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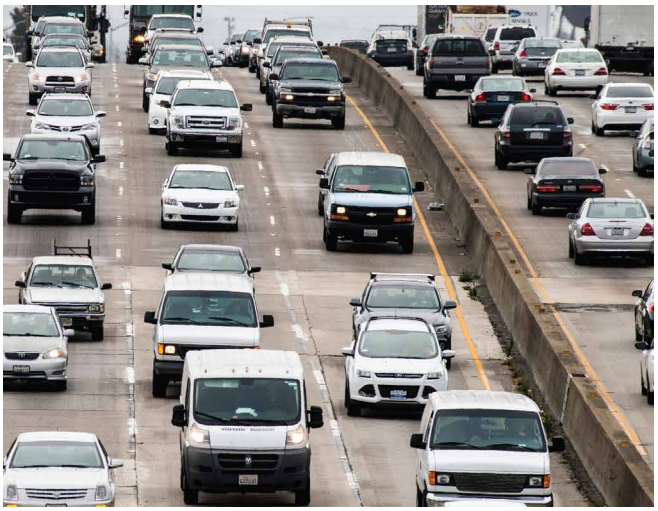

OWNING OUR AIR

The West Oakland Community Action Plan – **Volume 1: The Plan**

October 2019

A joint project of the Bay Area Air Quality Management District and West Oakland Environmental Indicators Project

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

West Oakland Environmental Indicators Project
know which way the wind blows

Owning Our Air:
The West Oakland Community Action Plan
Volume 1

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Acknowledgements

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Executive Summary

West Oakland residents have endured poor air quality and poor health for decades. In recent years, effective community organizing combined with government regulations and other interventions have improved conditions considerably. However, disparities persist. Air pollution and poor health conditions in West Oakland continue to be unacceptably high.

Recent State legislation (Assembly Bill, or AB, 617; 2017) opens new opportunities for further progress. AB 617 directs air regulators to identify communities with a high cumulative pollution exposure burden and to work with communities to develop solutions. Communities are empowered and air regulators are refocused on local impacts and local solutions.

Several Bay Area communities were identified through this process, with West Oakland being the first to go through the AB 617 emissions reduction planning process. Meaningful, ongoing engagement with community is a cornerstone of AB 617. The West Oakland Environmental Indicators Project (WOEIP) has a long, successful track record of organizing community members to advocate for action to improve air pollution and health. The Bay Area Air Quality Management District, the regional air pollution agency, partnered with WOEIP and the West Oakland Community Action Plan Steering Committee (Steering Committee) to prepare this plan: Owning Our Air: The West Oakland Community Action Plan. The Plan lays out a series of measures to be implemented over the next five years by state, regional, and local agencies to reduce pollution in the community. This Plan is unique thanks to the West Oakland community and key stakeholders who genuinely participated to shape its content.

Chapter 1 summarizes the purpose and scope of the Plan and describes the pollutants and impacts that are the focus of the Plan: fine particulate matter ($PM_{2.5}$), diesel particulate matter, and cancer risk from all toxic air contaminants.

Chapter 2 describes the West Oakland community, including the long history of industrial, port-related, transportation, and other sources generating pollution that impacts the community. Rates for mortality, asthma, cardiovascular disease and other health impacts are higher in West Oakland than Alameda County and the Bay Area, demonstrating some of the disparities experienced by West Oakland residents.

Chapter 3 describes the process to establish and convene the community Steering Committee that has provided the community wisdom, priorities, and voice behind this Plan.

Chapter 4 describes the goal and targets that the Steering Committee has established for this Plan. The overall goal is to protect and improve community health by eliminating disparities in exposure to local air pollution. To focus and evaluate progress toward this goal, the Committee established equity-based targets for $PM_{2.5}$, diesel particulate matter, and cancer risk in seven "impact zones" with the highest pollution levels. The targets are: by 2025, all West Oakland neighborhoods will have the same air quality as today's average West Oakland neighborhood, and by 2030, all West Oakland neighborhoods will have the same air quality of today's "cleanest" West Oakland neighborhood.

Chapter 5 describes the technical analysis that provides a foundation for this Plan. The analysis focuses on two questions: 1) What sources contribute most to community impacts, and; 2) How much must emissions be reduced, and from what sources, to meet the community's goal? Detailed estimates of local emissions from highways, local streets, Port-related activity, rail, stationary and other sources were developed for each of the seven zones, and local concentrations were modeled.

Chapter 6 describes the strategies proposed by the Steering Committee to achieve the goal and targets. Action will be needed from many entities, including the California Air Resources Board, the Air District, the Port of Oakland, the City of Oakland, and others. Proposed actions include regulations, grants and incentives, local ordinances, and more. Chapter 6 shows that rules on the books and other actions in place, in combination with the measures identified in this Plan move us closer to the equity targets identify in Chapter 4. But more actions are needed to achieve these targets.

Chapter 7 describes enforcement processes by the Air District and the California Air Resources Board (CARB) in West Oakland and proposes goals and strategies for each agency to enhance these efforts.

Chapter 8 describes methods to track implementation of this Plan's strategies.

Appendices to the Plan present the detailed technical analysis, details on Steering Committee meetings and other materials.

Introduction

West Oakland is a shore-front community and home to approximately 26,000 Bay Area residents from diverse economic, social, and racial backgrounds. Freeways encircle, and busy arterials and boulevards crisscross, West Oakland. Adjacent to the community is the Port of Oakland, a large and complex maritime port, with related rail yards and rail lines. West Oakland has long been a neighborhood with strong African American roots, with the community unfortunately having been shaped by redlining practices and disinvestment. Within the past decade, West Oakland has seen increased development promising to bring economic growth and jobs to the City of Oakland and the community. However, many long-time residents are concerned that new growth will increase rents and displace existing residents who can no longer afford to live in the community.

West Oakland residents face many challenges within their community. Limited access to quality food and health services, poverty, and high unemployment rates create stressful conditions and poor health outcomes. Regional air pollution affects all neighborhoods in the San Francisco Bay Area. However, West Oakland experiences higher concentrations of air pollution compared to many surrounding communities. West Oakland experiences among the highest levels of diesel particulate matter – a toxic air contaminant – of any community in the Bay Area. West Oakland also sees higher rates of asthma, cardiovascular disease, premature death, and other poor health outcomes related to air pollution than other parts of Alameda County and the region. While many factors affect health conditions in West Oakland, this Plan seeks to reduce air pollution's contribution. The Plan's goal is to protect and improve community health by eliminating disparities in exposure to local air pollution.

Chapter 1 – Purpose and Scope

In July of 2018, the West Oakland Community Action Plan Steering Committee (Steering Committee), including residents, community and local business leaders, and government agency representatives, committed to create *Owning Our Air: The West Oakland Community Action Plan* (Plan) to reduce the health effects of air pollution in West Oakland. The Plan is a joint effort between the West Oakland Environmental Indicators Project (WOEIP) and the Bay Area Air Quality Management District (Air District). Steering Committee members signed a Charter to define their work and made a one-year commitment to deep discussion and collaboration in the creation of this formal plan to improve health in their own community.

THE PLAN

The Plan addresses the disproportionate air pollution burden faced by people who live, work, and play in West Oakland. The Plan presents Strategies to reduce both air pollution emissions and exposure to air pollution. The Steering Committee agreed on the Strategies and identified the government agencies that are responsible for implementing the Strategies. Most of the Strategies depend on action and collaboration between community members, business leaders, and government agencies.

No single agency can solve West Oakland's longstanding air pollution challenges on its own; progress requires action and coordination among many. The government agencies that will be integral to implementing the Strategies include the Air District, the City of Oakland, the Port of Oakland, the Alameda County Public Health Department, the California Air Resources Board (CARB), the Metropolitan Transportation Commission (MTC), among others.

AB 617

Assembly Bill (AB) 617 (C. Garcia, Chapter 136, Statutes of 2017) directs communities and air districts to work together to address air pollution and related health effects in overburdened communities like West Oakland. AB 617's community-focused approach provides a new framework for addressing the long-standing disparities in air pollution and related health effects across the state. Air pollution science and solutions are locally focused, and communities are empowered. This Plan documents the Steering Committee's effort to study air pollution in West Oakland and identify Strategies that will work towards eliminating West Oakland's air pollution burden.

SCOPE

In approaching the challenge of this planning process, the Steering Committee was mindful of the numerous other planning activities occurring concurrently or previously in and for West Oakland. These include the West Oakland Specific Plan, the Port of Oakland Seaport Air Quality Plan, the West Oakland Truck Management Plan, and the (MTC) San Francisco Bay Area Goods Movement Plan. The Steering Committee compared the goals and intended actions of these plans and performed a gap analysis to reduce redundancy and identify impacts and mitigation that are not addressed elsewhere. The outcome of this gap analysis guided the selection of strategies defined in the Plan. The Plan also includes strategies from these plans that the Steering Committee strongly supports. By including these

previously existing strategies, the Plan works to reinforce existing planning and build from those activities.

The Plan addresses these West Oakland air pollution sources:

- Mobile sources, such as heavy-duty trucks and light-duty vehicles that travel through West Oakland and on the surrounding roadways and freeways and are attracted to magnet sources[1] in and near West Oakland;
- Mobile sources that serve the Port of Oakland, such as cargo equipment, port trucks, locomotives, ocean-going ships, and harbor craft in the San Francisco Bay;
- Stationary sources in and adjacent to West Oakland such as the East Bay Municipal Utility District wastewater treatment plant, recycling facilities such as Schnitzer Steel, CASS, and California Waste Solutions, and gas stations, back-up diesel generators, and auto-body shops; and
- Area sources in West Oakland, such as restaurants and other businesses with commercial cooking, and backyard burning.

The Steering Committee also identified sources of pollution that are not included in the Plan's scope. The Plan does not study or attempt to address the background or regional sources of pollution that all Bay Area communities face, such as freeways, roadways, and industrial facilities in other parts of the Bay Area outside the immediate vicinity of West Oakland. The Plan also does not seek to address the burdens that residents of West Oakland shoulder because of poverty, lack of economic and educational opportunities, illegal dumping, and excessive noise, although some of these current conditions are described in the Community Profile (Chapter 2).

POLLUTANTS

The Plan seeks to reduce emissions of and exposure to pollution from these sources. Specifically, the Plan investigates and seeks to reduce pollutants that have the greatest health impacts in West Oakland: fine particulate matter ($PM_{2.5}$), diesel particulate matter (diesel PM), and other toxic air containments (TACs).

Fine Particulate Matter

Particulate matter (PM) is a mixture of solid particles and liquid droplets suspended in the air. Of these particles, those less than 2.5 micrometers in diameter, called fine PM or $PM_{2.5}$, pose the greatest risk to health. Health impacts from $PM_{2.5}$ include premature mortality, heart disease, and respiratory illnesses like asthma and bronchitis. Because of these health impacts, this Plan is concerned with reducing emitted $PM_{2.5}$ from all sources to reduce local exposures in West Oakland.

[1] Magnet sources include industrial sources and other businesses, parking lots, port docking facilities, warehouses, cargo staging and handling areas, fuels sales, truck and other mobile equipment maintenance facilities, weigh stations, and food service for drivers and other logistics workers.

Diesel Particulate Matter

Diesel particulate matter is a form of PM that comes from the combustion of diesel fuel. Most diesel PM is in the $PM_{2.5}$ size range and has the same health burdens associated with fine PM. Diesel PM has also been identified as a toxic air contaminant and is known to cause cancer. In West Oakland, diesel PM is by far the most dominant air pollutant (over 90%) in terms of cancer risk. Because diesel PM has the health burdens associated with $PM_{2.5}$, is the dominant source of cancer risk from air pollution in West Oakland, and is identified by the community as a primary concern, this Plan highlights reducing exposures to diesel PM.

Toxic Air Contaminants

In addition to diesel PM, many other compounds emitted into the air have been identified as being toxic. Compounds such as benzene, formaldehyde, acetaldehyde, hexavalent chromium, perchloroethylene, polycyclic aromatic hydrocarbons (PAHs), arsenic, and dioxins, are air pollutants known to cause cancer. In West Oakland, non-diesel sources of concern are on-road gas powered vehicles—mostly cars and light-duty trucks—and industrial stationary sources that use, process, or generate toxic compounds.

Many TACs are carcinogenic. But TACs also have non-cancer health impacts. Non-cancer health impacts range from eye irritation to respiratory diseases and nervous system disorders. The State Office of Environmental Health Hazard Assessment (OEHHA) has set reference levels above which health impacts from TACs may occur. In the Bay Area, TAC levels rarely exceed these reference levels[2] so that, in practice, the cancer-related toxicity usually drives regulatory policy, not the non-cancer impacts. Likewise, cancer risk reduction is the focus of this Plan. However, it is important to note that the strategies this Plan identifies that reduce TACs will have health benefits beyond reductions in cancer risk.

Cancer Risk

Cancer risk is the likelihood that a person will develop cancer during their lifetime. Cancer risk from air pollution is generally expressed as the chance of cancer per million people similarly exposed to a toxic air pollutant. In this Plan, we report impacts from all TACs by combining their associated cancer risk. We combine TACs this way because it provides a succinct way to express the impacts of many compounds with different levels of toxicity. We report cancer risk by multiplying each TAC concentration by its associated cancer potency value[3] and by a constant number that accounts for an assumed exposure duration and breathing rate. Details are provided in the Technical Support Document (Appendix A).

[2] For example, the Reference Exposure Level for non-cancer health impacts for diesel PM is 5 micrograms per cubic meter (5 $\mu g/m^3$), which is greater than the highest levels in West Oakland.

[3] The State Office of Environmental Health Hazards Assessment (OEHHA) reports cancer potency values. See https://oehha.ca.gov/air/air-toxics-hot-spots.

