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CITY

What's in Richmond's air? New studies provide clarity on pollution and its sources

Local air pollution levels often fall short of what public health agencies say is safe. We looked at existing data and video mapped major sources.

By **Brian Krans**
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Richmond has always been an industrial town, even before it officially became a city nearly 120 years ago — from the Santa Fe Railroad and Standard Oil at the turn of the century, to the Ford assembly plant and shipyards of the World War II-era, to the Chevron refinery and chemical manufacturers of today.

These industries have driven Richmond's local economy and development for decades and helped to shape the city's identity. But this proud history has also come at a cost: Coupled with Richmond's physical location — tucked between two major interstates within a greater metropolitan area — all of this industrial activity has created higher levels of air pollution and other types of environmental harm than elsewhere in the Bay Area and state.

What's fueling Richmond's air pollution?

This article is part of a series investigating the causes, impacts, and possible solutions to local air pollution. **See other stories.**

This investigation was supported with funding from the Data-Driven Reporting Project. The Data-Driven Reporting Project is funded by the Google News Initiative in partnership with Northwestern University | Medill. Read our nonprofit's **policy on editorial independence**.

Richmonders have known this — and felt it — for decades, even while a lack of robust and consistent air monitoring made concrete evidence hard to gather. But a growing body of research on environmental pollution and its disproportionate impacts on vulnerable communities, much of it fueled by local activism, technology advances, and new public-health legislation, has begun to shed greater light on the sources of local pollution, what harmful materials and chemicals are in the air, and where they're most concentrated.

Still, knowing where to look for relevant information and understanding what it all means can be difficult. That's why, over the past few months, our newsroom has been busy poring over data from multiple sources to better understand what exactly is in Richmond's air and where it's coming from. We've presented some of what we know below, along with an immersive video mapping major pollution sources and impacted areas in the city.

Richmond's air isn't meeting new public health standards

The World Health Organization (WHO) identifies fine particulate matter — or **PM 2.5** — as the most harmful type of air pollution because the particles, which are 2.5 micrometers or smaller, can travel deep into the lungs and directly into the bloodstream. PM 2.5 is created mostly by burning fossil fuels such as coal, wood, and oil products such as gasoline and diesel. But it can also come from dust at a construction site, salt blowing in from the bay, and other sources. In Richmond, PM 2.5 comes from a variety of places, from heavy industrial activity to vehicle exhaust on interstates 80 and 580.

Taking accurate measures of this pollution locally is important because **short-term exposure to high levels of PM 2.5** can cause lung conditions such as bronchitis and can trigger asthma attacks. Longer exposure can reduce lung function in children, cause heart disease and emphysema, and has been linked to premature death, especially for people with preexisting heart or lung diseases.

> In 2020, the air district reported that the Richmond-San Pablo target area — home to 150,000 people — experiences "more asthma emergency room visits, higher rates of cardiovascular disease" and "lower life expectancy than in other areas of Contra Costa County."
>
> — AB 617 Richmond-San Pablo Community Air Monitoring Plan, July 2020

As more becomes known about the health impacts of PM 2.5 and other forms of air pollution, the safety recommendations provided by health agencies have become more stringent. In 2021, the WHO updated its **global air quality guidelines**, halving the annual amount of PM 2.5 exposure that it considers safe, from 10 to 5 micrograms. This year, the federal Environmental Protection Agency (EPA) also **lowered its annual threshold** from 12 to 9 micrograms, "to reflect new science on harms caused by particle pollution."

Recent studies have shown that Richmond's air quality routinely exceeds these limits. **Berkeley Earth**, an independent nonprofit research organization, found that Richmond's annual average PM 2.5 level is 7.4 micrograms. One **private study** of Richmond's air between Nov. 1, 2019 and Oct. 31, 2020 showed that certain parts of the city typically had PM 2.5 levels of 10 or more.

Jeffrey Kilbreth, an air-quality activist who lives in Point Richmond, said the EPA lowering its annual PM 2.5 standard by 25% is important because local air quality regulators such as the **Bay Area Air Quality Management District (BAAQMD)** must now work with local industries to ensure that companies lower their emissions to stay compliant with the federal Clean Air Act.

"It's a big, big deal," Kilbreth said. "[Richmond has] always been under 12, but we're not likely to be under 9, so we may have a problem and really need to reduce our PM."

