

East Oakland Emissions Inventory:

A Closer Look at Permitted Sources

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Introduction

To support the development of a community emissions reduction plan (CERP) for the East Oakland AB 617 community, the Bay Area Air Quality Management District (BAAQMD or Air District) worked with the California Air Resources Board (CARB) to develop an emissions inventory for local sources for the year 2021.¹ More recently, the Community Steering Committee (CSC), requested additional information about the largest pollution sources impacting East Oakland’s air quality.

Pollution sources are classified into four source sectors: Permitted Stationary, Unpermitted Stationary, On-road Mobile, and Off-road Mobile (Table 1). This document takes a closer look at permitted sources in and near East Oakland² which are of special concern for a few reasons:

1. These facilities are directly regulated by the Air District (unlike mobile sources);
2. Permitted sources account for all or most emissions of some air toxics like mercury, dioxins and furans, and hydrogen sulfide; and
3. Individual facilities or groups of facilities may be located near sensitive populations such as schools or senior centers.

¹ The year 2021 was designated by CARB for baseline emissions inventory development based on the timing of East Oakland’s selection for CERP development.

² Note that the East Oakland emissions inventory includes permitted sources within a geographic area that includes the community

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boundary established by the CSC and a buffer zone around the community that captures nearby sources that may impact air quality for community residents.

Table 1. Categories of sources included in the East Oakland emissions inventory.

Source Sector	Description	Examples
Permitted Stationary	Stationary sources that are permitted by the Air District and treated as individual facilities in the inventory	Autobody shops; Crematories; Metal recycling businesses
Unpermitted Stationary	Stationary sources that are not permitted by the Air District and are treated as a group in the inventory	Residential fireplaces; Commercial cooking; Construction dust
On-road Mobile	Mobile sources that operate on roadways	Buses; Passenger Cars; Trucks
Off-road Mobile	Mobile sources that do not operate on roadways	Aircraft; Locomotives; Ships

Table 2. Categories of pollutants included in the East Oakland emissions inventory.

Pollutant Category	Description	Examples
Criteria Air Pollutants (CAPs)	Common air pollutants that harm human health and for which U.S. EPA has established National Ambient Air Quality Standards (NAAQS)	Fine particulate matter (PM _{2.5}) Carbon monoxide (CO) Sulfur dioxide (SO ₂)
Toxic Air Contaminants (TACs)	Over 200 pollutants identified by CARB that are known or suspected to cause cancer or other serious health effects	Diesel particulate matter (DPM) Benzene Formaldehyde
Toxicity Weighted Emissions (TWE)	Emissions summaries that account for the different toxicities of individual TACs and help to illustrate how they contribute to cancer risk, chronic health effects (asthma, hypertension), and acute health effects (eye or respiratory irritation)	Cancer risk weighted Chronic hazard weighted Acute hazard weighted

Table 2 describes the three categories of pollutants included in the East Oakland emissions inventory: Criteria Air Pollutants (CAPs), Toxic Air Contaminants (TACs), and Toxicity Weighted Emissions (TWE). Additional background inventory information can be found in the [Air District slide deck from the August 10, 2023 CSC meeting](#).

Placing Permitted Sources in Context

Some stationary sources, such as factories, are issued permits to operate by the local air district that define how much air pollution they can emit. While these permits “allow” pollution that we know has negative health and quality of life impacts, they also provide the local air district with tools to track, reduce, and mitigate these emissions. Emissions summaries in this document focus on three important pollutant categories that are most helpful for understanding impacts on human health in East Oakland: PM_{2.5}, cancer TWE, and chronic TWE (Table 2).

Among the CAPs, PM_{2.5} is of special concern because fine particles can travel deep into the lungs and bloodstream, where they can cause or contribute to premature deaths, long-term effects like heart disease and respiratory conditions like

emphysema, and short-term health effects like bronchitis and asthma attacks. For TACs, using cancer TWE and chronic TWE allows us to consider the toxicity of all TACs in the inventory in a combined way.

Contributions of the source sectors listed in Table 1 to PM_{2.5} emissions, cancer TWE, and chronic TWE in East Oakland are shown in Figure 1. For PM_{2.5}, stationary sources are dominant, with permitted stationary sources accounting for 25% of local emissions and unpermitted stationary sources accounting for 48%. However, on-road and off-road mobile sources combine to account for 88% of cancer TWE and 74% of chronic TWE, with permitted sources contributing only about 2% in each case.