Chapter 2 – Community Description

Located in the urban core of the San Francisco Bay Area, West Oakland is bounded by Interstate 880 (I-880) to the south and west, Interstates 80 (I-80) and 580 (I-580) to the north, and Interstate 980 (I-980) to the east. The Port of Oakland and associated rail yards and rail lines lie to the south and west. The *Owning Our Air: The West Oakland Community Action Plan* (Plan) area includes the Port of Oakland and the northern industrial part of Jack London Square and is bounded by the Oakland Alameda Estuary to the south, the San Francisco Bay to the west, I-80 and I-580 to the north, and I-980 to the east. Figure 2-1 shows the Plan location and area boundaries.

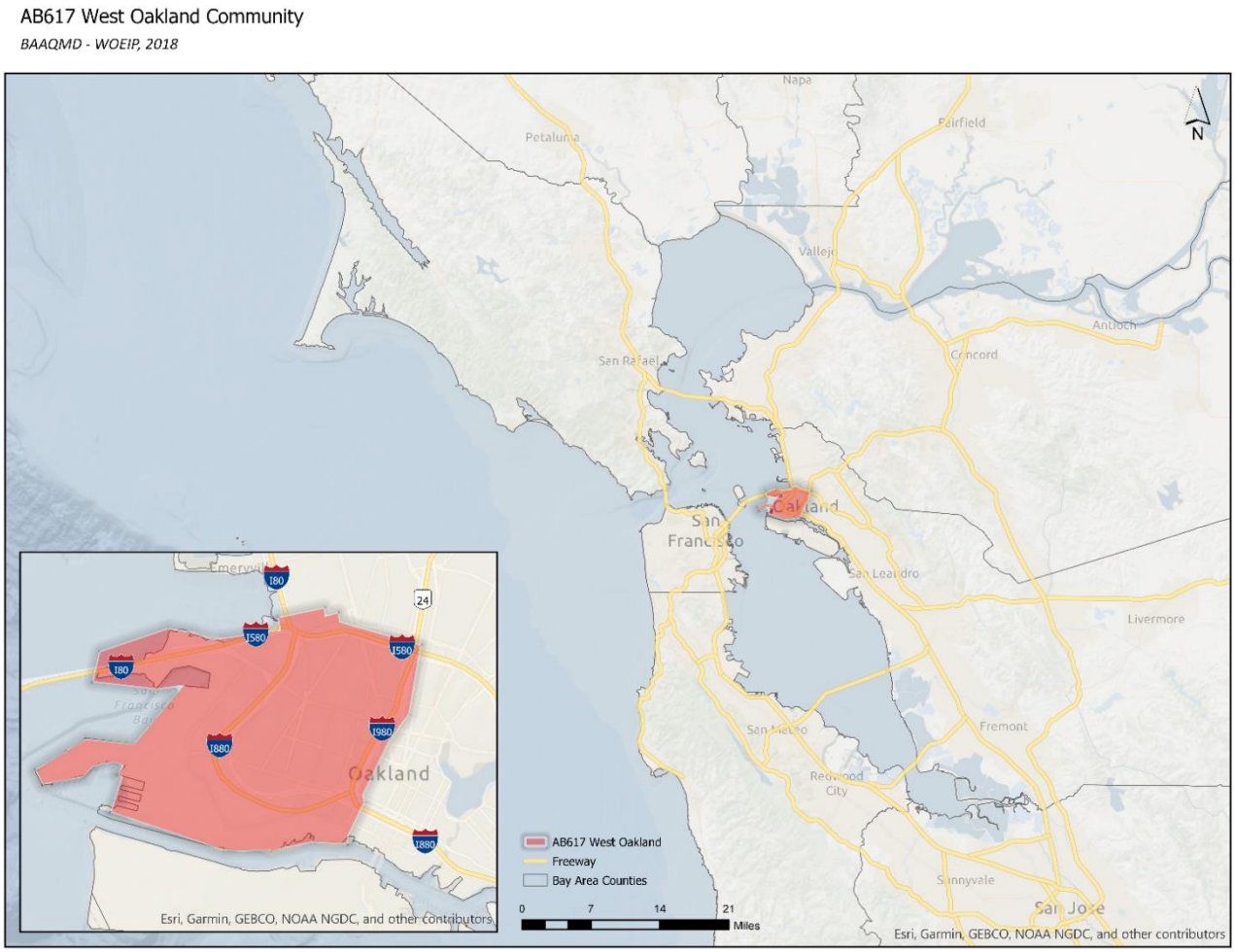


Figure 2-1. Owning Our Air: The West Oakland Community Action Plan Location and Area Boundary

WEST OAKLAND HISTORY

Today, West Oakland is a mix of industrial, commercial, and residential uses, which is a direct result of 19th century industrialization and 20th century development patterns and public policy. In 1869, West Oakland became the final stop on the Transcontinental Railroad. The railroad brought workers from around the country to West Oakland, including African Americans, European Americans, and

immigrants. The railroad brought other industries, attracted by overland access to the United States, and shipping access to the Pacific Rim. This industrial growth continued through World War II.[4]

Despite West Oakland's ethnically diverse beginnings, 20th century U.S. housing policy created a segregated West Oakland. Beginning in the 1930s, federal housing policy created maps to guide mortgage investment. By design, these maps directed investment away from communities of color, which were considered too risky for investment. This practice is commonly referred to as "redlining" because these neighborhoods were color-coded red. Figure 2-2 shows the 1937 Residential Security Map for the inner east Bay Area. Redlined communities include West Oakland, Emeryville, south and central Berkeley, and parts of Alameda and Oakland along the Oakland Alameda Estuary.[5]

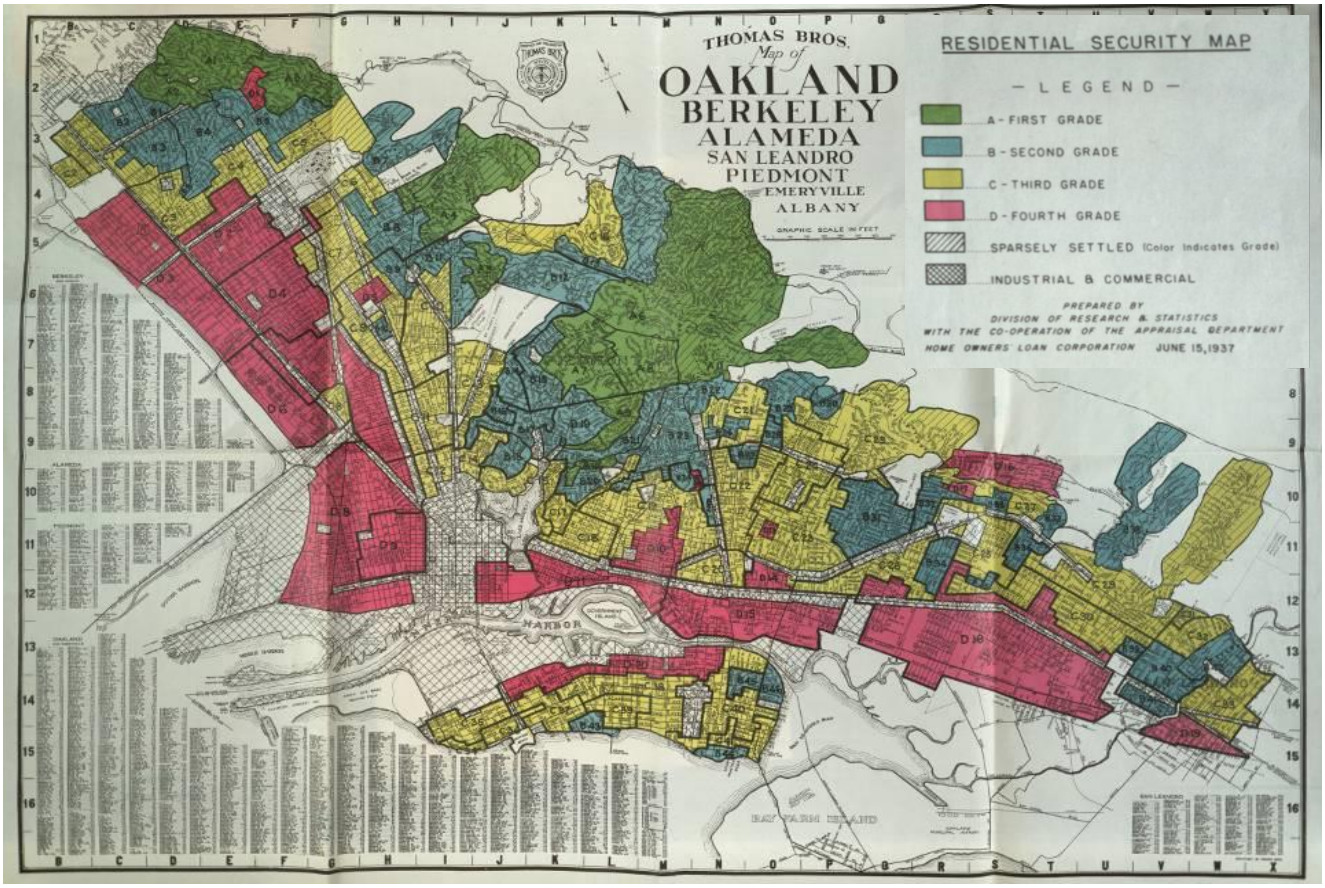


Figure 2-2. Home Owners' Loan Corporation Redlining Loan Rating Policy (1937)

Redlining was an explicitly discriminatory policy targeting African Americans and immigrants. These policies made it very expensive or impossible for residents in redlined communities to get

[4] City of Oakland. West Oakland Specific Plan, 2014, p. 1-3.
[5] Robert K. Nelson, LaDale Winling, Richard Marciano, Nathan Connolly, et al., "Mapping Inequality," *American Panorama*, ed. Robert K. Nelson and Edward L. Ayers, accessed May 15, 2019, https://dsl.richmond.edu/panorama/redlining/#loc=13/37.7976/-122.3111&opacity=0.8&city=oakland-ca&sort=17.

homeownership or maintenance loans. This led to disinvestment and depressed housing values in these communities.[6] Although the 1968 Fair Housing Act banned discrimination in lending, redlining that occurred during the preceding 35 years contributed to both the built environment and the unequal distribution of wealth in the U.S. today.

The second half of the 20th century brought additional changes to West Oakland. While shipping occurred in Oakland since the 19th century, goods movement at the Port of Oakland grew dramatically during and after World War II. After World War II, other regional infrastructure projects displaced residents and disrupted commercial activity. In the 1950s, the Cypress freeway cut through West Oakland, bringing traffic, noise, and air pollution. In the late 1960s, the federal government built a new U.S. Post Office distribution center. In the 1970s, Bay Area Rapid Transit (BART) built elevated tracks and the West Oakland BART Station, displacing social, retail, and cultural activities along 7th Street. In 1989, the Loma-Prieta earthquake damaged the Cypress Freeway. Due to the successful activism of the West Oakland community, the rebuilt freeway was relocated. In 1999, the Oakland Army Base closed.[7]

WEST OAKLAND TODAY

Today, people work, live, and play in West Oakland in proximity to the Port, the former Oakland Army Base (currently under redevelopment), regional infrastructure such as the Post Office, freeways, BART tracks, and other industrial uses including maritime-freight industry operations, large distribution centers, a concrete batch plant, a peaker power plant, and metal and other recycling facilities. West Oakland residents also work at the Port, U.S. Post Office, and other local freight and industrial operations, and drive these freeways and busy roadways as part of their jobs.

High levels of pollution are bad for everyone's health, but children, seniors, and people with pre-existing illnesses are especially vulnerable. Children breathe at greater rates than adults due to the size of their young developing lungs, while seniors are more susceptible to diseases due to low lung defenses and the natural effects of aging. Figure 2-3 shows the locations that the City of Oakland zoned as residential as well as other locations where sensitive receptors spend a large amount of time (i.e. childcare centers, schools, library, playgrounds, recreation centers, and senior facilities).

[6] Richard Rothstein. The Color of Law: A Forgotten History of How Our Government Segregated America, 2017.
[7] City of Oakland. West Oakland Specific Plan, 2014, p. 1-3.