From industries to interstates, these are the main fossil fuel pollution sources in Richmond

According to the Bay Area air district, residents of Richmond and San Pablo "are exposed to a substantial and complex mix of pollutants" from more than 200 permitted emission sources. Some of the main ones include:

- **Chemtrade**, an international chemical manufacturer with a location on Castro Street next to the Chevron refinery
- **IMTT** chemical plant, on Cutting Boulevard at the Santa Fe Channel
- The **Levin-Richmond Terminal**, which exports refinery byproducts, on Wright Avenue near the Santa Fe Channel

- Interstates 80 and 580
- Wastewater treatment plants, such as the Veolia facility in Point Richmond
- Local seaports, including the Port of Richmond
- Railways and rail yards running along the Richmond Parkway, including **those transporting coal**
- Local landfills, such as the West Contra Costa Sanitary Landfill Organics Processing Facility in North Richmond
- Small businesses such as auto body and paint shops, and restaurants using wood-burning or gas stoves in places such as the 23rd Street corridor

But the single biggest local source of emissions in Richmond and the surrounding area “by far” is the Chevron oil refinery, according to a 162-page BAAQMD study released in March 2024. **The Path to Clean Air report** was produced in partnership with local residents, community-based organizations, and public officials.

PM2.5 emissions sources in Richmond-San Pablo

Chevron (63%) **Small sources (fireplaces, dry-cleaning facilities, industrial boilers, toxic waste incineration)** (19%)
Off-road mobile sources (trains, ships, aircraft, heavy equipment) (7%) **On-road mobile sources (motorcycles, cars, trucks)** (7%)
Other permitted industries (factories, power plants, gas stations) (4%)

