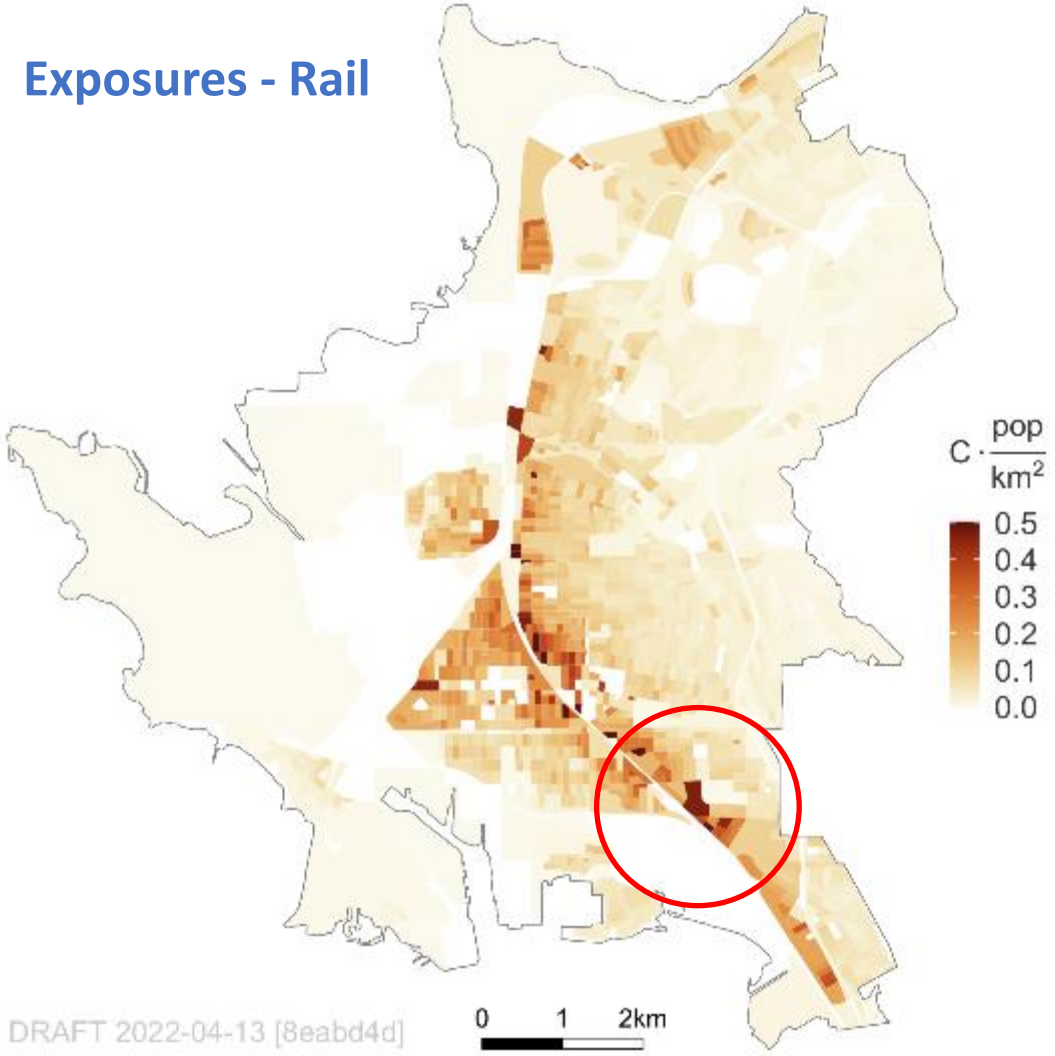
Marine and Rail (cont.)

Modeled TAC Impacts on a Cancer Risk Scale

Exposures - Marine



Exposures - Rail



Summary of Insights from Modeling Analyses

Chronic Hazard Index

- Chevron and onroad sources (vehicles and trucks) are the key exposure drivers for TACs with chronic health impacts
- For Chevron, three main processes account for 80% of the facility's contribution to exposures:
    1. Heat Recovery Steam Generator (key TAC = manganese*)
    2. Sulfur Recovery Unit (key TAC = sulfuric acid)
    3. Fluidized Catalytic Cracking Unit (key TACs = nickel compounds, hydrogen cyanide, hydrochloric acid, arsenic)

**Info on key TACs taken from the chronic hazard-weighted emissions inventory (individual TACs not modeled for exposure analyses)*

Summary of Insights from Modeling Analyses (cont.)

Cancer Risk

- Mobile sources account for 94% of modeled cancer risk in the community (diesel PM is the key driver)
- Within the *Marine & Rail* area of concern, rail activities and harbor craft account for over two-thirds of the modeled cancer risk
- Modeled cancer risk maps show areas with high population density in close proximity to rail lines (e.g., along Carlson Blvd.)
- Though marine sources are of lesser importance for the community as a whole, impacts from these sources can be seen in Point Richmond and the western part of the Iron Triangle

Summary of Insights from Modeling Analyses (cont.)