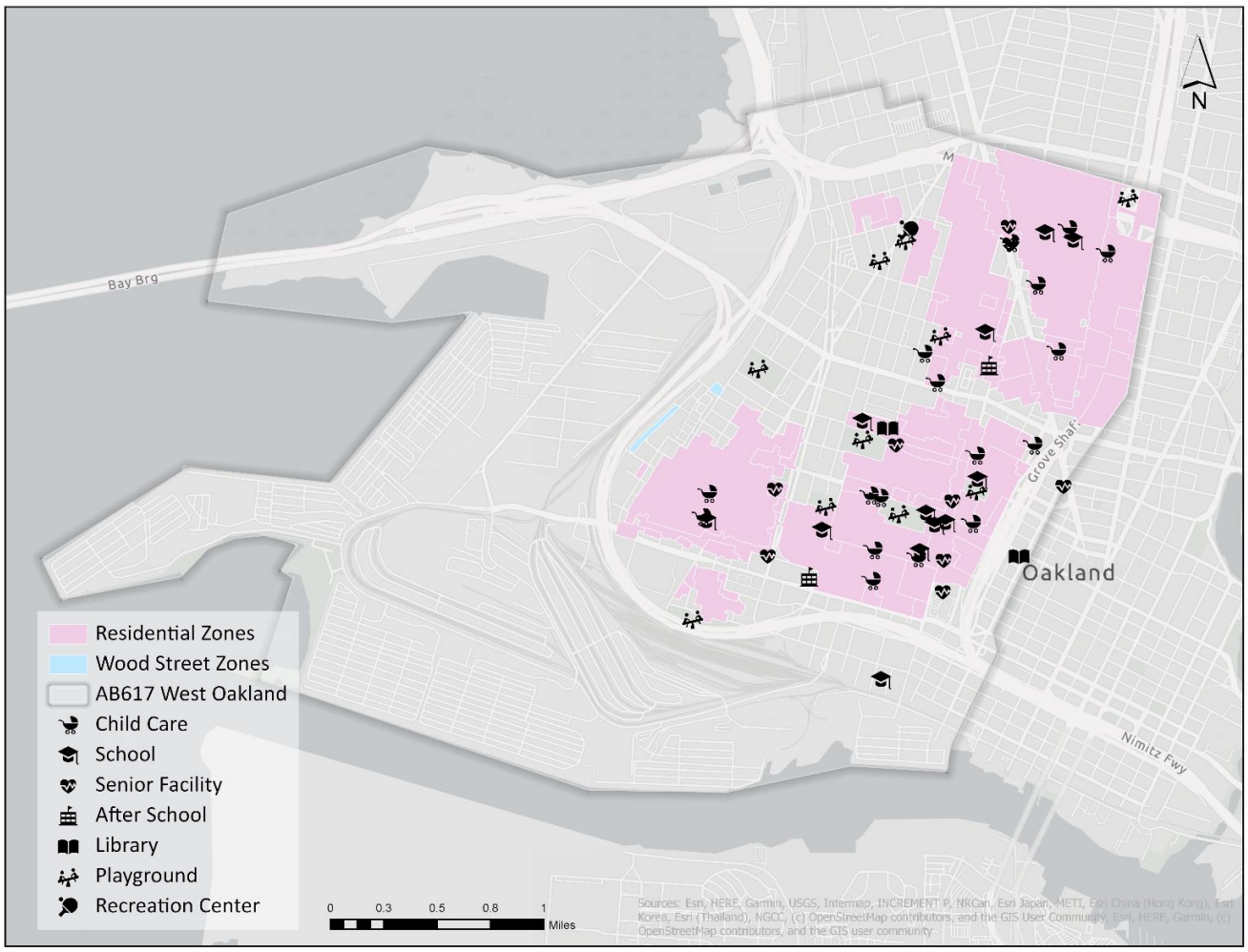


Figure 2-3. Residential Zones and Sensitive Receptors in West Oakland

Transportation infrastructure and industrial uses contribute to West Oakland's elevated levels of diesel particulate matter (diesel PM), fine particulate matter ($PM_{2.5}$), and toxic air contaminants (TACs). Because of high levels of local pollution exposure and poor health conditions, the Air District identified West Oakland as an impacted community in the Community Air Risk Evaluation Program (CARE).[8] Similarly, the State of California, using the CalEnviroScreen[9] screening tool, recognizes that across a wide array of environmental and health indicators that include air, water, and soil pollution, West Oakland is one of the most impacted areas in the state. Figure 2-4 shows that all West Oakland census tracts are in the top 50% of pollution-burdened census tracts, with the highest census tract scored at 89%.

[8] Air District Community Air Risk Evaluation Program, April 2014.
[9] CalEnviroScreen https://oehha.ca.gov/calenviroscreen.

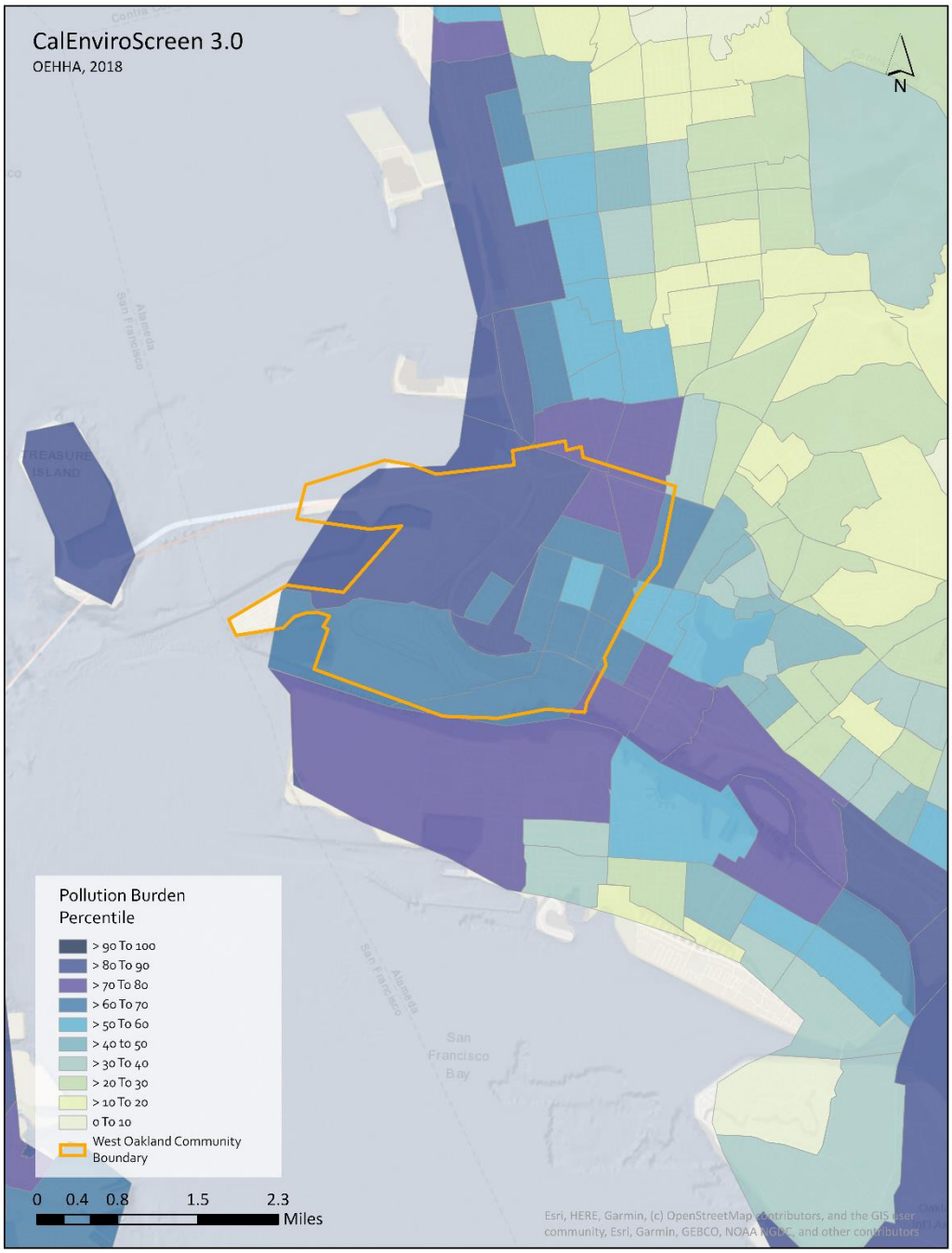


Figure 2-4. CalEnviroScreen 3.0 Pollution Burden Percentile Score[10]

[10] CalEnviroScreen https://oehha.ca.gov/calenviroscreen/maps-data.

POPULATION CHARACTERISTICS

Approximately 26,000 people live in West Oakland.[11] Figure 2-5 shows the percentage of population by race based on the American Community Survey 5-year estimates (2013-2017) for the Plan area, Alameda County, and the Bay Area region. Approximately 42% of the population in West Oakland is African American, compared to 11% in Alameda County and 6% in the Bay Area as a whole.

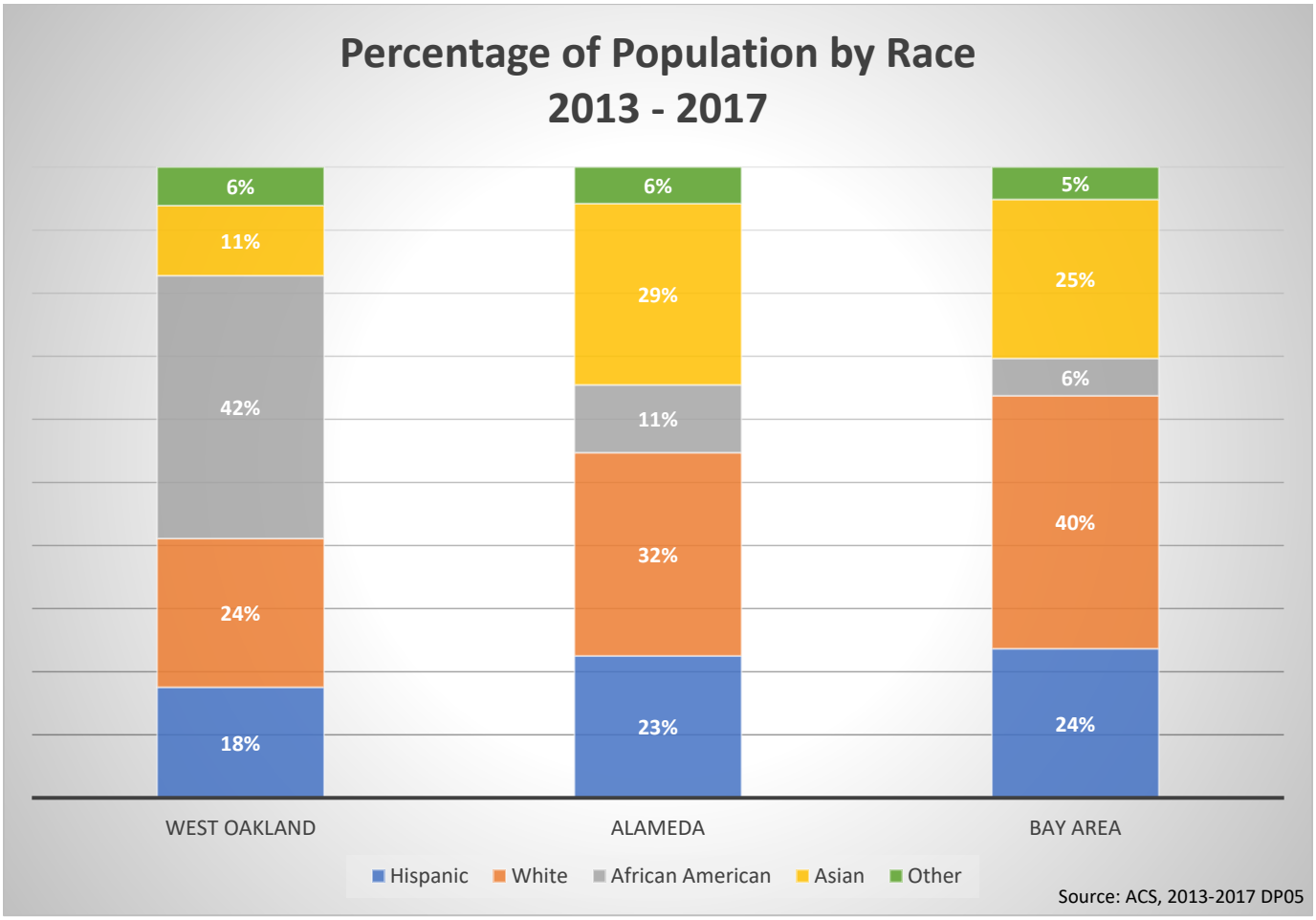


Figure 2-5. Race Demographics for West Oakland, Alameda County, and the Bay Area

West Oakland is predominately a low-income community. Approximately 52% of the population in West Oakland lives below the Bay Area poverty level (two times the federal poverty level), compared to 25% in Alameda County, and 23% in the Bay Area as a whole. An estimated 9% of the population in West Oakland is unemployed, compared to 6% in Alameda County and the Bay Area as a whole. Figure

[11] American Community Survey (ACS) 2013-2017 DP05 (Census Tracts: 4014, 4015, 4016, 4017, 4018, 4022, 4024, 4025, 4026, 4027, 4105, 9819, 9820).

2-6 shows education level, income, and employment status for West Oakland, Alameda County, and the region based on the American Community Survey 5-year estimates (2013-2017).[12]