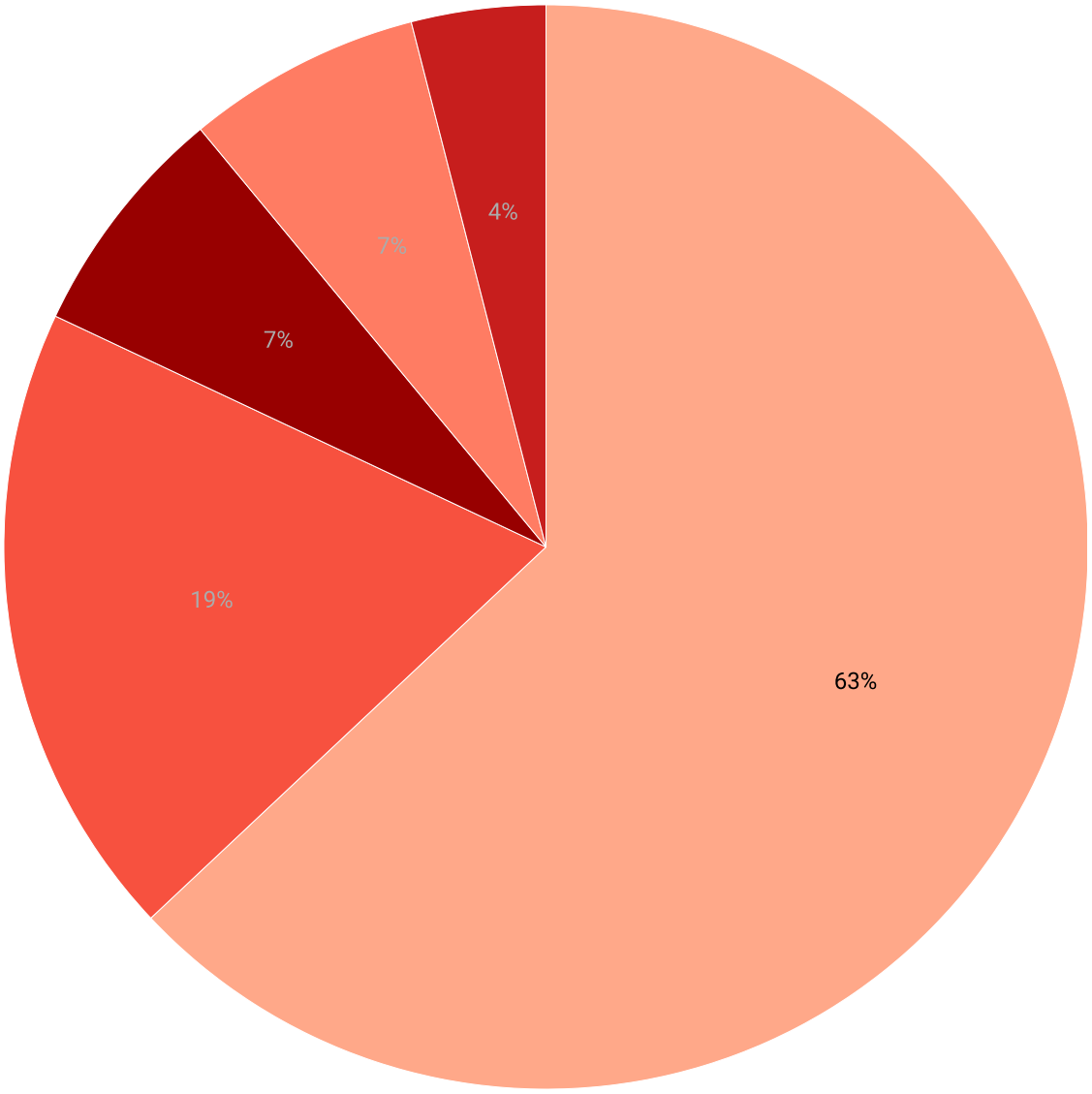
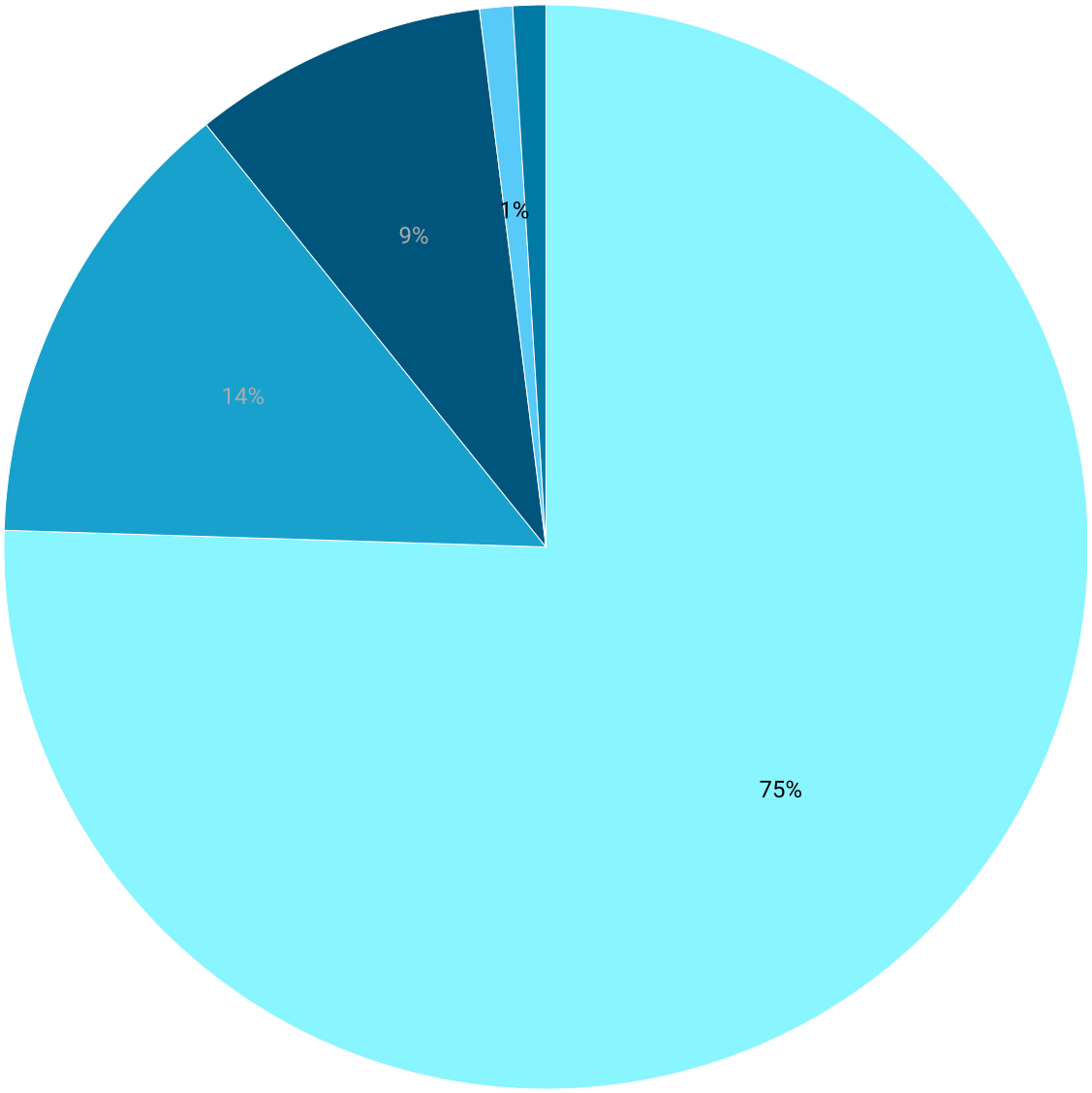


Chart: Cityside • Source: Bay Area Air Quality Management District, March 2024 • Created with Datawrapper

The report found that the Chevron refinery was responsible for well over half of the region's locally emitted PM 2.5 (62%) and manganese (77%) emissions, the latter of which **EPA studies** have shown can damage the nervous system if inhaled in large amounts. The refinery also emits other harmful substances such as sulfur dioxide, hydrogen cyanide, sulfuric acid, and hydrogen sulfide.