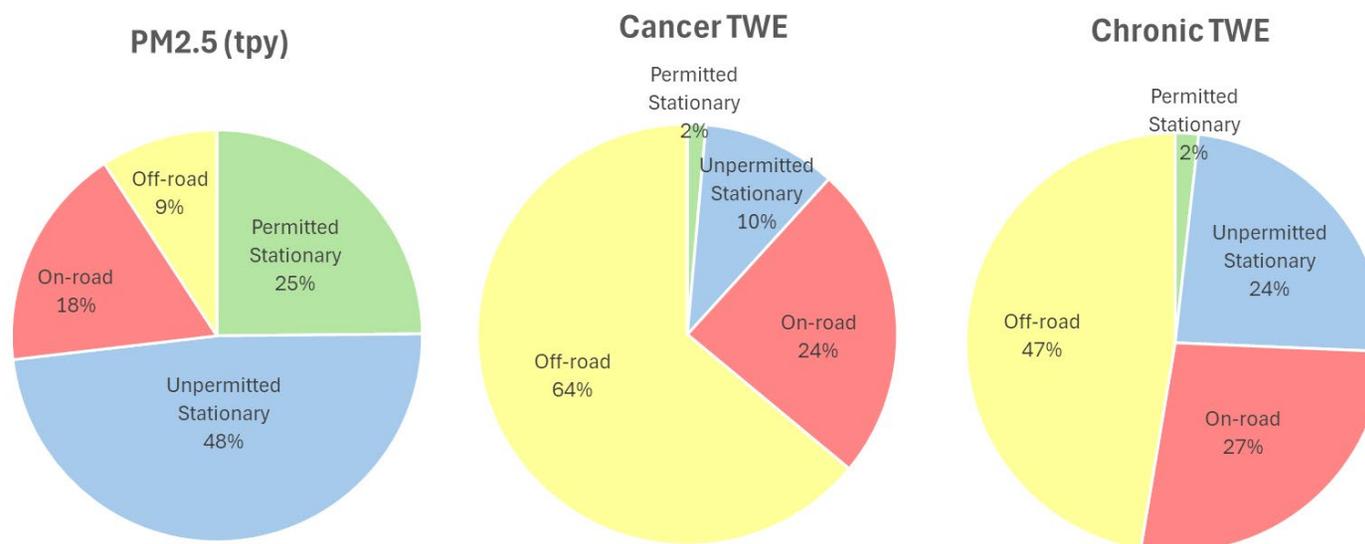


Figure 1: Source sector contributions to PM_{2.5} emissions (left), cancer TWE (center) and chronic TWE (right) in East Oakland.

These findings highlight permitted facilities as an important source of PM_{2.5} emissions. For cancer and chronic TWE, even though permitted sources play a small role in the overall inventory, individual facilities may still be important emitters. As noted above, some toxic compounds are primarily or entirely

emitted by permitted sources, and emissions from facilities are released from a concentrated set of stacks or other release points, while emissions from other source sectors may be distributed widely (e.g., over a vast road network).

Identifying East Oakland’s Top Permitted Polluters

To identify permitted sources that are likely having the greatest impact on human health in East Oakland, facility-level emissions were ranked for the three pollutant categories described above: PM_{2.5}, cancer TWE, and chronic TWE. This analysis led to the identification of a “Top 10” list based on facility-level contributions to total emissions from all permitted sources. Figure 2 shows emissions contributions for these 10 facilities, which account for 91% of permitted source PM_{2.5} emissions, 61% of permitted source cancer TWE and 84% of permitted source chronic TWE in East Oakland. Within the permitted

source inventory, key contributors to total emissions are as follows:

- **PM_{2.5}:** Davis St. Transfer Station, Miller Milling Co., and Peet’s Coffee and Tea
- **Cancer TWE:** Cultured Marble Products and Amazon Services, LLC
- **Chronic TWE:** PCC Structural and two crematories (Evergreen Cemetery and East Bay Crematory)