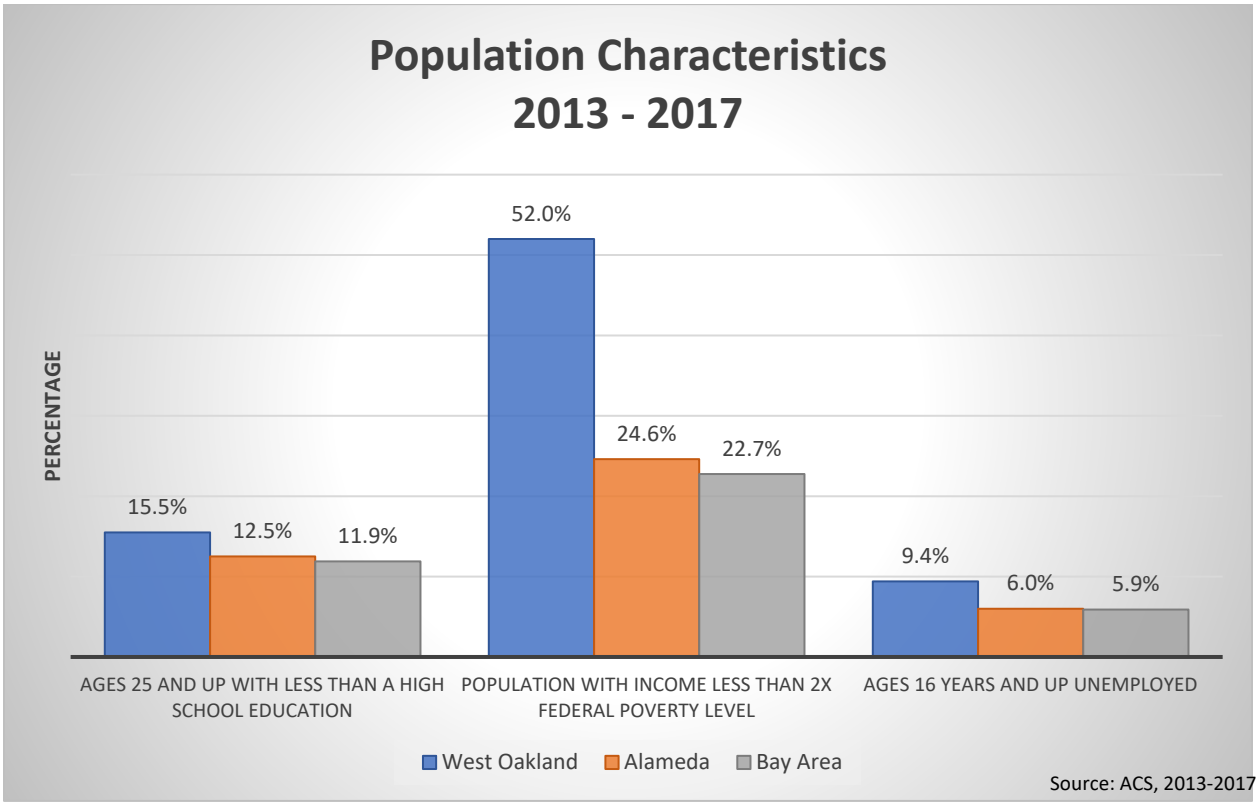


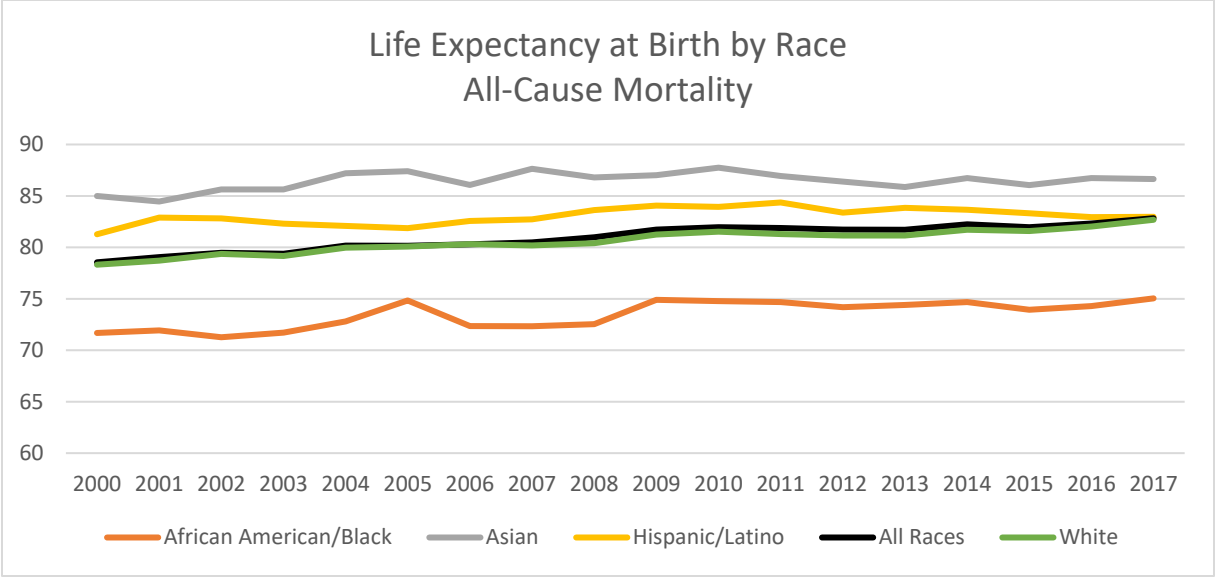
Figure 2-6. Educational Attainment, Poverty, and Unemployment in West Oakland, Alameda County, and the Bay Area[13]

HEALTH CONDITIONS IN WEST OAKLAND

Figure 2-7 shows life expectancy in Alameda County has increased overall since 2000. However, African Americans in 2012 had a life expectancy of 74.7 years, living on average between 12 and 15 years fewer than those with the highest life expectancy. Figure 2-8 shows life expectancy by census tract providing a more detailed view of the uneven geographical distribution of life expectancy in Alameda County, with residents in West Oakland among those with the lowest life expectancy. In addition,

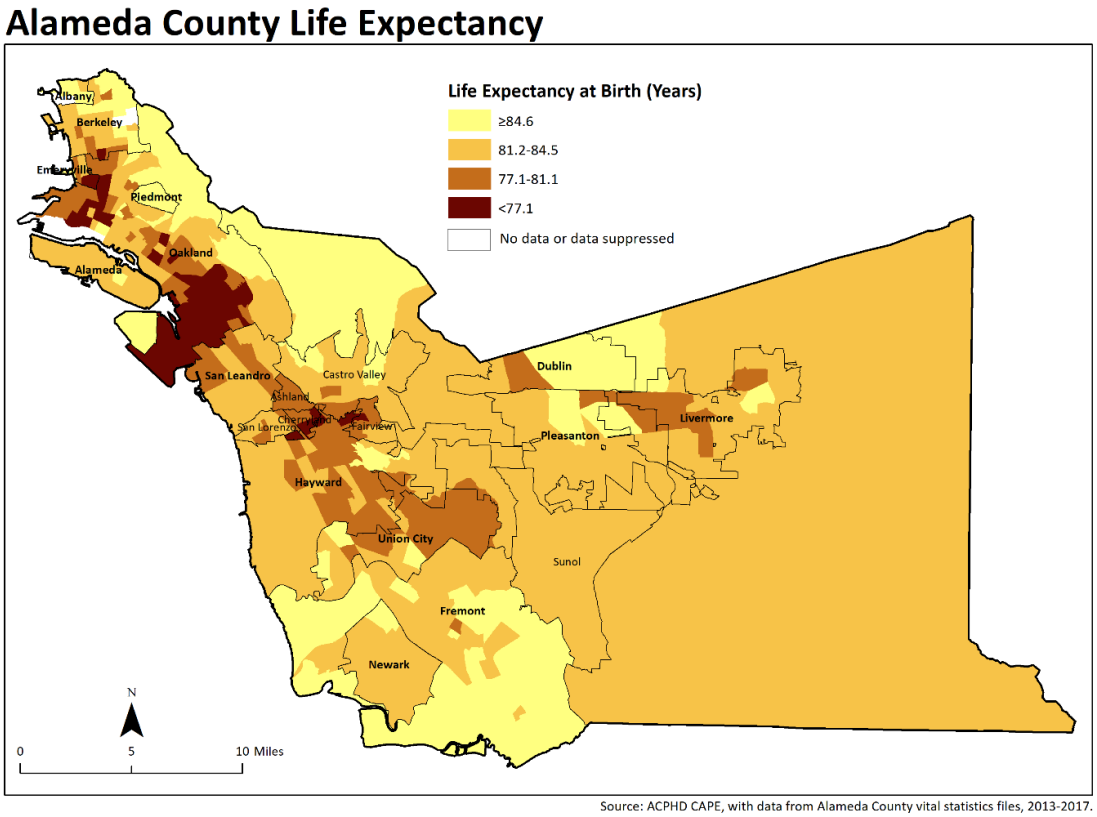
Figure 2-9 shows average life expectancy in West Oakland compared to Alameda County based on data from the Alameda County Department of Public Health.

[12]ACPHD CAPE, with data from American Community Survey (ACS) 2013-2017.
[13] ACPHD CAPE, with data from American Community Survey (ACS) 2013-2017.



Source: ACPHD CAPE, with data from Alameda County vital statistics files, 2000-2017

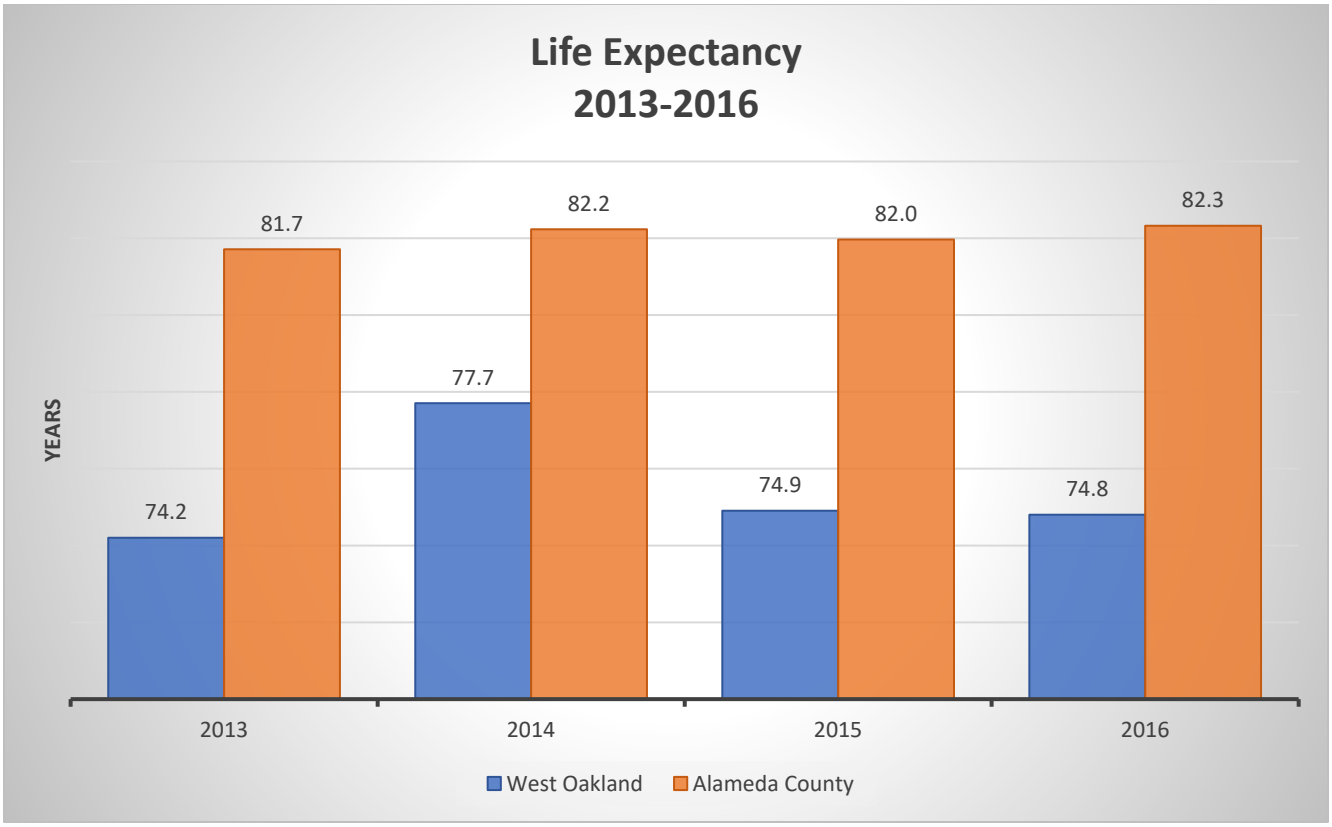
Figure 2-7. Life Expectancy at Birth by Race/Ethnicity in Alameda County[14]



Source: ACPHD CAPE, with data from Alameda County vital statistics files, 2013-2017.

Figure 2-8. Life Expectancy at Birth for Alameda County[14]

[14] ACPHD CAPE, with data from Alameda County vital statistics files, 2013-2017.



Source: ACPHD CAPE, with data from Alameda County vital statistics files, 2000-2017

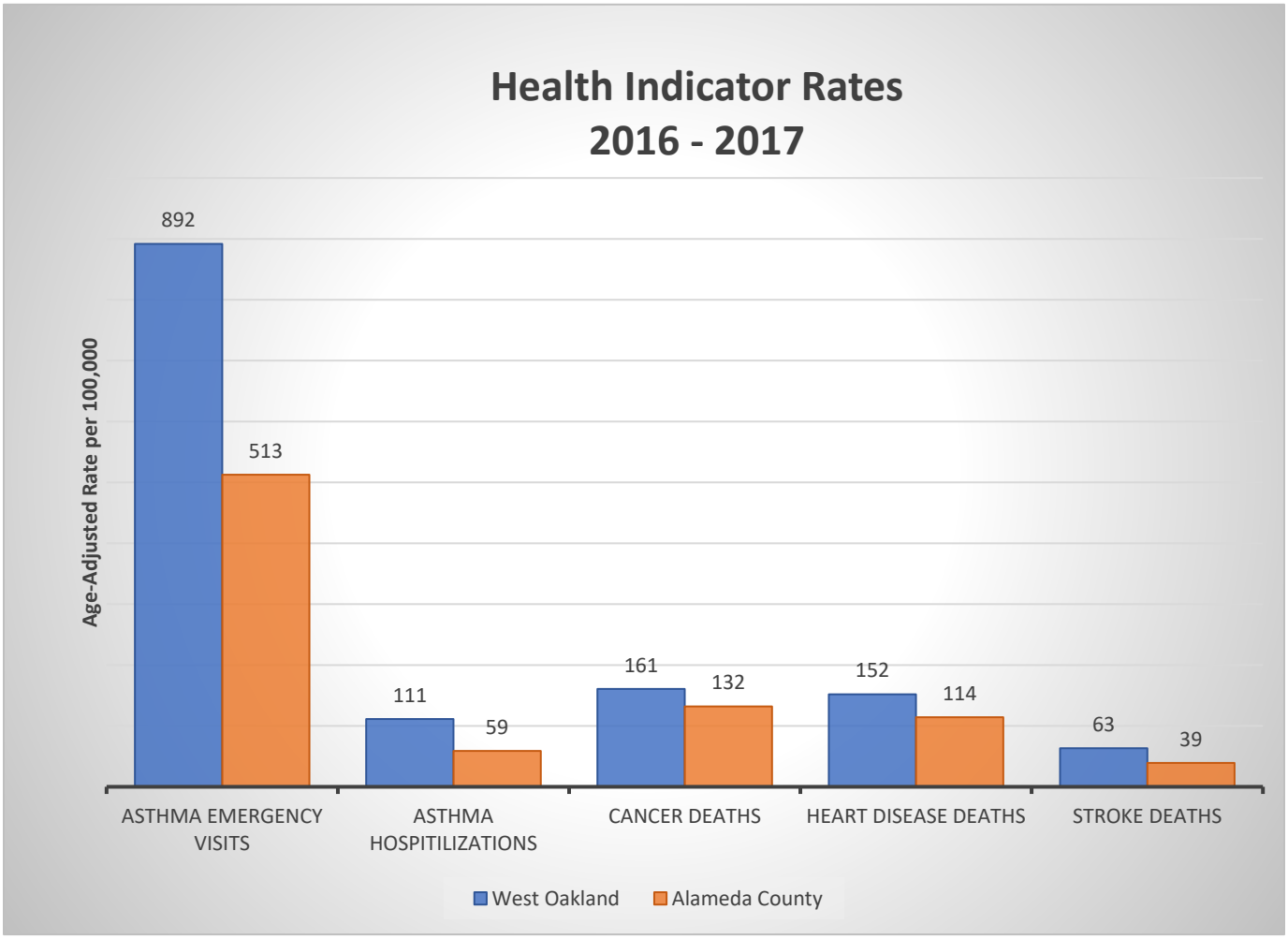
Figure 2-9. Life Expectancy at Birth for West Oakland and Alameda County

Chronic diseases cause most death and disability in Alameda County. There are major inequities in chronic disease burden by race/ethnicity, socioeconomic status, and place of residence. Studies show the detrimental effects that air pollution can have on health. For example, exposure to particulate matter is associated with asthma, bronchitis, emphysema, heart disease, stroke, and other health effects.