$PM_{2.5}$ Impacts

- $PM_{2.5}$ concentration maps show impacts from Chevron, WCCC Landfill, Levin Terminal, and onroad mobile sources (vehicles and trucks)
- Chevron and road dust are the two largest local contributors to annual average residential $PM_{2.5}$ exposures (impacts roughly equal)
- Though FCCU emissions will be reduced by Rule 6-5, modeling conducted for that rule showed that other PM sources at Chevron combined make a larger contribution to exposure inequities across the Rule 6-5 modeling domain
- Road dust represents a growing portion of onroad emissions inventories due to recent reductions in vehicle exhaust emissions; this category is currently the subject of a study by CARB, Caltrans, and EPA

Additional Insights from Air Quality Measurement Data

Additional Insights from Measurement Data

- Model results can show us *annual average* concentrations and residential exposures over the study area, that we can split apart by each contributing modeled source
- Measurement results can show variations in levels of air pollutants in time or space (or of different pollutants) that may indicate other problems not reflected in the modeling results
  - **Near-source impacts of other pollutants:** higher levels of black carbon and ultrafine particles near roadways
  - **Spatial variations in pollution:** higher levels of $PM_{2.5}$ near the interface between industrial and residential areas
  - **Shorter-duration variations in pollution:** examples of short peaks in concentrations that can impact health too

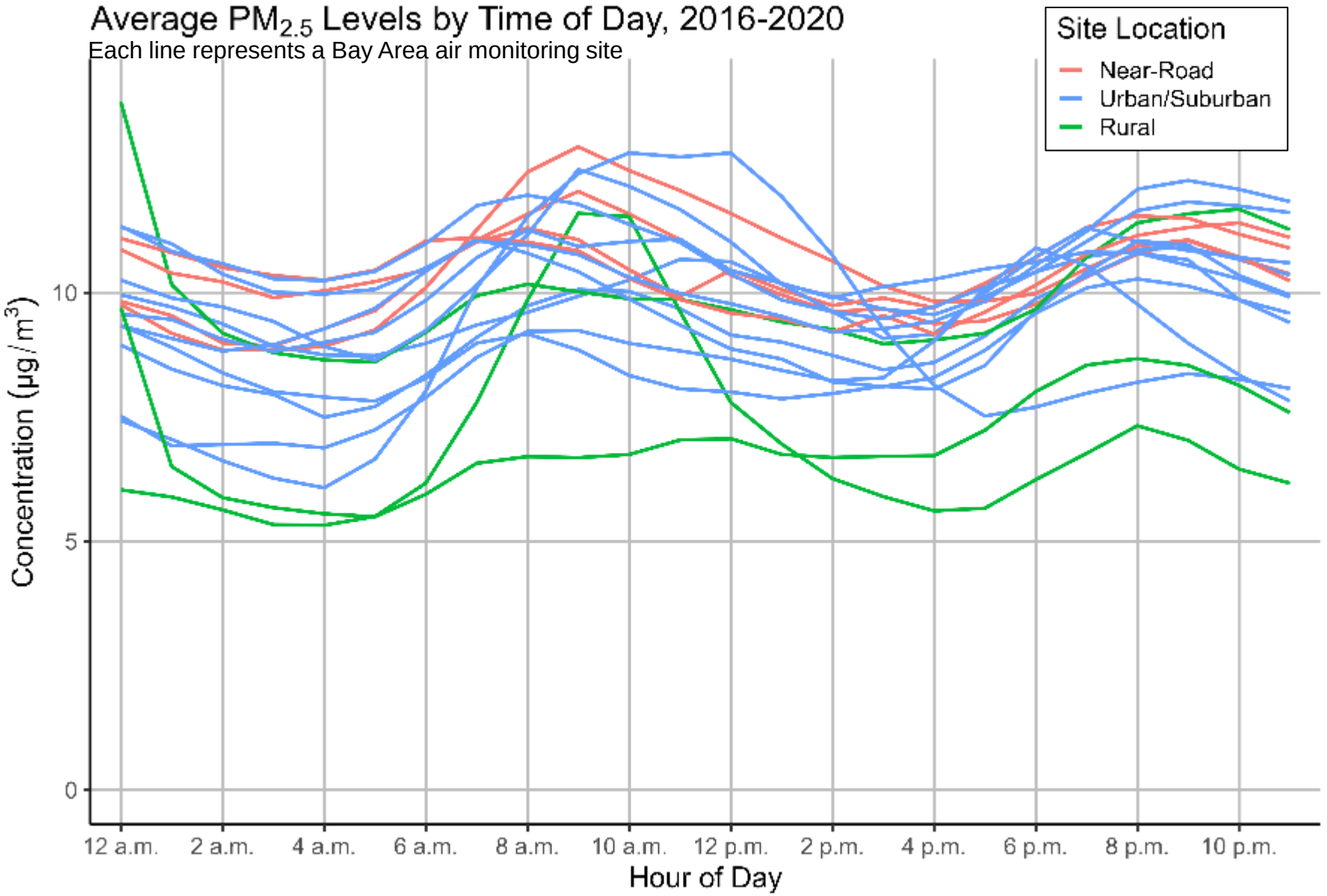
Near-Source Impacts of Other Pollutants
On-Road Mobile Sources

Selected Near-Roadway Pollutants

Pollutant	Description / Examples	Main Sources on Roadways	Notable / Example Health Effects
Fine particulate matter ($PM_{2.5}$)	Smaller than 2.5 µm (1/20th the thickness of a human hair). Smaller size makes it easier to inhale & be deposited in lungs.	Exhaust from gasoline, diesel fuel, etc., being burned in engines Brakes & tires wearing down Road dust being kicked back up	Asthma development, asthma attacks, difficulty breathing, bronchitis, heart disease, heart attacks, strokes, neurological (brain) disease, lung cancer, low birth weight, lost days of work and/or school. Increased emergency room visits, medicine usage, hospital admissions, and premature deaths / years of life lost.
Black carbon	Soot; a component of $PM_{2.5}$; correlated with **diesel particulate matter (DPM)**		
Ultrafine particles (UFP)	Smaller than 0.1 µm.		
Volatile organic compounds (VOCs)	Gases such as benzene, toluene, ethylbenzene, xylene, formaldehyde. Some are odorless, some not.	Exhaust Fuel evaporation	Some VOCs cause cancer. Many can cause eye/nose/throat irritation, headaches, rashes, nausea, or disorientation, depending on how much is inhaled.
Nitrogen oxides (NO_x)	Family of reactive gases; contributes to formation of $PM_{2.5}$ in outdoor air	Exhaust	Coughing, wheezing, difficulty breathing, increased asthma & allergy attacks.
Carbon monoxide (CO)	Colorless, odorless gas		Harder for blood to carry oxygen; at high levels (about 100,000 ppb), poisoning