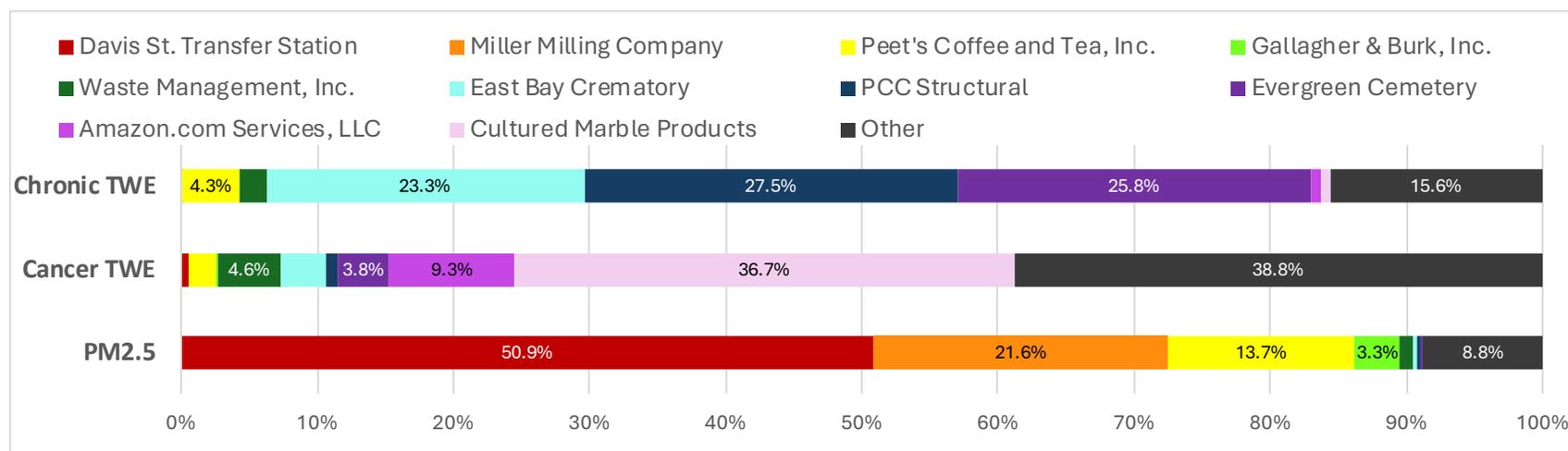


Figure 2. Facility-level contributions to total permitted source emissions in East Oakland.

The “Other” category in Figure 2 includes the contributions of all other permitted stationary sources beyond the “top 10” (unpermitted stationary, on-road, and off-road emissions are not included). This information on the top 10 permitted stationary sources identifies individual facilities that are likely to have the biggest impact on East Oakland’s air quality.

Table 3 provides additional details on the top 10 permitted facilities, including key pollutants associated with each facility and a list of processes emitting those pollutants.³ For example, this table shows that stockpiles are an important source of PM_{2.5} emissions at the Davis Street Transfer Station. This kind of information can be used to target specific processes or devices for emission control measures or other actions.

Locations of these 10 facilities are shown in Figure 3. Note that some of the facilities lie just outside the community boundary or, in the case of Cultured Marble Products, about one mile from the boundary edge. These facilities were included in the emissions inventory because of their potential impacts on community residents; for example, Cultured Marble Products is a leading source of cancer TWE, as shown in Figure 2.