Figure 2-10 shows the rate of various health metrics per 100,000 people in West Oakland and Alameda County as a whole, averaged over a two-year period based on data from the Alameda County Department of Public Health. West Oakland residents experience higher rates of deaths from cancer, heart disease and strokes,[15] and higher rates of asthma emergency visits and hospitalizations[16] compared to Alameda County. Asthma emergency visits for all ages in West Oakland was 76% higher than the Alameda County average. Asthma hospitalizations for West Oakland are about 88% higher than the County average and heart disease deaths are 33% higher, respectively. In addition, African

[15] ACPHD CAPE, with data from Alameda County vital statistics files, 2013-2017 using Census Tracts: 4014, 4015, 4016, 4017, 4018, 4022, 4024, 4025, 4026, 4027, 4105, 9819, 9820.
[16] ACPHD CAPE, with data from Alameda County vital statistics files, 2013-2017 using Zip Codes: 94607, 94608, 94609, 94612.

American males and females have approximately two times higher stroke death rates than any other racial/ethnic group in Alameda County.[17]

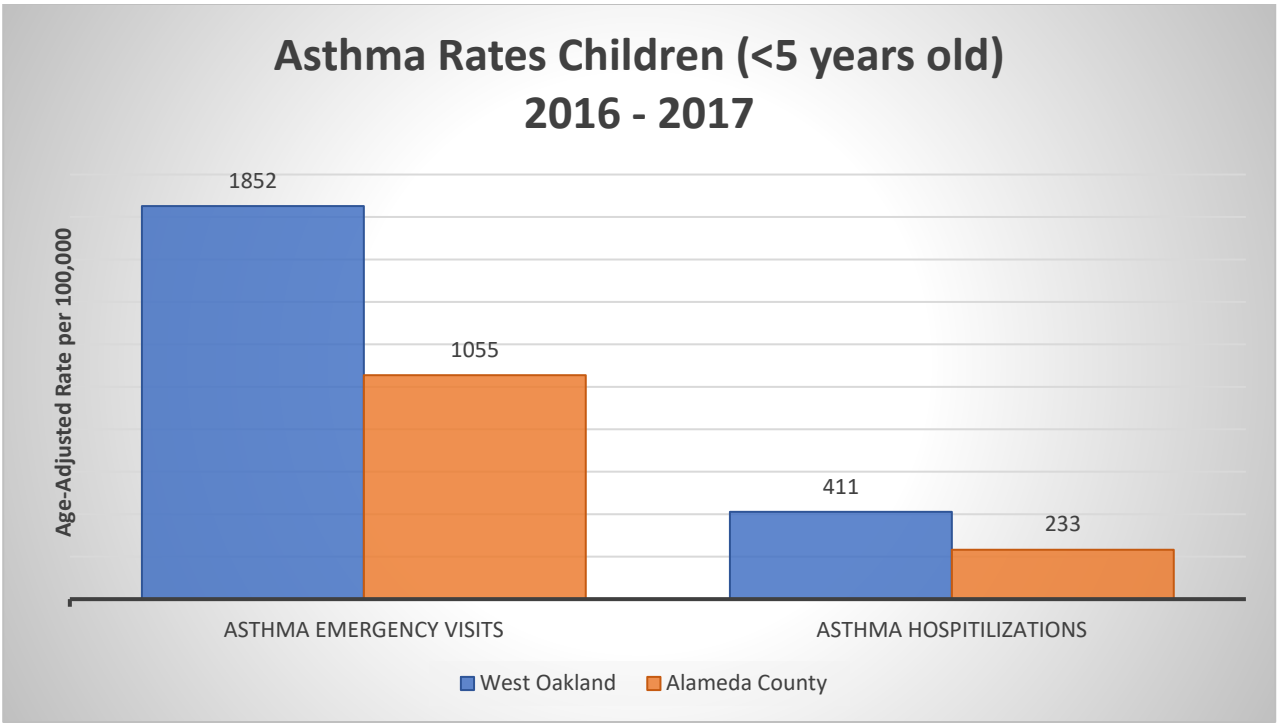


Source: ACPHD CAPE, with data from Alameda County vital statistics files, 2016-2017

Figure 2-10. Health Indicators in West Oakland and Alameda County

According to the Alameda County Department of Public Health, West Oakland experiences higher rates of asthma emergency department visits and hospitalizations for all groups compared to Alameda County,[18] but even greater rates for children under five (Figure 2-11). Asthma emergency visits and hospitalization for children in West Oakland during this time period are both approximately 76% higher than the Alameda County average.

[17] Alameda County Vital Statistics Files: Stroke Mortality by Gender and Race/Ethnicity 2010-2012.



Source: ACPHD CAPE, with data from Alameda County vital statistics files, 2016-2017

Figure 2-11. Asthma Rates for Children Under 5 Years of Age in West Oakland and Alameda County

POLLUTION SOURCES

Air pollution affecting West Oakland residents comes from sources within West Oakland, as well as from sources throughout the region. This Plan focuses on identifying local sources and identifying measures to reduce emissions and exposure to local emissions. Examples of major sources in West Oakland include I-880 and other freeways, surface streets, truck-related businesses[19], drayage trucks, cargo-handling equipment, ships and harbor craft, locomotives, and stationary sources.[20]

The Air District and community partners have studied local pollution sources for many years and continued this analysis during the planning process. The Steering Committee identified sources of interest through review of Air District, City of Oakland, and Port of Oakland data sets and emissions inventories, air pollution modeling, air pollution measurements, community surveys and investigations, and their own local knowledge.

Through this process, the Steering Committee identified the following air pollution emission sources, many that can be seen in Figure 2-12:

[19] Truck-related businesses are businesses served by commercial trucks daily that either provide services to trucks, such as gas stations and truck repair shops, or truck yards from which trucks depart and return. These businesses are also referred to as "magnets" because their business operations attract trucks.

[20] The Air District is the agency responsible for issuing permits to sources that do not move and produce air pollution, otherwise known as permitted stationary sources.

1. Major highways surrounding the community. This includes I-880 on the west and south, I-80 and I-580 to the north, and I-980 to the east;
2. Permitted stationary sources, such as recycling facilities, a wastewater treatment plant, back-up diesel generators, gas dispensing facilities, and paint spray booths;
3. Truck-related businesses that generate truck trips in West Oakland and in and out of the Port of Oakland, including magnet sources that attract truck trips, such as the U.S. Post Office on 7th Street;
4. Port-related sources, including drayage trucks, cargo-handling equipment, ships and harbor craft, and trains traveling through the Union Pacific and BNSF rail yards located at the Port of Oakland; and
5. Construction and area sources, such as backyard burning, restaurants and businesses with commercial cooking operations.

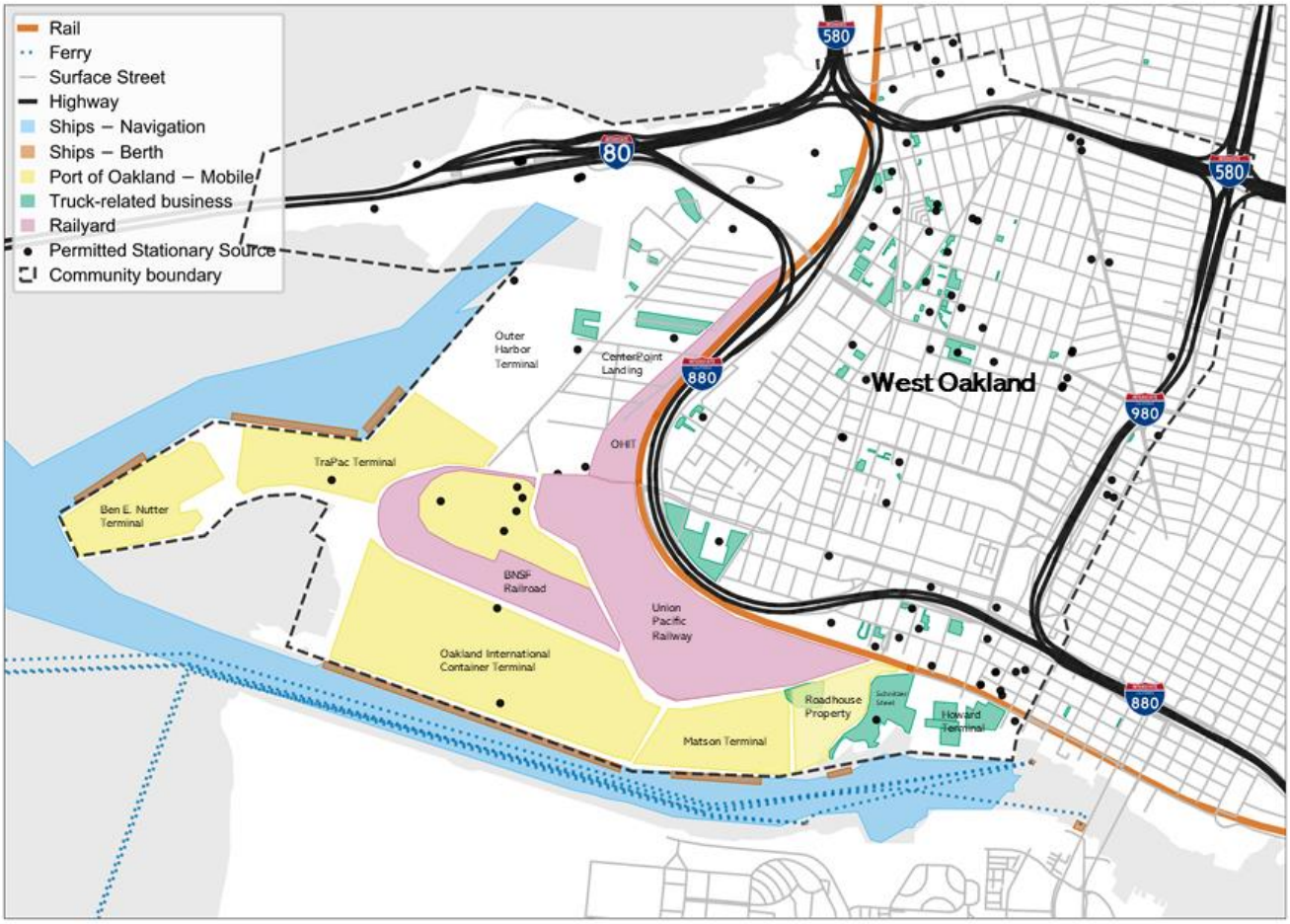


Figure 2-12. Air Pollution Emission Sources in West Oakland[21]

[21] Figure 2-12 is similar, but different than, Figure 5-2. Figure 2-12 presents the local pollution sources within the West Oakland Action Plan boundary while Figure 5-2 presents the sources included in the technical assessment's community-scale modeling.

Chapter 3 – Community Engagement

The Plan reflects more than the past year of discussions, data evaluation, and decision-making. Decades of work by community activists, citizen scientists, and public and private sector workers have made this Plan possible. West Oakland is uniquely positioned to develop and implement this Plan because of this long-term work, spearheaded by the WOEIP, and because of the partnership between the WOEIP and the Air District.

BACKGROUND

Founded in 1999, WOEIP conducts air quality research and advocates for better air quality in West Oakland. To accomplish this work, WOEIP collaborates with other community leaders, the Air District, Port of Oakland, City of Oakland, Alameda County Public Health Department, CARB, and the U.S. Environmental Protection Agency. Examples of this work include:

- Studies and reports: *Neighborhood Knowledge for Change: The West Oakland Environmental Indicators Project (2002), Clearing the Air: Reducing Diesel Pollution in West Oakland (2003),* and *Paying with Our Health: The Real Cost of Freight Transport in California (2006)*.

- Co-chairing the Port of Oakland's Maritime Air Quality Improvement Plan (2009) and the Seaport Air Quality 2020 and Beyond Plan; participating in the West Oakland Specific Plan (2014) working group, the Oakland Army Base Stakeholder Group, the Air District's Public Participation Plan External Stakeholder Advisory Group; and the West Oakland Toxic Reduction Collaborative; and organizing Willowfest and Earth Day celebrations.

- Community Air Risk Evaluation (CARE) Program work: WOEIP participated in the CARE Task Force and helped identify Bay Area communities with significant air pollution disparities and populations most vulnerable to air pollution. This effort deepened the relationship between WOEIP and the Air District. The CARE Program partnership also produced the West Oakland Truck Survey (2009). The West Oakland Truck Survey increased community awareness of air pollution health impacts and led to the early retirement of older diesel trucks polluting West Oakland.

COMMUNITY READINESS & PARTNERSHIP

WOEIP is led by co-founders Ms. Margaret Gordon and Mr. Brian Beveridge. Their work ensures that West Oakland is ready to create and implement the Plan. WOEIP brings experience developing and providing air quality information and outreach to the community and is a natural co-lead for the Plan Steering Committee. This is why the Air District and WOEIP entered into the Co-leads Partnership Agreement to develop and implement the Plan. The Partnership Agreement outlines the roles and responsibilities of the Co-leads and ensures that the Plan is a community-led effort and not dictated by the Air District.