More info at https://www.epa.gov/criteria-air-pollutants and https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards

Near-Road vs. Other Sites: $PM_{2.5}$

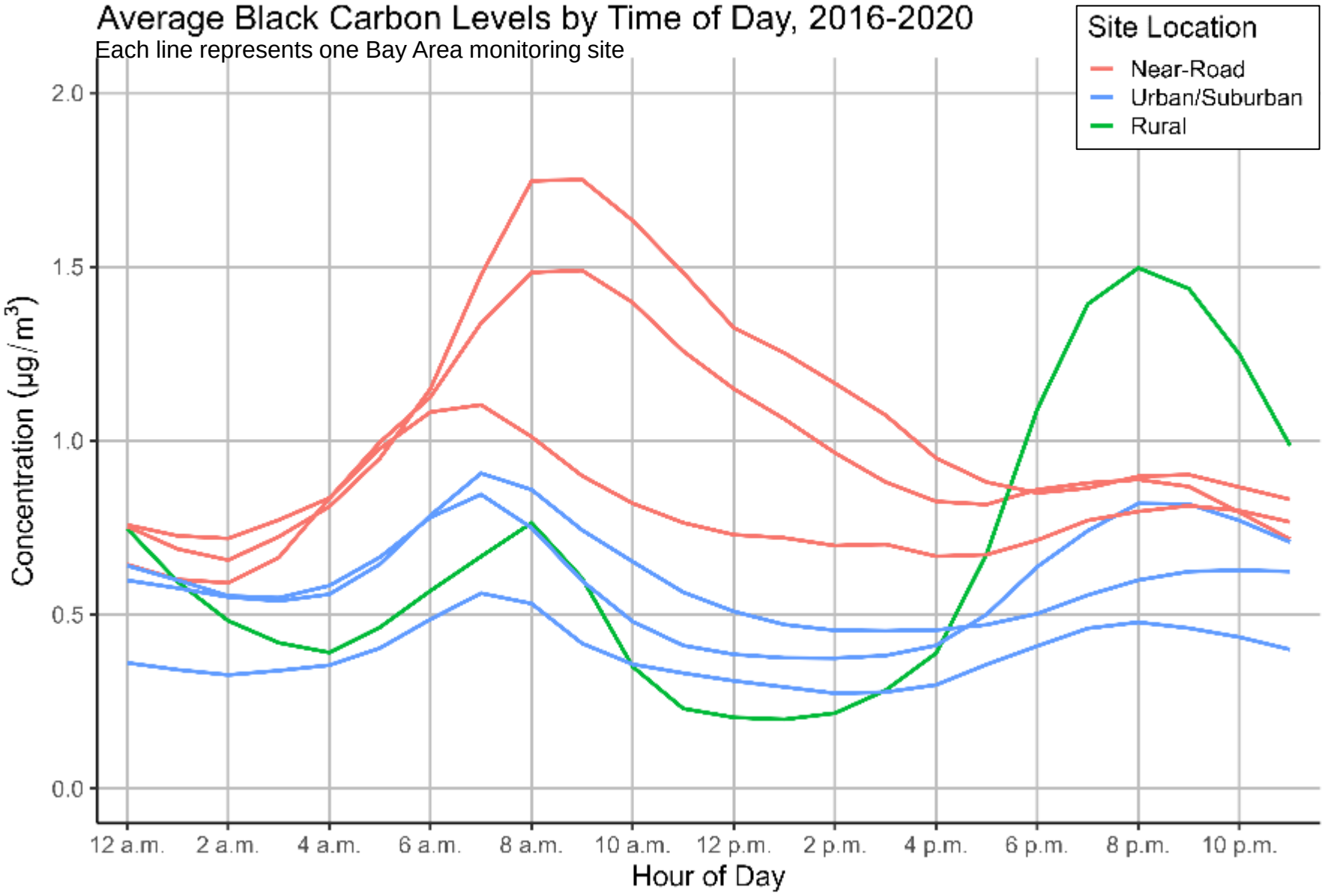


In addition to combustion of fossil fuels and wood, $PM_{2.5}$ comes from brake and tire wear, other non-combustion sources, and forms through reactions of other pollutants

At most sites, $PM_{2.5}$ levels increase during the morning commute period

$PM_{2.5}$ levels at near-road sites are often, on average, at the higher end compared to other sites in the Bay Area

Near-Road vs. Other Sites: Black Carbon



Black carbon is a component of particulate matter, emitted by burning of fossil fuels (traffic and industrial operations), wood burning, wildfires