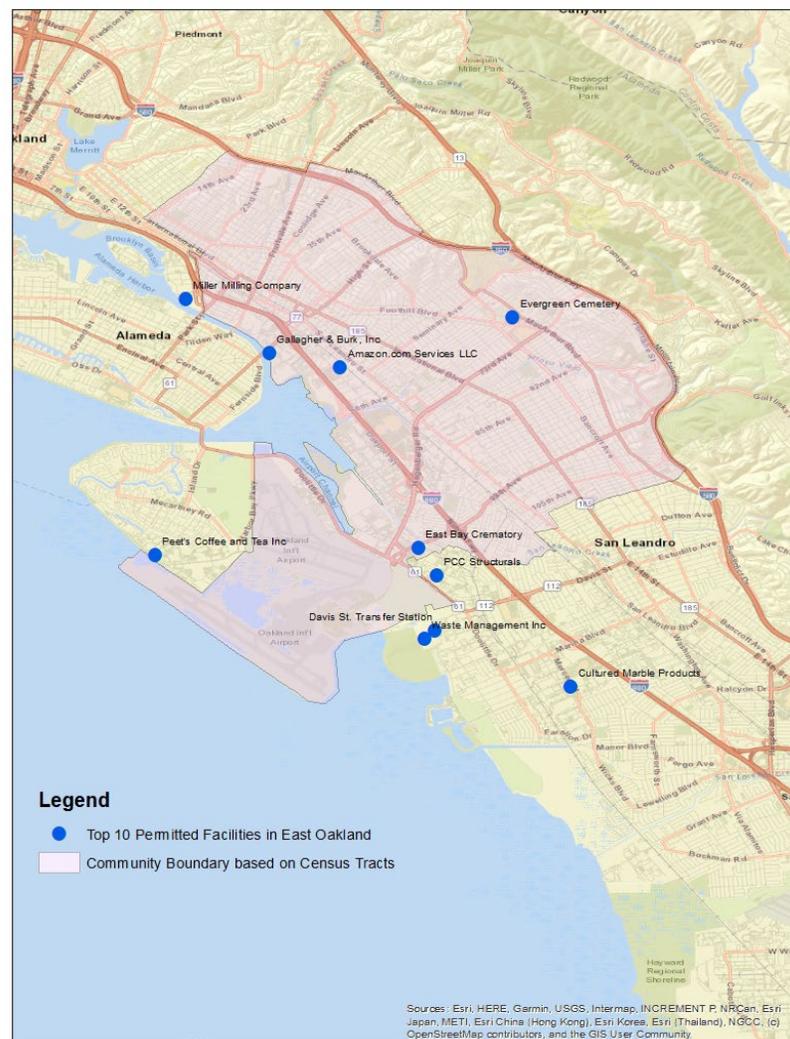


Figure 3. Map showing locations of key permitted facilities in East Oakland.

³ Note that this facilities in this table are listed in order of PM_{2.5} emissions from highest to lowest. This was done because permitted

sources make a much larger contribution to total PM_{2.5} emissions in East Oakland than to total cancer or chronic TWE (see Figure 1).

Table 3. Detailed information for the Top 10 permitted facilities in East Oakland (ranked in order of PM_{2.5} emissions).

Facility Name	Description	Key Pollutants	Key Processes
Davis St. Transfer Station	Recovers materials for reuse, recycling, or composting; facilitates the transfer of trash to the Altamont Landfill in Livermore	PM _{2.5}	Stockpiling, green waste transfer building, indoor waste sorting, material processing
Miller Milling Company	Mills wheat into white and whole grain flours	PM _{2.5}	Grain elevator, wheat cleaning house, flour flood loadout system
Peet's Coffee and Tea, Inc.	Coffee roasting plant	PM _{2.5} , formaldehyde	Coffee destoner, gas burner for coffee roaster
Gallagher & Burk, Inc.	Paving and grading services; construction material supplier	PM _{2.5}	Drum mixer, aggregate storage bins
Waste Management, Inc.	Landfill (closed)	Vinyl chloride, hydrogen sulfide	Landfill gas collection system and flare
East Bay Crematory	Human cremation services	Mercury, arsenic, hydrochloric acid	Crematory retort
PCC Structural	Manufactures metal components for aircraft engines	Nickel	Belt grinder, triple gator saw
Evergreen Cemetery	Human cremation services	Mercury, arsenic, hydrochloric acid	Crematory retort
Amazon.com Services, LLC	Delivery services warehouse	Diesel particulate matter	Emergency standby generator
Cultured Marble Products	Manufactures cast polymer composite home fixtures	Styrene	Curing ovens, gelcoat spray booth

The study area from the emissions inventory is larger than the East Oakland CERP area to ensure we capture all the emissions that may be impacting the air quality in East Oakland. The map of the top 10 in Figure 3 shows that most of the sites are below or just above the 880 freeway. While this is an industrial area of East Oakland, there are still several pockets of residential areas

very close to these facilities in East Oakland. Additionally, many of them are right near homes in the City of Alameda, however the typical wind patterns would likely push some of that pollution toward East Oakland. One of the most geographically concerning facilities is Evergreen Cemetery because it is surrounded by residential neighborhoods, three schools, and a public park.

Cultured Marble Products (CMP) is further away in San Leandro, but it's pollutants likely still impact East Oakland residents. While CMP is a significant polluter, there are numerous other stone countertop fabricators in San Leandro and the cumulative impact of that industry may be notable. The [workers](#) in these businesses can also see serious [health issues from the silica dust](#).