ESTABLISHING THE WEST OAKLAND COMMUNITY ACTION PLAN STEERING COMMITTEE

WOEIP and Air District staff developed and implemented an outreach strategy to recruit Steering Committee members. This outreach and engagement process reached community-based organizations, faith-based organizations, school board members, business representatives, environmental justice advocates and public agencies, and is reflected in the membership of the Steering Committee.

Ms. Gordon and Mr. Beveridge brought a wealth of community contacts and active civic leadership to the outreach work and leveraged their existing relationships in the community. Ms. Gordon and Mr. Beveridge personally made phone calls, sent emails, and invited community members to attend the initial meeting. They are trusted community leaders, and the outreach process was successful because of their reputations and hard work.

Additional Air District and WOEIP staff and volunteers worked to make phone calls to local community leaders, write email blasts to community organizations, meet one-on-one with various local business contacts, and make weekly presentations at existing community meetings throughout West Oakland. Community members also canvassed door-to-door to build community interest in the Steering Committee.[22]

Individuals were invited to join the Steering Committee who live, work or have a business in West Oakland and had an interest in improving conditions in West Oakland. They also were expected to make a year-long commitment to attend meetings and agree to abide by the Steering Committee Charter which was developed by the Co-leads and shared with attendees at the Kick-Off meeting. Eighteen primary Steering Committee members joined the Steering Committee, and an average of 5-15 Steering Committee and community members combined attended most meetings.

The unique governing body is composed of a variety of residents, government agency representatives, public health workers, community organizers, entrepreneurs and local business representatives. The Steering Committee's composition reflects ethnic diversity and also encompasses a mixture of political, social, and cultural perspectives from West Oakland. These community leaders provide a breadth of experience within the community and ensure that the Plan is a true community-led process. Each Steering Committee member signed a participant agreement pledging their commitment to the process and received an orientation packet.

STEERING COMMITTEE KICK-OFF MEETING

After several public workshops to provide an overview of the AB 617 Program and the community engagement component, the Steering Committee launched a kick-off meeting in July 2018. Ms. Margaret and Jack P. Broadbent, the Air District's Executive Officer/Air Pollution Control Officer, opened the event. Speakers included Libby Schaaf, Mayor of Oakland; Cestra Butner, President of the Board of Port Commissioners; and Lynette Gibson McElhaney, Councilmember for City of Oakland.

[22] See Appendix B for examples of outreach materials and meeting materials.

Figure 3-1. Steering Committee Kick-Off Meeting, July 2018

Figure 3-2. Steering Committee Kick-Off Meeting Orientation Packet

STEERING COMMITTEE MEETING FACILITATION

The Co-leads decided to hire professional facilitators to support each Steering Committee meeting to address any power imbalance between the Air District and the community. The facilitators' role was to maintain a positive working environment among meeting participants throughout the Plan development process. Facilitators that are trusted by the community are critical in alleviating community concerns that government entities, such as the Air District, have too much power in the

planning process. Having neutral facilitation fostered inclusivity and full participation by community members. The facilitators also structured each meeting to include a question and answer period to encourage public comments throughout the planning process. In addition, the facilitators guided the Steering Committee toward consensus on Plan elements and Strategies at critical points during the Plan's development.

CHALLENGES AND LESSONS LEARNED

The Air District recommended West Oakland as a Year 1 community because air quality issues in the community are well documented, WOEIP has deep roots in West Oakland, and the Air District has an established relationship with WOEIP. AB 617 legislation establishes a very short timeline for communities to develop plans. Because WOEIP is so experienced in community organizing, air quality issues, and partnering with government entities, the Co-leads were able to meet tight timelines.

Even with WOEIP's experience in the community and the existing relationship between WOEIP and the Air District, the timeline for developing the Plan was short. After all public meetings, Steering Committee members and the public completed meeting evaluations. Participants often commented that they didn't have enough time to review and understand the technical information prepared by the Co-leads before the Steering Committee meeting. The compressed Plan timeline put pressure on all partners. It was extremely difficult to deliver meeting materials to Steering Committee members and the public in advance of meetings to adequately study before each meeting. Due to the short timeframe for Plan development, there was limited time to return to topics discussed at previous meetings. The Co-leads recommend that in the future, community plans not be limited to a one-year development period.

Lack of state-of-the-art meeting facilities in West Oakland also was a limitation faced by the Co-leads. This is likely to be an issue in other impacted communities as well. Several meetings were held in downtown Oakland, but the Co-leads wanted most of the Steering Committee meetings to be in the community of West Oakland and in the same location. The West Oakland Senior Center was available and rented for monthly meetings. The Senior Center is centrally located, but it lacks communication amenities, such as a sound system and video screens, and lacks a kitchen. For each meeting, staff had to assemble and disassemble the room, bring a sound system, laptops, projection screens, and dinner for attendees. This meant that monthly Steering Committee meetings were extremely labor-intensive for the Co-leads, and less time was available for other activities, such as preparing materials or continuing outreach work to spread the word about the Plan. When Steering Committee meetings included world café style events, the noise could be distracting and uncomfortable.

Engaging young people in the process was also difficult for the Co-leads, and the West Oakland Senior Center was not the best location to hold meetings to attract youth participation. It also was not a location familiar to the young adults or young families in the community, who might have preferred a local school. Space at the meeting location and funds to offer childcare would have helped more community member adults with young children attend meetings regularly. Funding for childcare

services at meetings, and Steering Committee member transportation to and from meetings, also would help Steering Committee members attend more meetings.

Additional funding to support community partners to pay for staff, community outreach, event locations, food, material development, and communications equipment, would be extremely helpful for future efforts. For future year plans, new community relationships and knowledge need to be developed. It is essential that adequate time is included in the AB 617 process to build these community relationships that are recommended for Year 2 and later year plans. Funding for capacity building is imperative for communities to effectively participate in AB 617 implementation. Given more time to develop materials and relationships, Co-leads would also have more time to partner with youth organizations or schools to work with educators to engage youth in the Plan. (See Appendix D for a description of available state Community Air Grants to fund capacity building.)

STEERING COMMITTEE PROGRESS - SUMMER 2018 TO SUMMER 2019

Summer 2018

At the initial kick-off meeting, Steering Committee members heard presentations on the draft Seaport Air Quality 2020 and Beyond Plan from the Port of Oakland, an update on the West Oakland Truck Management Plan from the City of Oakland, and an overview of existing data and studies that examine cumulative health impacts in West Oakland from the Environmental Defense Fund. Participants were also given the opportunity to comment on the Steering Committee Charter at this meeting. In addition, the Co-leads let participants know that language interpretation services would be available at Steering Committee meetings upon request.

Fall 2018

In September 2018, the Steering Committee and public mapped pollution sources and locations where people are exposed to air pollution in West Oakland, such as homes, schools, and recreation facilities. The Steering Committee expressed support for additional Air District and City enforcement of existing regulations and ordinances, including truck idling, parking, and routes; better maintenance of street trees and illegal dumping removal; and better government response to backyard burning and odor nuisances. Figure 3-3 shows examples of these map-making activities, which helped the Co-leads develop the maps in Chapter 2 showing sources and receptors of pollution. The Co-leads also presented information about methods to identify and verify pollution sources. Later in the fall, the Steering Committee learned about emissions inventories and modeling methodologies, health effects of air pollution, and emissions reduction strategies the Steering Committee might include in the Plan.

Winter 2018/2019

In December 2018, the Steering Committee compiled a list of potential strategies to reduce emissions and exposure to air pollution in West Oakland. The Steering Committee considered strategies to address emissions from land-use policies, emissions from trucks and other mobile sources (i.e. ocean-going vessels, harbor craft, locomotives, and off-road construction equipment), and stationary sources; and existing and proposed exposure reduction strategies, such as indoor air filters and asthma management programs.

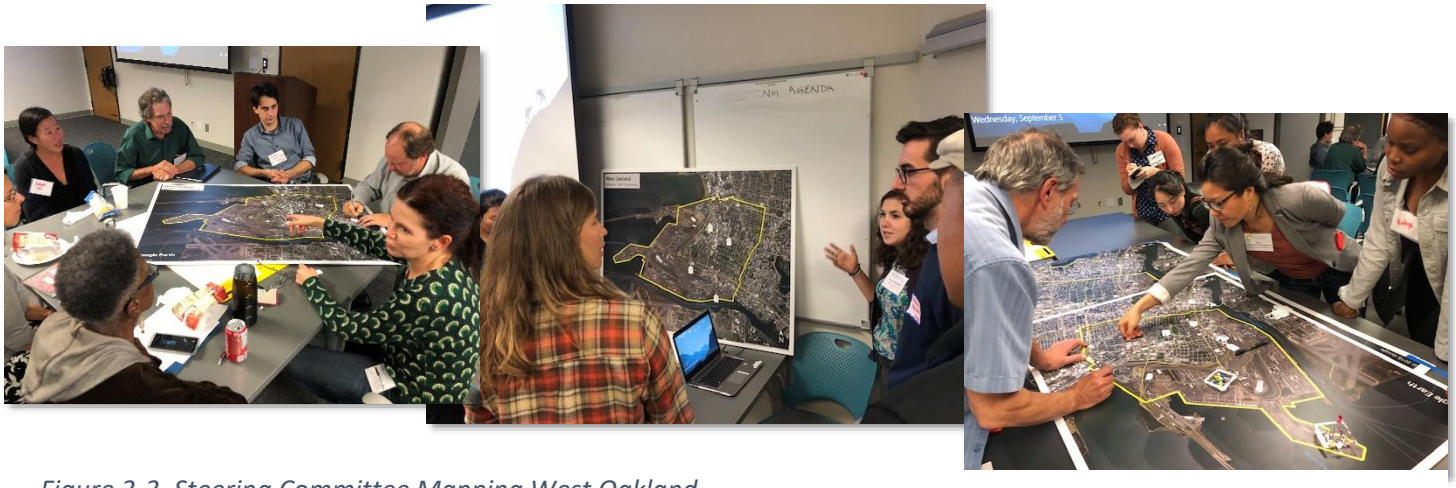


Figure 3-3. Steering Committee Mapping West Oakland

In January 2019, the Steering Committee performed a gap analysis of existing and proposed plans that affect the area, determining additional needs and identifying additional emissions reduction strategies to address these gaps. The Steering Committee voiced support for land use and transportation strategies to move truck related businesses, relocate truck parking and truck routes out of residential neighborhoods in West Oakland, require indoor air filtration, and advocate for more enforcement to respond to truck parking, routing, and idling complaints.

In February 2019, the Steering Committee discussed Environmental Defense Fund (EDF) geographic impact zones, which are areas with the highest impacts from air pollution. The Steering Committee worked on an impact zone exercise to prioritize strategies and develop tools for addressing problem areas.

Spring 2019

In March 2019, the Air District presented the preliminary findings from the air quality modeling work to the Steering Committee (see Chapter 5). The presentation explained how modeling can help identify the air pollution sources in West Oakland at the neighborhood-level, block-by-block. The presentation included maps of air pollution at seven zones within West Oakland. The presentation and maps also identified West Oakland's proportion of air pollution from *local* sources, versus the proportion of air pollution from *regional* sources.

That same month, the Steering Committee reached agreement on draft Strategies. In April 2019, the Steering Committee discussed the Plan goal and targets (see Chapter 4) and examined possible metrics and methods to track progress. In May 2019, the Steering Committee began to consider the Plan implementation phase. In June 2019 the Steering Committee convened a panel of agency leaders to discuss implementation, reflecting the fact that progress in local air quality and health will require actions by multiple governmental agencies and other stakeholders. Later in June and in July 2019, the Steering Committee reviewed and commented on a confidential draft of this Plan.

Summer 2019

In June 2019, the Steering Committee had two meetings. On June 5, representatives from CARB, City of Oakland, Alameda County Public Health Department, Port of Oakland, and Alameda County Transportation Commission spoke on a panel that discussed how to successfully implement the Plan. On June 26, the Steering Committee reviewed and commented on an internal draft of *Owning Our Air*. Between the June 26 meeting and July 8, the Steering Committee submitted approximately 100 comments in person, via email, and through Open Air Forum, the Air District's web-based commenting platform.

At the July 10 Steering Committee meeting, WOEIP and Air District staff updated the Steering Committee on the status of responses to the Steering Committee's comments on the internal draft Plan. The Steering Committee was again given an opportunity to comment on the internal draft. The Steering Committee gave direction to the Co-leads to continue making updates based on Steering Committee's comments, and to release the public draft of *Owning Our Air*. On July 23, the draft *Owning Our Air* was released for public review and comment. A press release and e-blast were sent from the Air District to interested parties. On July 24, the Draft Environmental Impact Report for the draft *Owning Our Air* was also released.

After releasing the public draft of *Owning Our Air*, the Steering Committee met on August 7 to prepare for the August 17 Town Hall meeting to introduce *Owning Our Air* to the public. The Town Hall was well attended by 108 people, representing West Oakland residents, community leaders, business owners, and other stakeholders. Opening remarks were made by John Bauters, Air District Board Member and Emeryville Council Member; Ms. Margaret Gordon, WOEIP co-founder; Libby Schaaf, Mayor, City of Oakland; Honorable Nancy Skinner, California State Senator, District 9; and Honorable Rob Bonta, California Assembly Member, 18th Assembly District. Four Steering Committee members representing BayPorte Village Neighborhood Watch, New Voices are Rising, Prescott Oakland Point Neighborhood, and AB Trucking provided their perspectives on why they became involved and their participation in the Plan's development. Representatives from the Air District, CARB, Port of Oakland, and City of Oakland all spoke about their agency's commitment to implementing the Plan.

Meeting agendas, materials, and presentations from all Steering Committee meetings listed above are available at www.baaqmd.gov/ab617woak.

LOOKING AHEAD

In the fall, the Air District Board of Directors will conduct a hearing and consider adopting the Plan and submitting the Plan to CARB. In December, CARB will meet in West Oakland to conduct a hearing on the Plan and consider approving the Plan. Upon approval of the Plan, the Steering Committee will continue to meet quarterly to advance and track Plan implementation.