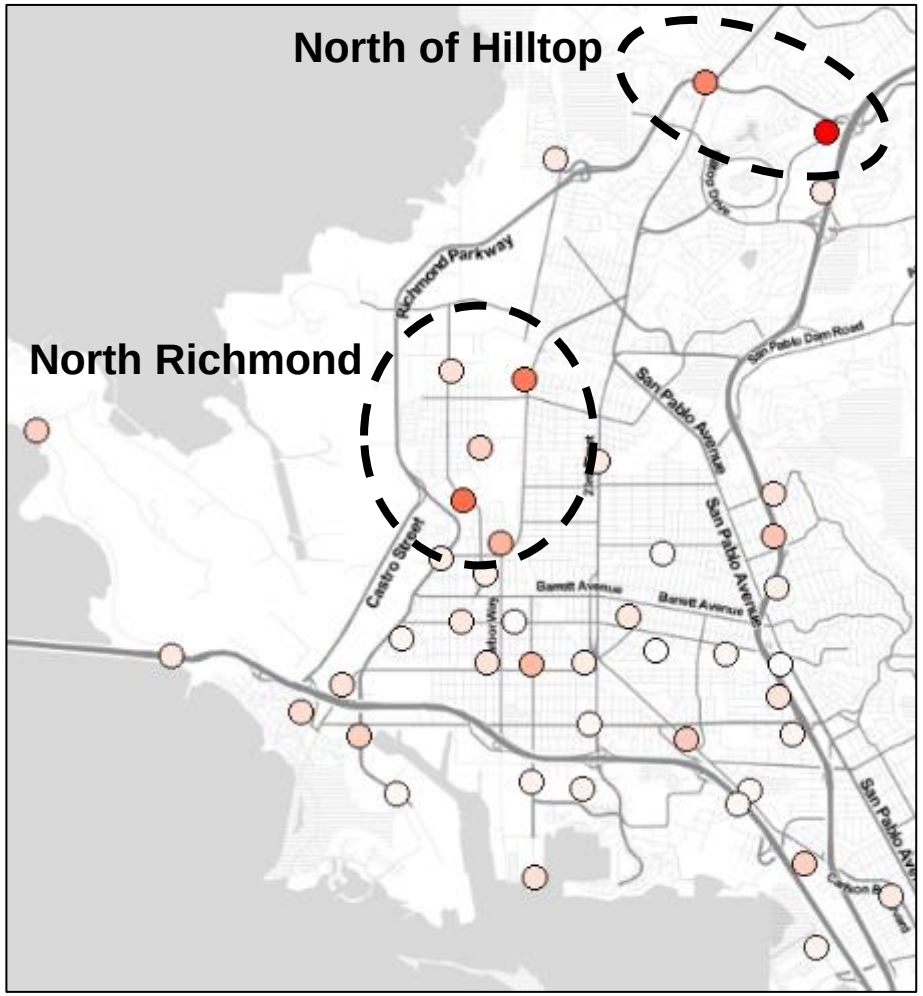
Black carbon levels are, on average, usually higher at the near-road sites, notably so during the morning commute period

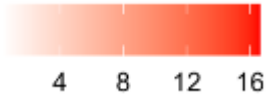
Technical Assessment Insights: On-Road Mobile Sources

- Measurement data show **higher levels of several pollutants that are monitored in near-road locations**
- Peak levels of black carbon and ultrafine particles are about **twice as high at the near-road monitors** compared to peak levels at other monitors
- On typical days, levels of several pollutants **increase during the commute hours in most locations**

Spatial Variations in Pollution:
$PM_{2.5}$ measurements from sensors and mobile monitoring can indicate places where concentrations are higher

Locations with more-frequent occurrences of higher $PM_{2.5}$ levels: Sensor network data (cont.)



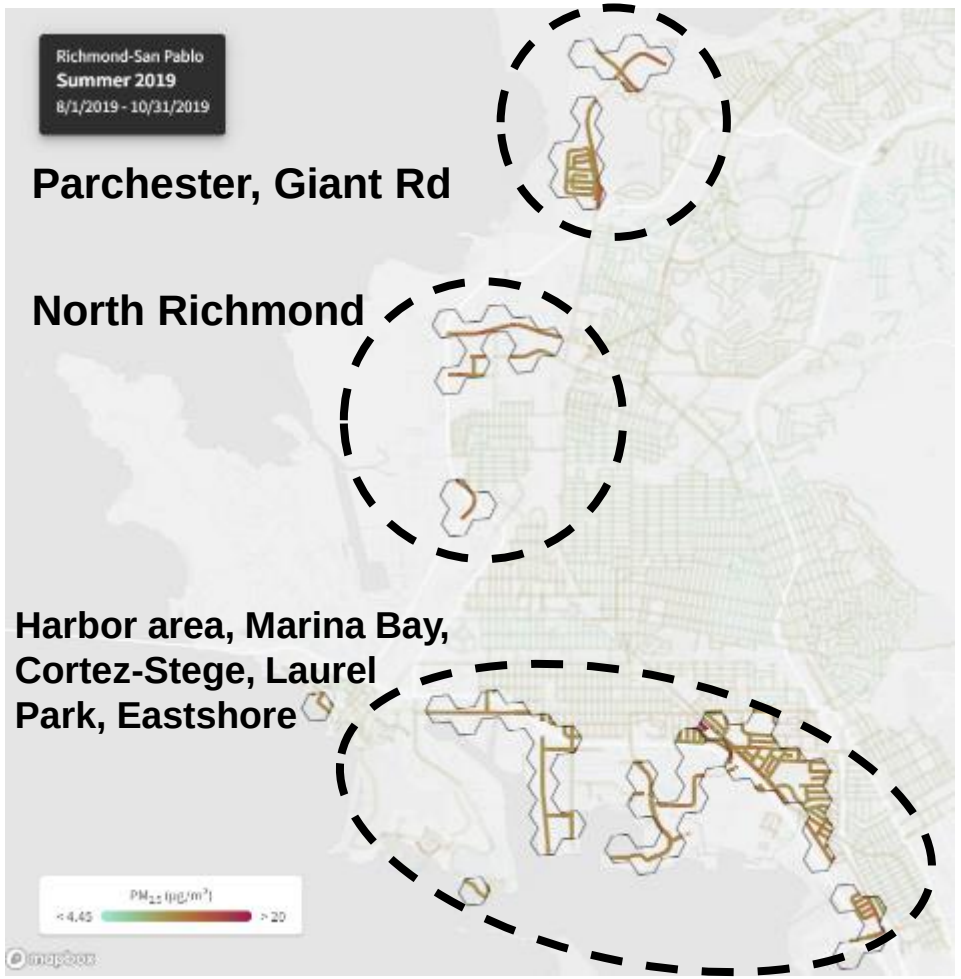


Percent of Hours at least 5 µg/m³ Above Sensor Network Average, 2020-2021

Local ongoing and/or intermittent sources may contribute to higher $PM_{2.5}$ levels in these areas