While these emissions are harmful to anyone's health who breathes them, some people are more vulnerable or sensitive to the effects of these pollutants than others. These people are referred to as "**sensitive receptors**." Sensitive receptors are groups of people who are more likely to experience adverse health effects from exposure to air pollution. They are considered sensitive because their bodies are less able to defend against or cope with the harmful effects of pollutants.

Some examples of sensitive receptors include:

- **Children:** Their lungs are still developing, and they breathe more air per pound of body weight than adults, making them more susceptible to the effects of air pollution.

- **Elderly:** As people age, their bodies become weaker and less capable of fighting off the impacts of pollutants.
- People with respiratory diseases (like asthma or bronchitis): Air pollution can aggravate their existing conditions, making it harder for them to breathe.
- **People with cardiovascular diseases:** Air pollution can increase the risk of heart attacks or stroke in these individuals.
- **Pregnant people:** Exposure to certain pollutants during pregnancy can potentially affect the health of the developing fetus.

Planners and regulatory agencies should also think about "**sensitive receptor locations**" such as hospitals, schools, day care centers, and community centers/parks. Some may even consider dense residential areas with many families as sensitive receptor locations.

While the Air District permitting and regulations are essential to protecting air quality and human health, we need to keep in mind many of the other quality of life impacts that air pollution permits do no prevent such as odor, visual blight, noise, and truck traffic.

Identifying East Oakland's Top Permitted Processes

In addition to assessing the emissions inventory at the facility level, it is also important to evaluate emissions for common processes or device types. Some devices, like backup generators, are in widespread use across numerous facilities and may be significant emission sources when considered collectively, even though their emissions at any one facility are

relatively small. This is especially true when considering cancer TWE, for which backup generators and other diesel engines are a key source. Figure 4 shows that such **diesel engines** account for 40% of cancer TWE from permitted sources in East Oakland. Locations of these engines are shown in Figure 5 (note that

because some facilities operate multiple engines, this figure provides information on the number of engines at each location).

Another widespread process that contributes to cancer TWE across East Oakland is **gasoline dispensing operations (gas stations)**. Note that the other processes highlighted in Figure 4 are associated with a small number of facilities that have already

been assessed above at the facility level. For example, the **curing ovens and spray booths**⁴ operate at Cultured Marble Products and the **crematories** operate at Evergreen Cemetery and East Bay Crematory.