Chapter 4 – Goal and Targets

The goal of the Plan is to protect and improve community health by eliminating disparities in exposure to local air pollution. The 2025 targets seek to improve air quality exposure in West Oakland neighborhoods so that all neighborhoods meet the exposure conditions of today's average West Oakland neighborhood. The 2030 targets seek to improve air quality exposure in West Oakland neighborhoods so that all neighborhoods meet the exposure conditions of today's least polluted West Oakland neighborhood. This chapter describes the development of the goal and targets. The goal and targets will serve as a framework to measure Plan implementation progress.

GOAL DEVELOPMENT

The Steering Committee developed the Plan goal after careful consideration, which included sharing and listening to each other's knowledge of West Oakland. This collective knowledge of West Oakland includes observations about the location of air pollution sources and the location of people in West Oakland.

Observations about air pollution sources in West Oakland included the source type, including mobile sources such as trucks, and stationary sources such as the East Bay Municipal Utility District facility. Observations about the location of people in West Oakland included residential areas, schools, parks, and hospitals. The Plan incorporates this local knowledge and allows the Steering Committee to consider both emissions and exposure to emissions at the neighborhood level, block-by-block, in West Oakland.

The Steering Committee also considered technical presentations from the Air District, CARB, the Environmental Defense Fund, and others. The Air District presented information about each agency's programs, providing data at the local, regional, and state level. The Environmental Defense Fund presented findings from data collection studies in West Oakland.

The Steering Committee learned that all Bay Area communities are exposed to air pollution. For example, Figure 4-1 presents the estimated cancer risk from regional and local air pollution in West Oakland based on the Air District's regional and local model estimates. In West Oakland, an additional excess cancer risk of 425 per million people can be attributed to air pollution sources outside of West Oakland that affect all Bay Area communities, while an excess cancer risk of 200 per million people can be attributed to modeled local air pollution sources.[23] This additional local risk is primarily due to the large number of goods movement, infrastructure, and industrial uses within the Plan area.

[23] As stated in Chapter 2, only 26,000 people live in West Oakland. However, health professionals typically express cancer risk per one million people.

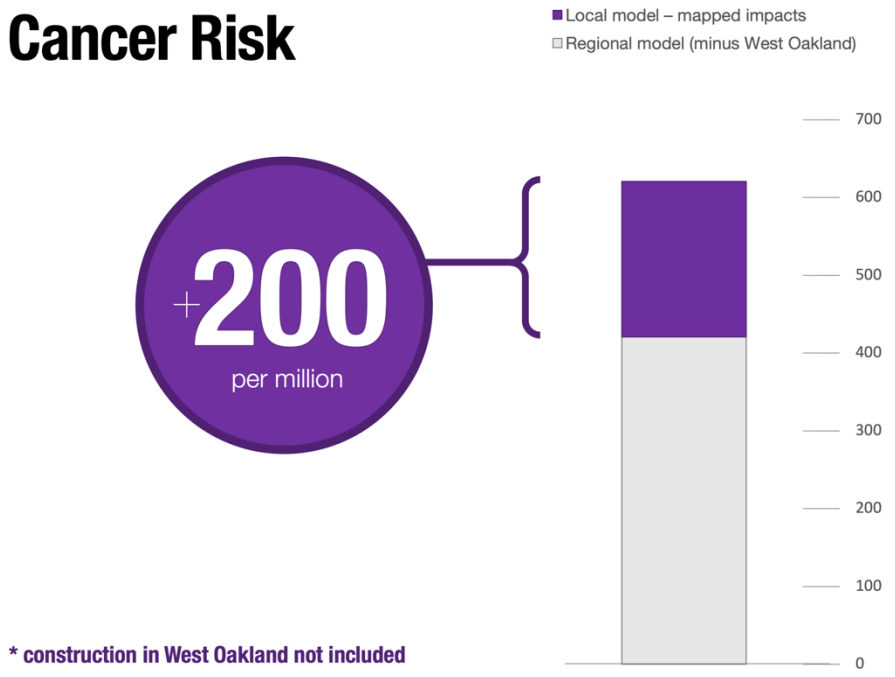


Figure 4-1. Regional and Local Cancer Risk in West Oakland (see Table 5-1 for a complete list of sources included and not included in the model)

The Steering Committee further investigated how different neighborhoods experience different levels of air pollution exposure. To better understand local variations in air pollution, the Steering Committee studied maps developed by the Environmental Defense Fund (EDF) showing local air quality measurements collected from May 2015 to May 2016 throughout West Oakland. Figure 4-2 displays areas identified by WOEIP and EDF as residential neighborhoods that experience higher pollution levels.[24] The red dots are locations where black carbon was measured above the median in West Oakland. The blue areas represent residential land-use parcels. The Steering Committee focused on developing strategies intended to eliminate the local disparity in exposure to air pollution in the numbered zones.

[24] The maps are generated using air pollution measurements collected in a study by the Environmental Defense Fund and partners and published in Environmental Science & Technology Journal 2017 51 (12), 6999-7008, https://pubs.acs.org/doi/pdf/10.1021/acs.est.7b00891?rand=3y8c9oq7.

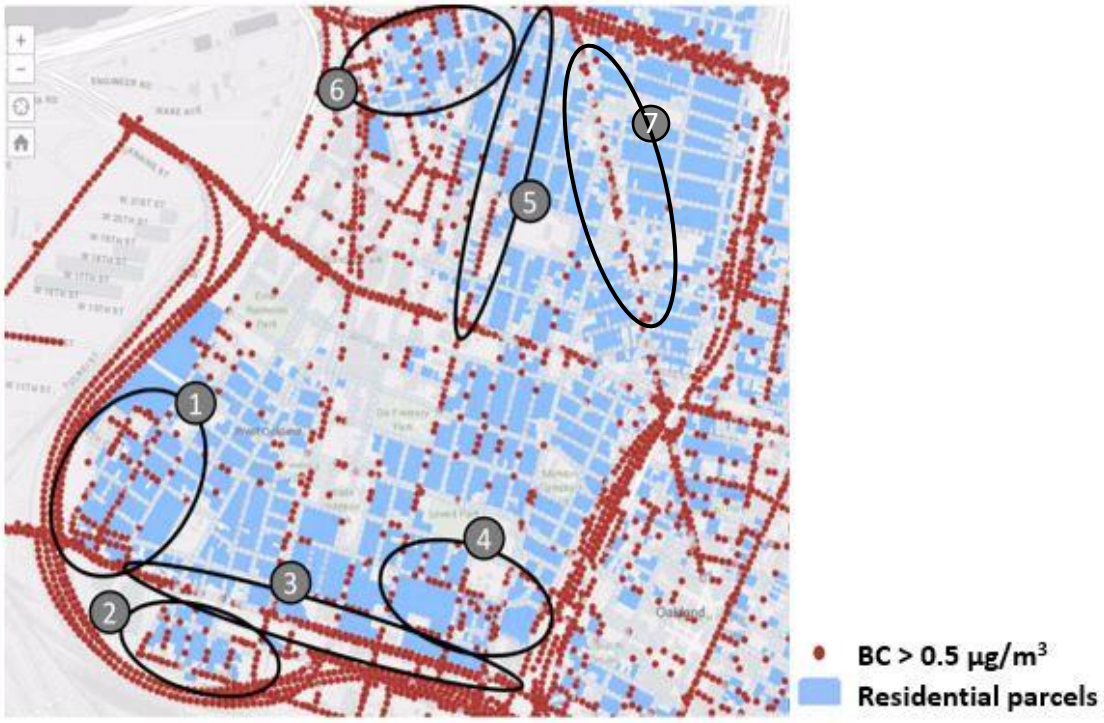


Figure 4-2. West Oakland Neighborhood Zones and areas with high measured levels of black carbon

Building on the neighborhood zones identified by WOEIP and EDF, the Air District used its local model to estimate exposure to various pollutants in West Oakland at the neighborhood level. For example, Figure 4-3 shows variations in cancer risks across West Oakland that the Air District's local model attributes to local sources. Cancer risk from local sources ranges from a high of approximately 350 per million (3rd Street) to a low of 110 per million in the Hoover-Foster neighborhood. Figure 4-3 also presents the contribution from the port, rail, and truck categories in the zones with the highest cancer risk. More details about the modeling and emissions are presented in Chapter 5.

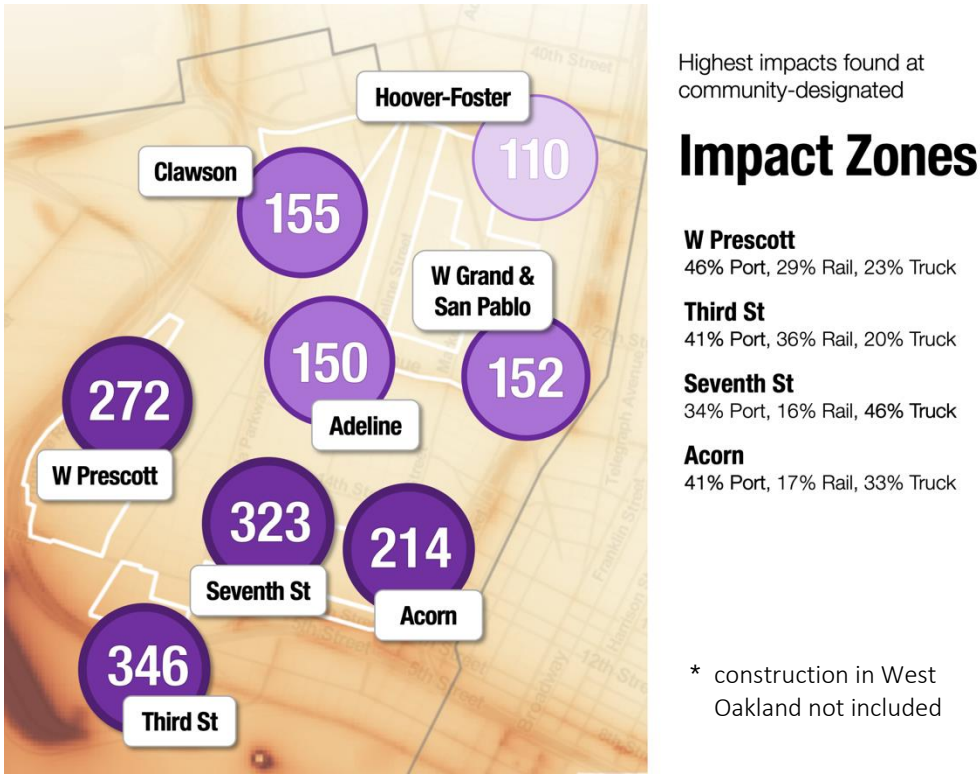


Figure 4-3. West Oakland Neighborhoods with Different Local Cancer Risks

TARGET DEVELOPMENT

The Plan targets will help the Steering Committee determine if we are on track to meet the Plan's goal. The Steering Committee developed the Plan targets to address disparities within West Oakland. Addressing disparities in exposure to air pollution within West Oakland will also help make progress towards eliminating disparities between West Oakland and the Bay Area at large. The targets can be described as follows:

- **By 2025**, throughout West Oakland, all neighborhoods will experience conditions of the ***average*** West Oakland residential neighborhood, as they existed during the base year (2017).

- **By 2030,** throughout West Oakland, all neighborhoods will experience conditions of the ***least*** impacted residential neighborhood during the base year (2017), i.e., today's "cleanest" neighborhood in West Oakland.

Presented below are the specific targets for diesel PM, $PM_{2.5}$, and cancer risk, which address emissions and exposure from local sources only. The targets define the desired future conditions which are based on the baseline (2017) model year findings. In addition, these conditions reflect the impact of local sources excluding the regional background. More details on the development of the targets based on the emissions inventory and modeling is provided in Chapter 5.

Diesel Particulate Matter (diesel PM) Target

- By 2025, local emission sources will contribute to the average West Oakland residential neighborhood a concentration of diesel PM of no more than 0.25 $\mu g/m^3$ (micrograms per cubic meter).
- By 2030, local emission sources will contribute to the average West Oakland residential neighborhood a concentration of diesel PM of no more than 0.13 $\mu g/m^3$.

Fine Particulate Matter ($PM_{2.5}$) Target

- By 2025, local emission sources will contribute to the average West Oakland residential neighborhood a concentration of $PM_{2.5}$ of no more than 1.7 $\mu g/m^3$.
- By 2030, local emission sources will contribute to the average West Oakland residential neighborhood a concentration of $PM_{2.5}$ of no more than 1.2 $\mu g/m^3$.

Cancer Risk Target

- By 2025, local emission sources will contribute to the average West Oakland residential neighborhood a cancer risk of no more than 200 in a million.
- By 2030, local emission sources will contribute to the average West Oakland residential neighborhood a cancer risk of no more than 110 in a million.

Emission Reduction Targets

Achieving these equity-based concentration targets will require reducing emissions from sources impacting the West Oakland community. The Air District has worked with the Steering Committee and CARB to define and quantify emissions reduction targets that support tracking progress towards the Plan's goals. Chapter 6 discusses how specific measures in the Plan, for which we can quantify emission reductions, produce concrete emission reductions for diesel PM, $PM_{2.5}$, and other toxics and make progress toward the equity-based targets.

The reduction benefits quantified in Chapter 6 are the Plan's emission reduction targets.

Table 6-1 shows the differences in diesel PM emissions in 2024 forecasts with and without the Plan compared to the base year. The total diesel PM emission benefits of the Plan in 2024 relative to 2024 without the Plan is about -2.4 tons per year (-10.5%). The reductions in diesel PM in 2024 with the Plan relative to the base year is about -7.5 tons per year (-27%). As shown in Table 6-1, the emission reduction target for diesel PM of 2.4 tpy is largely driven by reductions in emissions from port-related sources (1.9 tpy).