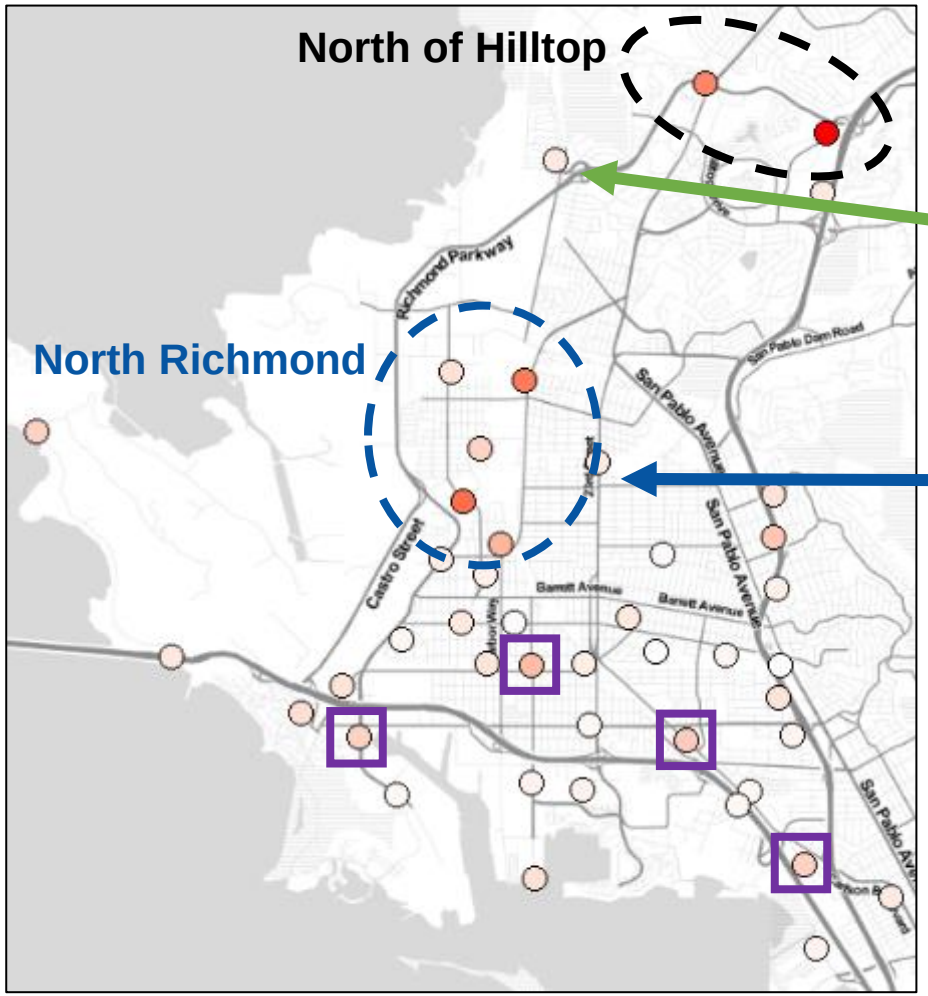
Many of these areas are at the interface of industrial areas with locations where **people reside or spend time** for work or school

Locations with higher average $PM_{2.5}$ levels: Aclima mobile monitoring data (cont.)



Data collected Aug – Oct 2019
https://rspreport.aclima.tools/

Locations with more-frequent occurrences of higher $PM_{2.5}$ levels: Sensor network data



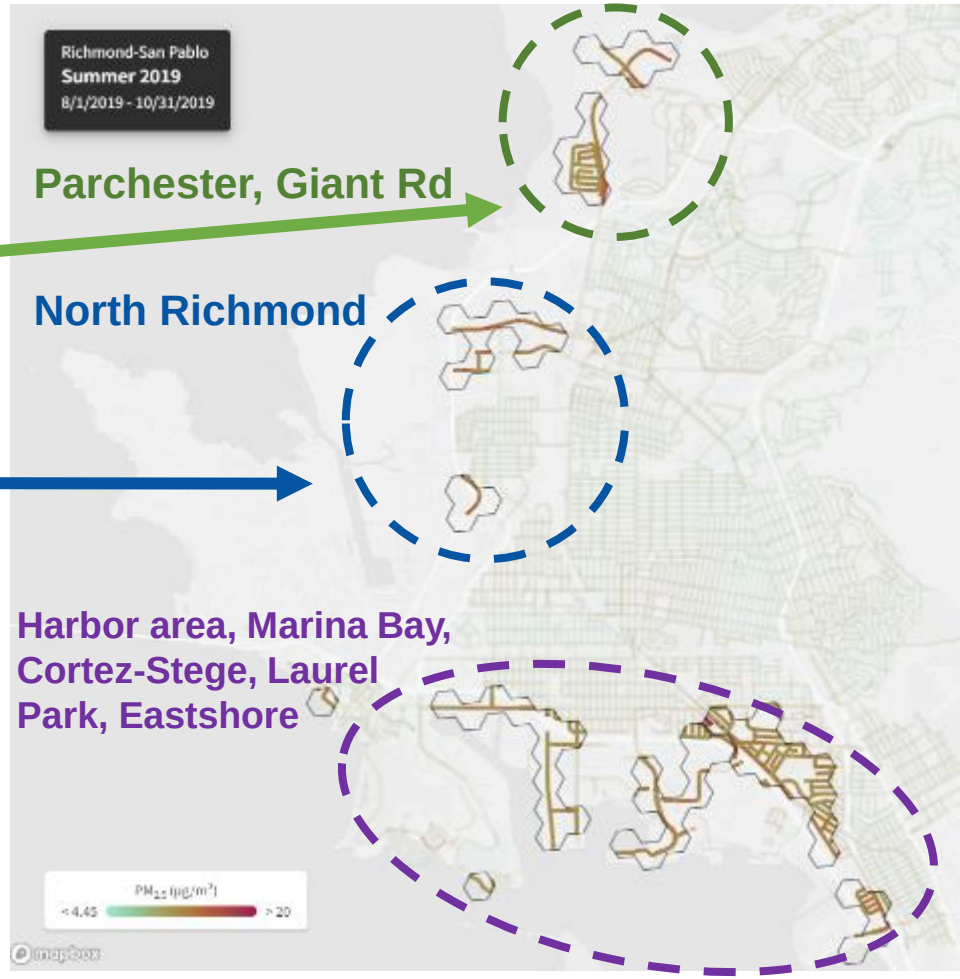
Traffic, restaurants, different topography