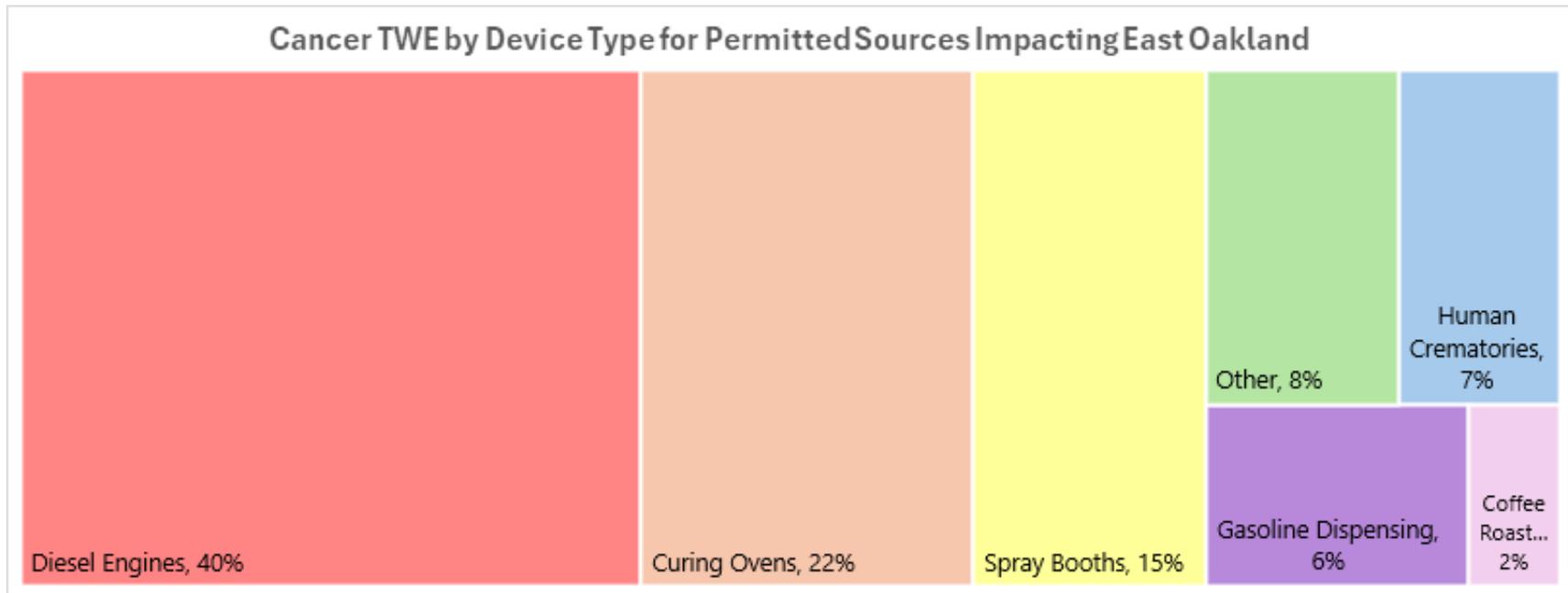


Figure 4: Cancer TWE from East Oakland permitted source by device/process type.

⁴ Spray booths also operate at autobody shops in the community, but those emissions are much lower than the emissions from spraying operations at Cultured Marble Products.

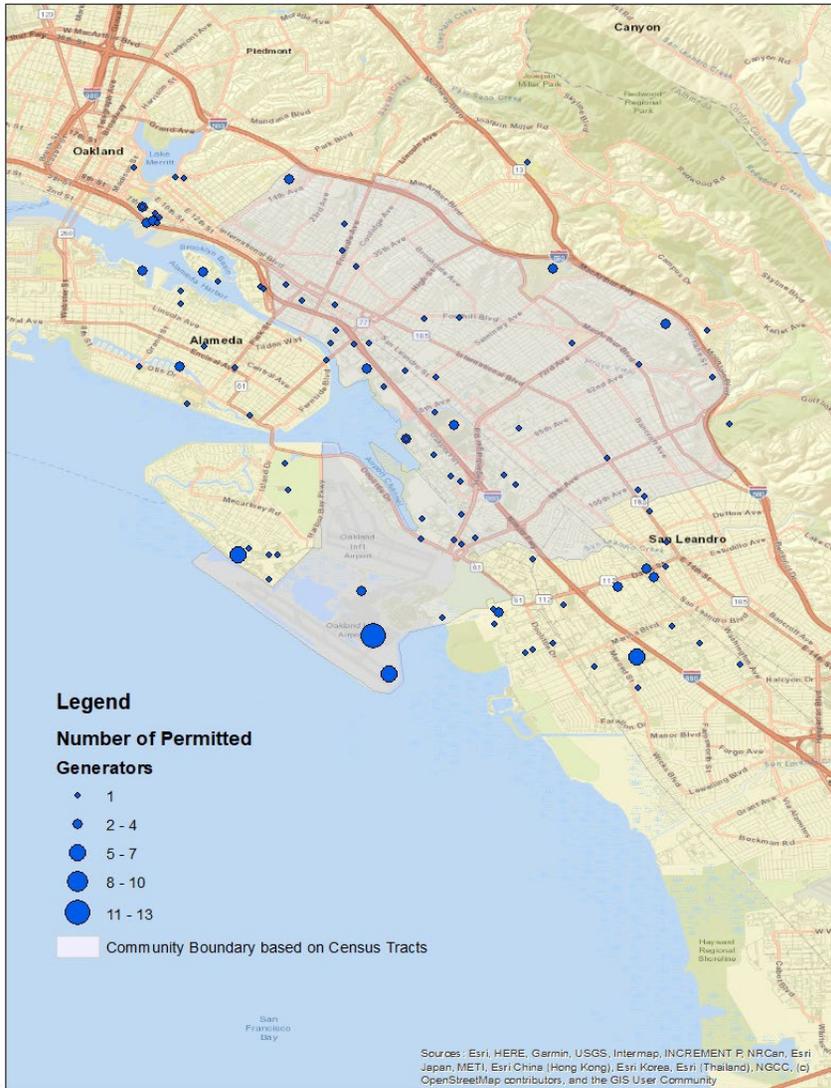


Figure 5: Locations of permitted backup generators and other permitted diesel engines in East Oakland. (Dot size shows the relative number of permitted generators)