Manganese emissions sources in Richmond-San Pablo

Chevron (75%) **On-road mobile sources (motorcycles, cars, trucks)** (14%)
Small sources (fireplaces, dry-cleaning facilities, industrial boilers, toxic waste incineration) (9%)
Off-road mobile sources (trains, ships, aircraft, heavy equipment) (1%)
Other [non-Chevron] permitted industries (e.g. factories, power plants, gas stations) (1%)



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The second largest source of PM 2.5 emissions in Richmond, after Chevron, is what the air district describes as “area sources” — smaller individual sites that are dispersed throughout the city but have a big cumulative impact on local air quality. These include hazardous waste treatment plants, smaller oil and natural gas producers, wood and coal-burning commercial boilers, and residential wood-burning fireplaces. Together these have accounted for 19% of the locally generated PM 2.5 measured by the district.

Road vehicles and various types of commercial transport — locomotives, marine vessels, aircraft, and related heavy equipment — combine to make up 14% of local PM 2.5 emissions, according to the 2024 air district report. Not

surprisingly, multiple studies have identified Richmond neighborhoods in closest proximity to I-80 and I-580 as among those with the highest pollution levels.

While the Chevron refinery and other "area sources" are the main producers of PM 2.5 locally, the average Richmonder is more likely to be exposed to exhaust and debris from vehicles and trucks that can cause cancer and chronic illness, according to the Path to Clean Air report.

Chevron **agreed this year to reduce airborne pollution** at its Richmond refinery by 70%, following a three-year legal battle. It was one of two East Bay refinery operators who agreed to significantly reduce emissions to comply with stricter standards imposed by the air district. The other was the **Martinez Refining Company**.

In an email to Richmondside, Chevron Richmond spokesperson Caitlin Powell wrote that the company "has a long-standing commitment to reduce emissions and improve our performance." She said the company has reduced emissions at the refinery by 85% over the past 50 years and that recent investments in modernizing the facility have led to about a 40% reduction in PM 2.5 since 2018.

"Policies that encourage investment and the issuance of timely permits will enable us to continue to drive down emissions, while providing the affordable, reliable and ever cleaner energy the region depends on," she said.

The Chevron refinery is not the only source of industrial pollution in Richmond in recent years to come under scrutiny.

Last year, the air district fined the Chemtrade chemical plant $1.2 million for under-reporting its sulfuric acid emissions for more than a decade. Sulfuric acid is destructive to the skin, eyes, teeth and lungs, according to the **U.S. Centers for Disease Control and Prevention,** and severe exposure can be fatal.

In 1993, **a leak at another chemical plant in Richmond**, owned by General Chemical, created **a miles-wide cloud** of sulfuric acid and sent an estimated 24,000 people to the hospital with complaints ranging from eye irritation to nausea. That incident resulted in the company agreeing to pay $180 million in settlement claims.

Richmond's air is more polluted than other parts of Contra Costa County

Assembly Bill 617, which became state law in 2017, was created to improve air quality in California's most highly impacted areas. The Richmond-San Pablo region was one of 17 such places identified as suffering the worst air pollution in the state. The legislation requires local air districts to work with stakeholders in each area to create plans for decreasing local emissions. Other parts of the Bay Area that made the ignominious list were Bayview Hunters Point and other parts of southeast San Francisco, and east and west Oakland.

In 2020, the air district **reported** that the Richmond-San Pablo target area — home to 150,000 people — experiences "more asthma emergency room visits, higher rates of cardiovascular disease" and "lower life expectancy than in other areas of Contra Costa County."

Like many longtime Richmonders, Marisol Cantú, a third-generation Richmond resident and community health activist who served on the community steering committee that helped to author the Path to Clean Air report, said she is more familiar than she would like to be with air pollution.

“It's a completely lived and true and shared experience,” she said of longtime Richmonders. “Whether it's overtly communicated [or not], it is unconsciously part of our everyday dialogue, whether we're not able to walk or we're borrowing inhalers.”

But knowing what’s in Richmond’s air has been an ongoing and uphill battle, said Cantú, even as residents feel its effects.

“There's been decades of environmental justice activism that has already educated and engaged our community,” Cantú said. “To the point where, maybe they don't know PM 2.5 and what it actually is, but they know asthma.”

This is the first in a series of Richmondside reports on local air pollution. Upcoming stories will examine its health impacts, recent policy efforts to improve our air, and more.

We want to hear from you

Got a tip or personal story to share about air pollution and its impacts in Richmond? Email us at **hello@richmondside.org**, leave us a voice message at (510) 239-7413, or use our **tips form**.