Warehouses and truck-related businesses, rail lines

Nearer refinery and related facilities, warehouses and truck-related businesses, scrapyards, rail lines

Harbor and industrial operations, warehouses and truck-related businesses, rail lines, traffic

Locations with higher average $PM_{2.5}$ levels: Aclima mobile monitoring data



35 4 8 12 16

Percent of Hours at least 5 µg/m^3 Above Sensor Network Average, 2020-2021

Data collected Aug – Oct 2019

https://rspreport.aclima.tools/

Shorter-duration Variations in Pollution: Examples of short peaks in $PM_{2.5}$ levels that can impact health

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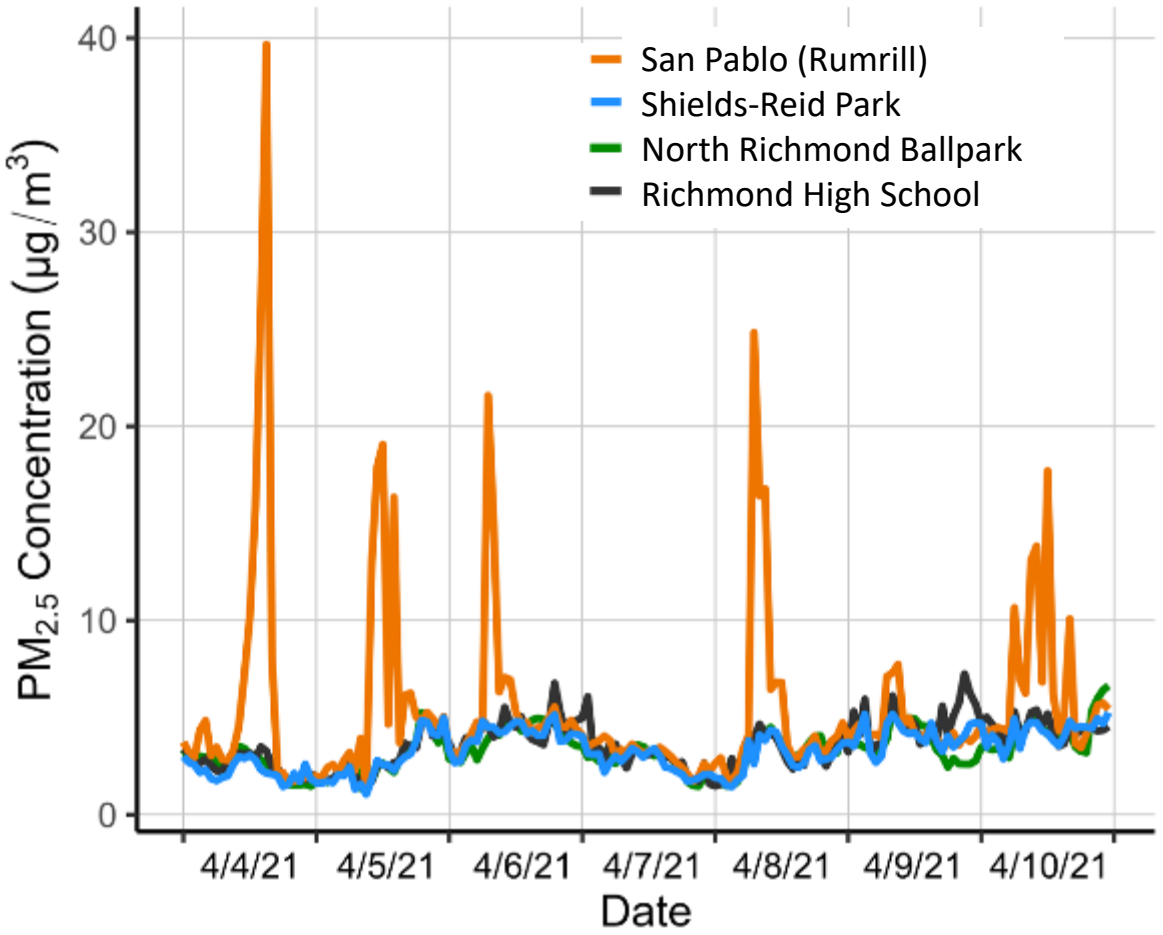
Shorter-Duration Air Quality Events