Figure 6: Example of a generator used at an airport. (Source: <https://csdieselgenerators.com/diesel-and-gas-airport-generators/>)



Figure 7: Unpermitted diesel-fueled generators supply power to now closed cannabis production facilities in East Oakland on July 28, 2022. (Source: <https://www.kqed.org/news/11958266/after-lawsuit-managers-of-defunct-oakl> Beth LaBerge/KQED)

Rules and Regulations Applicable to the Top Polluters and Processes

This section explains the top BAAQMD rules and regulations relevant for the top polluters and processes discussed in this document. Note that this is not an exhaustive list of all applicable rules and regulations.

Table 4: Relevant Rules/Regulations for Permitted Sources

Source/ Process Category	Facility Name(s)	Current Rules/Regulations
Permitted Sources (<i>in general</i>)	<ul style="list-style-type: none"> - Any permitted source - All of the top 10 permitted sources, including Cultured Marble Products and Peet's Coffee and Tea 	<ul style="list-style-type: none"> - Regulation 2: Permits - Rule 2-1: General Requirements - Rule 2-2: New Source Review (for any new and modified sources) - Rule 2-5: New Source Review of Toxic Air Contaminants (for any new and modified sources of toxic emissions)
Fugitive Dust (Particulate Matter)	<ul style="list-style-type: none"> - Davis St. Transfer Station - Miller Milling Company - Gallagher & Burk, Inc. 	<ul style="list-style-type: none"> - Regulation 6, Particulate Matter: Common Definitions and Test Methods; Rule 6-1: General Requirements; and Rule 6-6: Prohibition of Trackout (all regulating particulate matter) - Also see Fugitive Dust White Paper (first step in rule development process)
Backup Generators (BUGs)	<ul style="list-style-type: none"> - Various locations, including Amazon.com Services LLC warehouse 	<ul style="list-style-type: none"> - Rule 2-5: New Source Review of Toxic Air Contaminants (regulating Toxics, including Diesel Exhaust Particulate Matter)
Landfills	<ul style="list-style-type: none"> - Waste Management, Inc. 	<ul style="list-style-type: none"> - Rule 8-34: Solid Waste Disposal Sites (regulating VOC and Methane) - Also see CARB Landfill Methane Rule
Cremation Services	<ul style="list-style-type: none"> - East Bay Crematory - Evergreen Cemetery 	<ul style="list-style-type: none"> - Regulation 11 - Hazardous Pollutants, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities <ul style="list-style-type: none"> o See Rule 11-18 Facility Risk Reduction Program for updates to Implementation Procedures and for current facility lists, as well as the Rule 11-18 Amendments Concept Paper
Warehouses and Other Indirect Sources	<ul style="list-style-type: none"> - Amazon.com Services LLC warehouse 	<ul style="list-style-type: none"> - See BAAQMD Stationary Source Committee Discussion of ISR + AB617 CERP strategies on Indirect/Magnet Sources <ul style="list-style-type: none"> o Including discussion of SCAQMD Warehouse Rule + approaches using Local Authority
Gasoline Dispensing	<ul style="list-style-type: none"> - Various locations 	<ul style="list-style-type: none"> - Rule 8-7: Gasoline Dispensing Facilities (regulating VOCs)

For additional information about BAAQMD's rules and regulations, please visit the resources below:

- Current Rules and Regulations webpage - <https://www.baaqmd.gov/rules-and-compliance/current-rules>
- Rules Under Development webpage (updates on rules currently *or recently* being worked on) - <https://www.baaqmd.gov/rules-and-compliance/rule-development/rules-under-development>
- Rule Development Process - <https://www.baaqmd.gov/rules-and-compliance/rule-development>

Relevant Strategies

Because the Air District issues permits to stationary sources of pollution and manages the resulting emissions, there are multiple opportunities for addressing impacts from these sources. Several options for developing strategies and actions for permitted sources are outlined below, along with example strategies from prior Bay Area CERPs.

1. Review and update permit

conditions: Existing permitted sources may be operating under permit conditions that no longer reflect current activities or account for all potential sources of emissions. This can be true for individual facilities or groups of related sources, and staff from the Air District's Engineering Division can conduct reviews of existing permits to identify opportunities for emissions reductions.