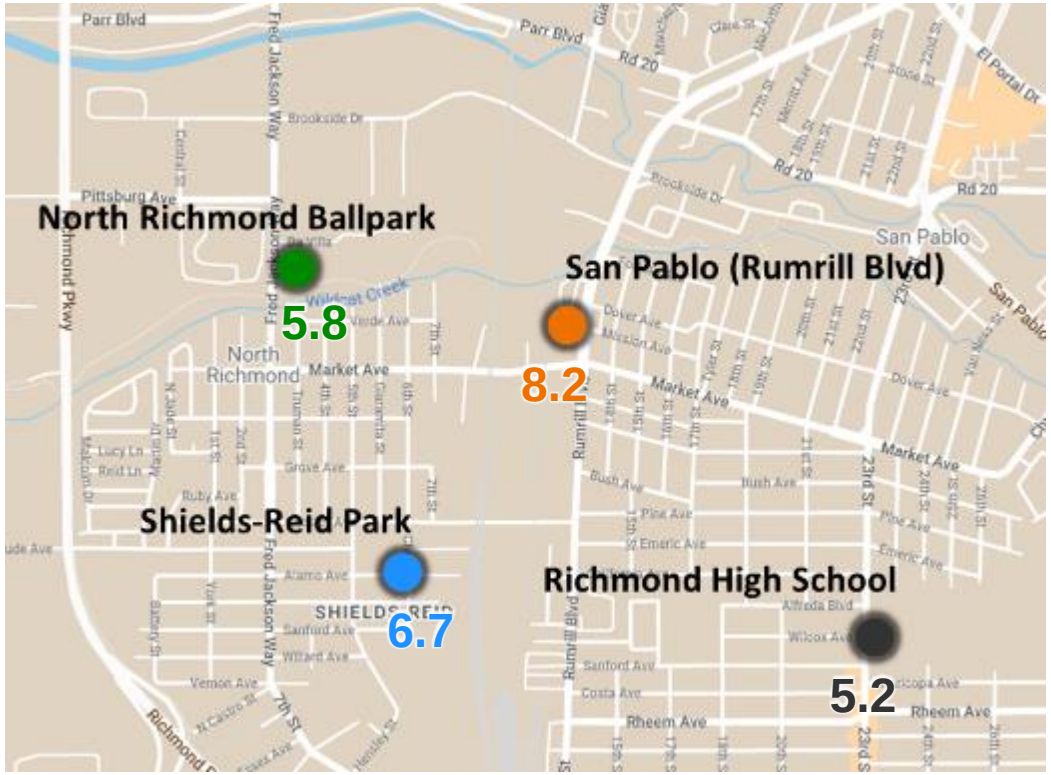
- Annual average concentrations are important for estimating chronic exposure to pollution
- Air pollution events with intermittent or recurring high concentrations at **shorter timescales** (days, hours, minutes) can also **impact health and quality of life**
- Sources behind these events **may not be the largest in terms of total emissions for the area**, and some may not be well characterized in emissions inventories
- Shorter-duration events are in addition to ongoing pollution from the combination of other local and regional sources

Higher $PM_{2.5}$ Levels at San Pablo Monitoring Site

Hourly $PM_{2.5}$ Levels, April 4-10, 2021



Locations of air quality sensors (Ramboll/Groundwork Richmond)



Annual averages for 2021 shown under sensor location (µg/m³)

- Occurrences of higher $PM_{2.5}$ levels at the **San Pablo** monitoring location on several days
- These higher $PM_{2.5}$ levels usually occur during the daytime and on weekends, possibly indicating a localized source or sources with certain hours of operation

Higher $PM_{2.5}$ Levels at San Pablo Monitoring Site (cont.)

Map of area around Rumrill Blvd. and Market Ave.

What's in this immediate area?

- Traffic (Rumrill Blvd., Market Ave.)
- Railway
- Grocery store, restaurants, food trucks
- Automobile dismantler and other industrial facilities
- Dusty empty lots

Google Street View of Rumrill Blvd.

Higher $PM_{2.5}$ Levels at San Pablo Monitoring Site (cont.)

Map of area around Rumrill Blvd. and Market Ave.

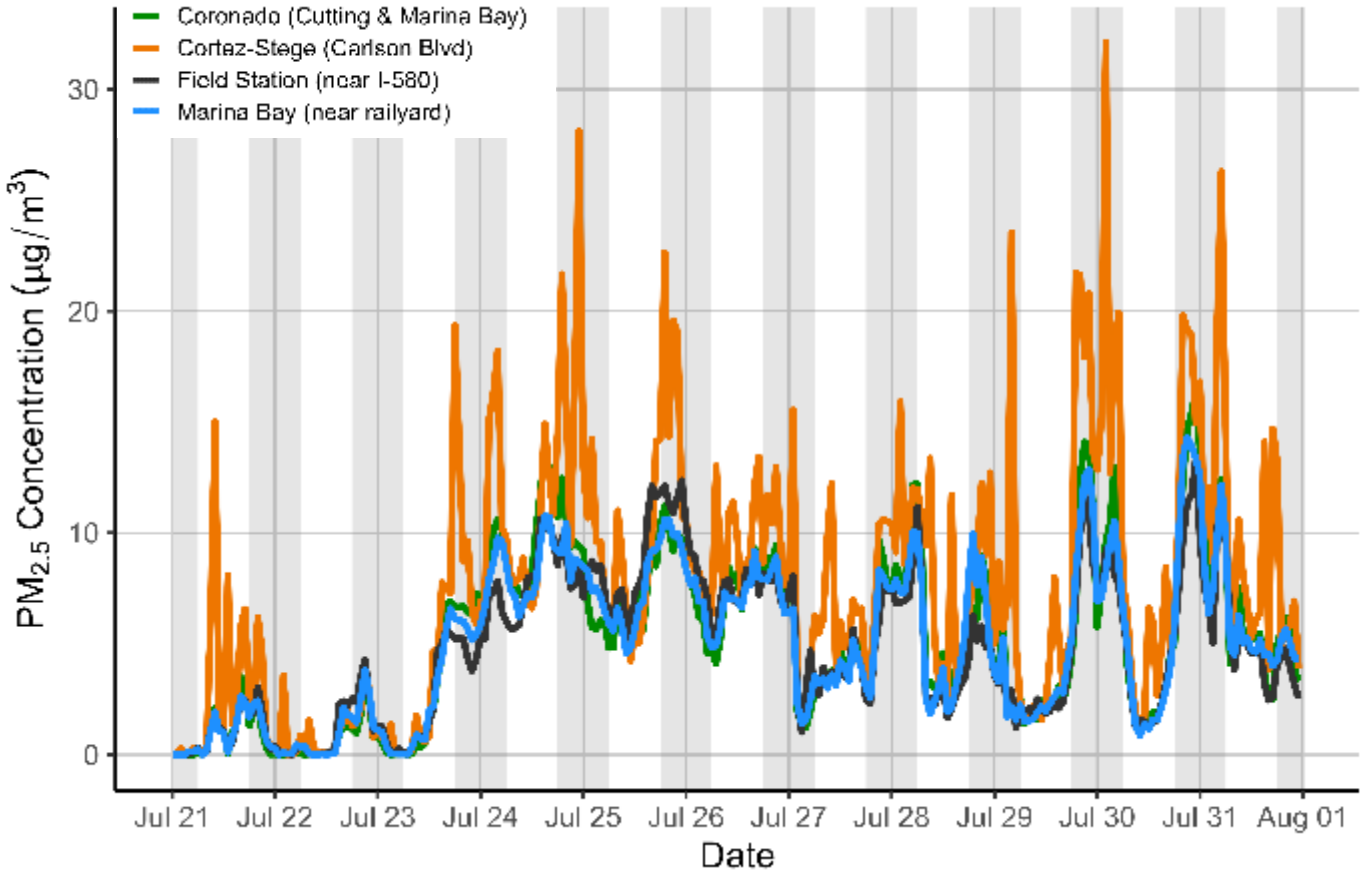
These higher $PM_{2.5}$ levels may be due to food operations, based on:

- Time periods when the higher levels occur
- Air quality complaint in this area related to food operations
- Proximity of the air monitor to those operations

Google Street View of Rumrill Blvd.

Higher $PM_{2.5}$ Levels near Carlson Blvd.

Hourly $PM_{2.5}$ Levels, July 21-31, 2020



Locations of air quality sensors (Ramboll/Groundwork Richmond)

Annual averages for 2020 shown under sensor location (µg/m³)

- Sensor along Carlson Blvd. showed **frequent occurrences of higher $PM_{2.5}$ levels** compared to nearby sensors, possibly due to a localized source(s)
- Aclima data also showed **higher $PM_{2.5}$ levels in this area,** though sensor data do not continue to show this pattern past Summer 2020

Higher $PM_{2.5}$ Levels near Carlson Blvd. (cont.)

Map of area around Carlson Blvd. and Spring St.

What's in this area?

- Traffic (Carlson Blvd., I-580)
- Railway (freight and Amtrak)
- Partially unpaved road (Spring Street)
- Various light industrial and commercial facilities along Spring Street
- Disturbed soil, piles of dirt

Google Street View of Spring St.

Community Concern: Odors from Industries

- Many air quality complaints are related to odors
- Odors can come from **natural** sources and from **human** activities
- While some odors may not be associated with high levels of a pollutant, **they can still affect health and well-being**
- Odors also may indicate the **presence of other toxic, odorless pollutants** that are emitted at the same time
- The public can report odors and other air quality complaints
  - Website: https://www.baaqmd.gov/online-services/air-pollution-complaints
  - By phone at 800-334-ODOR (6367)

Summary of Insights from Measurement Data

- Measurement data show **higher levels of several pollutants in near-road locations**, especially black carbon and ultrafine particles
- Spatially dense measurements are possible for some pollutants like PM, and show several **areas with higher concentrations, especially at the interface between industrial and residential**
- Shorter-duration air quality events occur and can also have **impacts on health and well being**
- While some shorter-duration examples were highlighted in this presentation, there are many other locations that are near similar types of sources and may experience similar impacts

Community Concerns

Connecting to Strategies

Connecting to Strategies

Fuel Refining

- Reductions in TAC emissions through the Rule 11-18 process
- Evaluations of opportunities for process-level improvements and controls

Industrial and Commercial Sources Near Communities

- Assess the potential impact of sources not covered by current permits (e.g., fugitive dust sources at Pick-n-Pull, coal dust from rail cars)
- Develop or amend District rules (e.g., Rule 6-1 for construction dust or Rule 6-2 for commercial cooking)
- Implement facility-specific controls (e.g., further dust mitigation at Levin Terminal)

RICHMOND · SAN PABLO COMMUNITY PATH TO CLEAN AIR

Connecting to Strategies (cont.)

Mobile Sources

- Control road dust through street sweeping and/or reducing trackout from construction projects and industrial sites
- Vegetative barriers where rail lines or roadways pass near densely populated areas
- Incentive funds to replace trucks, engines, or equipment

Steering Committee Questions and Discussions

Public Comment

Standing Environmental Justice Updates

Public Comment

Next Meeting

- Our next Steering Committee meeting will be on Monday, June 27th, 2022, from 5:30 p.m. to 8:00 p.m. Agenda topics will include:
  - Air District Problems to Solutions Presentation #2

Public Comment on Non-Agenda Matters