Example: In the *Path to Clean Air CERP for Richmond, North Richmond, and San Pablo*, it was determined that permits for metal recycling operations did not include fugitive dust or certain potential sources of air toxic emissions. A strategy was developed to conduct a source evaluation for these facilities and investigate opportunities for reducing particulate matter and air toxic emissions.

2. Enhance enforcement activities: Staff from the Air District's Compliance and Enforcement Division (C&E) conduct inspections and enforce Air District rules and regulations. The enforcement program includes unannounced compliance inspections of permitted facilities, investigations of community complaints, and responding to incidents such as fires. Strategies may include enhancing these activities and improving the transparency of the complaint resolution process.

Example: In the *Path to Clean Air CERP for Richmond, North Richmond, and San Pablo*, several actions related to enforcement activities, especially at the Chevron Refinery. One action called for the development of a standardized Chevron inspection protocol in partnership with the PTCA CSC, and another required increasing the frequency of Air District inspections, audits, and investigations at the refinery.

3. Develop or amend rules and regulations: Staff from the Air District’s Office of Rules write regulations that govern stationary sources of air pollution in the Bay Area. These rules generally target specific industries or device types across the Bay Area rather than focusing on an individual facility. In addition to crafting new rules, staff review and amend existing rules to achieve greater emissions reductions and improve public health. The rule development process is a key approach for addressing emissions from permitted sources.

Example: In the West Oakland Community Action Plan (WOCAP), one strategy accelerated the implementation of Rule 11-18 for Schnitzer Steel. Rule 11-18 is designed to reduce air toxic emissions at existing facilities, and accelerated implementation of this rule reduced toxic emissions from Schnitzer by 70% through the installation of a thermal oxidizer.

In addition to the potential Air District actions described here, there are other alternatives for reducing community exposure to harmful emissions from permitted facilities through other actions and through other partner agencies. For example, the WOCAP calls for installing filtration systems to be installed in nearby schools or senior centers and (the more aspirational and challenging strategy of) relocating polluting facilities can be relocated away from populated areas and (both strategies pursued in West Oakland). Some additional examples are listed in Table 5 below.

Table 5. Potential CERP Partner Agencies and Strategy Types

Potential Partner Agencies	Potential CERP Strategy Types
<ul style="list-style-type: none"> City of Oakland (<i>Planning, Department of Transportation, Public Works, Sustainability, City Administrator, Mayor’s Office, Police Department</i>) Alameda County Public Health Department CalEPA California Office of Environmental Health Hazard Assessment (OEHHA) Port of Oakland (airports) Caltrans East Bay Municipal Utilities District (EBMUD) PG&E East Bay Community Energy 	<ul style="list-style-type: none"> Better enforcement of existing rules More holistic health, equity, and cumulative impacts analysis / assessments Negotiation of community benefits agreements Lobby state to add additional rules/protections Grant writing strategy for larger projects Repair past harms that have created today’s inequities Reduce exposure of the “sensitive receptors” (residents, vulnerable workers) Enhance community collaborative problem solving and information sharing / data transparency Updates to City Zoning code Updates to City Conditions of Approval Increase health-promoting conditions and programs Multi-Agency coordination and data sharing Indirect source rule

Potential Strategy: Pollution Magnets and Indirect Sources

Some permitted stationary sources act like pollution magnets and draw in mobile sources, causing pollution to concentrate. Examples include warehouses, railyards, and airports where trucks and equipment (and airplanes for the airport) are necessary for operation. This means some stationary sources have high emissions levels, not necessarily from their on the ground operations, but from being a place that attracts numerous mobile sources such as planes, trucks, trains, etc. (aka a magnet). Some facilities can have a big impact as mobile pollution magnets without being on the list of top permitted sources. For example, Oakland International Airport's emissions that count as "stationary" are not high enough to appear on the top permitted sources list, however if associated mobile sources of pollution were attributed to the airport (airplanes and ground support equipment) then it would be considered a top polluter.

The Air District is exploring the possibility of developing an Indirect Source Rule. Indirect Source Rules generally make facilities responsible for meeting emissions standards through a variety of options like requiring zero emission vehicles, on-site charging infrastructure, and solar panels. Each facility would be held accountable for not meeting emissions targets.



Emissions
from Facility
Operations
and
Processes



Emissions
from Mobile
Sources that
Come to the
Facility

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