Table 6-2 shows the differences in cancer risk-weighted emissions in 2024 forecasts with and without the Plan compared to the base year. There is about a 12% reduction in total cancer risk-weighted toxic emissions from the Plan in 2024, relative to 2024 without the Plan. There is about a 27% reduction in cancer risk-weighted toxic emissions in 2024 with the Plan, relative to the base year. As shown in Table 6-2, while the cancer risk-weighted emissions are an aggregation of multiple air toxic compounds, diesel PM is responsible for over 90% of total cancer risk in West Oakland. Therefore, the emission reduction target for diesel PM addresses cancer risk, and targets were not established for any other

individual air toxic compound. (See Appendix A, Part 1, Section 4.1.3 for a discussion of cancer risk modeling and assessment.)

Table 6-3 shows the differences in $PM_{2.5}$ emissions in 2024 forecasts with and without the Plan compared to the base year. The total $PM_{2.5}$ emission benefits of the Plan in 2024, relative to 2024 without the Plan, is about -3.7 tons per year (-3%). The reductions in $PM_{2.5}$ in 2024 with the Plan, relative to the base year, is about -0.4 tons per year (-0.3%). For $PM_{2.5}$, the emission reduction target is 3.7 tpy, which is, and are primarily associated, with port-related sources (1.8 tpy) and road dust from surface streets (1.46 tpy).

An important finding of the technical assessment for the Plan is that the quantifiable emission reductions identified so far do not achieve the equity-based targets: more emission reductions, from sources yet to be determined, or analyzed, are needed. For example, we expect progress towards achieving the equity-based targets will also come from land use policies and other Strategies identified but not quantified in this Plan.

PROXIMITY-BASED GOALS

The CARB Community Air Protection Blueprint calls for plans prepared under AB 617 to include proximity-based goals to reduce exposure at sensitive receptors. Reducing exposure of the most vulnerable members of the community is a priority of this Plan. Steering Committee members helped identify sensitive receptor locations in West Oakland and developed strategies to reduce exposure in these areas. Figure 2-11 shows residential areas, schools, and other sensitive receptor locations in the Plan area, whereas Figure 4-2 shows “impact zones” in West Oakland that are exposed to higher local levels of pollution and that are the focus of this Plan’s strategies. Many of the strategies in this Plan will help reduce exposure for sensitive receptors, such as measures addressing conflicting land uses, relocating truck routes, planting trees and other vegetative barriers, installing high efficiency air filtration, and other approaches. During Plan implementation, the Steering Committee will emphasize strategies that provide the greatest benefit to the most vulnerable people and locations.

SUMMARY

The goal to protect and improve community health by eliminating disparities in exposure to local air pollution reflects the stark reality that such local disparities in exposure exist. The Steering Committee will track progress towards the goal during the Plan implementation phase based on the metrics in the Plan targets. The 2025 targets are to improve air quality exposure in West Oakland neighborhoods so that *all* neighborhoods meet the exposure conditions of today’s *average* West Oakland neighborhood. The 2030 targets are to improve air quality exposure in West Oakland neighborhoods so that *all* neighborhoods meet the exposure conditions of today’s *least polluted* West Oakland neighborhood, Hoover-Foster. Achieving the exposure conditions in the least polluted West Oakland neighborhood puts West Oakland on path towards eliminating the difference between exposure in West Oakland and the rest of the Bay Area. Figure 4-4 summarizes the goal and targets for the Plan.

The 2025 and 2030 targets are ambitious for the five- and ten-year timeframes. The Steering Committee and other stakeholders also expressed support for eliminating the disparity between air

quality in West Oakland and the least polluted Bay Area communities. The Co-leads absolutely support and recognize this desire. It is reflected in the Plan Goal but should be considered too aspirational for a target within the Plan's timeframe.

GOAL

To protect and improve community health
by eliminating disparities in exposure to local air pollution.

	BASELINE Baseline conditions in West Oakland in the year 2017.	2025 TARGET All neighborhoods experience West Oakland's ***average*** air quality.	2030 TARGET All neighborhoods experience West Oakland's ***best*** air quality.
Diesel PM	0.30 µg/m^3	< 0.25 µg/m^3	< 0.13 µg/m^3
$PM_{2.5}$	1.70 µg/m^3	< 1.70 µg/m^3	< 1.20 µg/m^3
Cancer Risk	204 in a million	< 200 in a million	< 110 in a million

Figure 4-4. Goal and Targets for the Plan

Chapter 5 – Technical Assessment

Various agencies and organizations have analyzed air pollution extensively in West Oakland. For over 20 years, WOEIP has conducted local air pollution measurements, truck surveys, and other activities to better understand local pollution sources. Recently, WOEIP partnered with the Environmental Defense Fund, Google, and Aclima to conduct detailed air pollution measurements in all West Oakland neighborhoods. In 2008, CARB and the Air District collaborated on an assessment of local health risk due to diesel particulate matter. In 2009, WOEIP and the Air District collaborated on a truck traffic survey that revised some of the assumptions made in the health risk assessment about truck traffic in West Oakland. Through the Community Air Risk Evaluation Program (CARE), the Air District conducted additional air pollution modeling and measurement studies to better understand local sources and concentrations. Most recently, to support this Plan, the Air District has developed detailed estimates of local pollution sources and local air pollution concentrations. This chapter and the Technical Support Documentation in Appendix A describe the technical assessments underlying this Plan.

OVERVIEW

To support the Steering Committee's selection of strategies and targets, the Air District conducted extensive technical analysis of air quality impacts in West Oakland. The technical analysis focused on two key questions:

Question 1. *What sources contribute most to community impacts from air pollution in West Oakland?*

Question 2. *How much must emissions be reduced, and from what sources, to meet the community's goals?*

For definitions of technical terms, including the following, please see the Glossary:

- Intensity
- Emissions
- Concentrations
- Average concentrations
- Exposures

APPROACH

The Air District devoted technical resources to creating and using computer-based simulations, or models, to answer the two questions above. Our approach to the technical assessment was guided by the key aims identified by our community partners. The key aims include: (a) eliminating air quality disparities, (b) taking pollution receptor proximity into account, and (c) focusing on local sources. By using models, and a general assessment of the air pollution emissions in West Oakland, the Air District could address Question 1, and thereby guide the policy choices needed to answer Question 2, in a way that supported these aims.

The Air District accomplished this by determining which local sources contribute most to air pollution at any given location in West Oakland, including, but not limited to, places of specific concern to the community—the impact zones discussed in Chapter 4.

MODELING AREAS

Two types of models were applied to represent air pollution levels in West Oakland. First, a regional-scale model that covers the entire Bay Area was applied to understand the contributions made by sources outside West Oakland. The regional-scale model applied was the Community Multiscale Air Quality (CMAQ) Modeling System, supported by the U.S. Environmental Protection Agency and used for estimating levels of smog, PM, and toxics within a regional airshed. This regional-scale modeling zeroed out emissions from West Oakland sources, so that only impacts from outside sources would be represented.

Why Model When You Can Measure?

Since there have been several recent measurement studies in West Oakland, why does this technical assessment adopt a modeling approach? With instrument-based **measurements**, we can *quantify* and *compare "what is."* For example, the West Oakland Street View study helped address the question, "How much black carbon do we find on each street?" Or, "Where is black carbon highest?" This is very useful. But black carbon measurements are often less useful for determining "*why it is*." With computer-based **models**, we can better *diagnose and explain.* With modeling, we can help address the question: Where does the diesel particulate matter come from? What sources are responsible, and which contribute the most?

Second, a community-scale model, nested within the regional-scale model, was applied to determine the contribution of sources for which data were available within West Oakland to impacts in the community. The community-scale model applied was a simplified plume model supported by U.S. EPA (AERMOD) that can produce more fine-grained air pollution concentration estimates near sources than the regional model, leading to more accurate estimates of impacts within the community. This community-scale model was used to calculate results at locations spaced 20 meters apart (about 65 feet) to provide hyper-local, block-by-block, information.

Both models, the regional-scale and the community-scale, simulated a full year to estimate *annual average concentrations* of air pollution levels in West Oakland for 2017, the baseline year for this technical assessment. The baseline was set to 2017 because this was the year with the most recent emissions information available when the technical assessment began in late 2018. The Technical Support Documentation (Appendix A) has details on these models and their application.

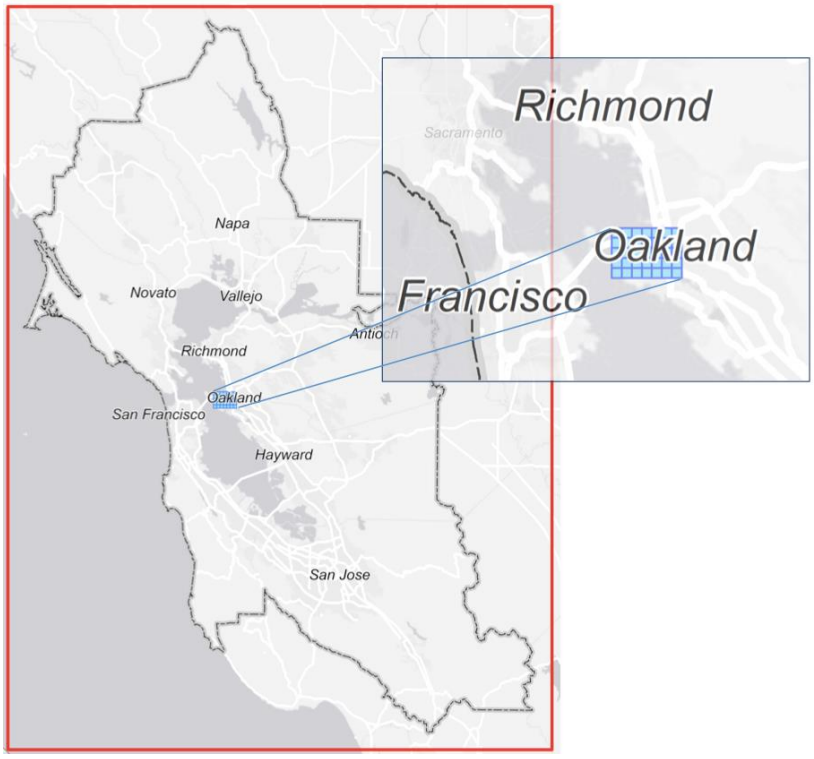


Figure 5-1. Regional-Scale Modeling Area

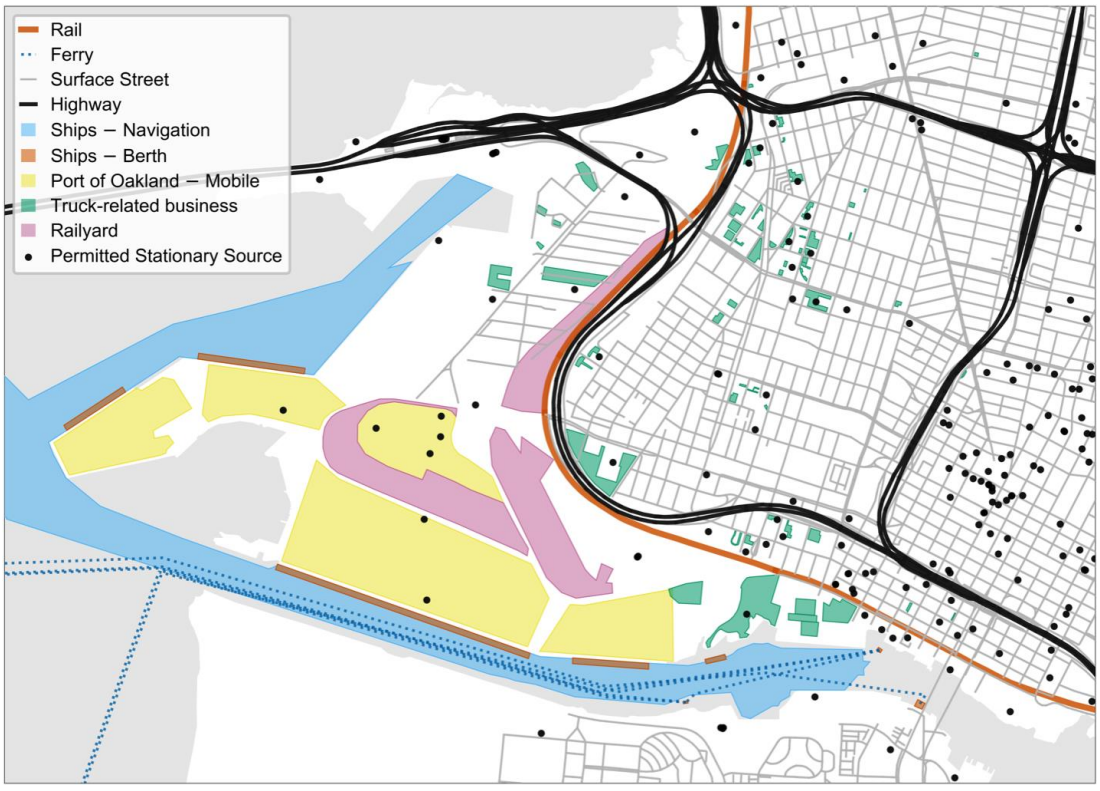


Figure 5-2. West Oakland Community-Scale Modeling Area with Locations of Modeled Emissions

Figure 5-1 shows the area covered by the regional-scale model (red rectangle). The area of the community-scale modeling is shown as blue squares, expanded in the inset. The Air District boundary is outlined (grey dashed line). White lines show major roadways. Figure 5-2 zooms in to more clearly show the area covered by the community-scale model, and the types and locations of air pollution sources that were included. All sources shown in Figure 5-2 were included in the community-scale modeling.

To determine air pollution *exposures* of West Oakland residents, we need maps of air pollution *concentrations*, which the community-scale modeling provides. We also need to know where people are. To represent the locations of people in the community, the Steering Committee agreed to use the latest Census population information. The latest decennial U.S. Census, conducted in 2010, provides residential population counts at the Census block level, as mapped in Figure 5-3. In this figure, Census blocks with a higher percentage of West Oakland's residential population are mapped in darker shades. Census blocks with no residential population are not shaded.

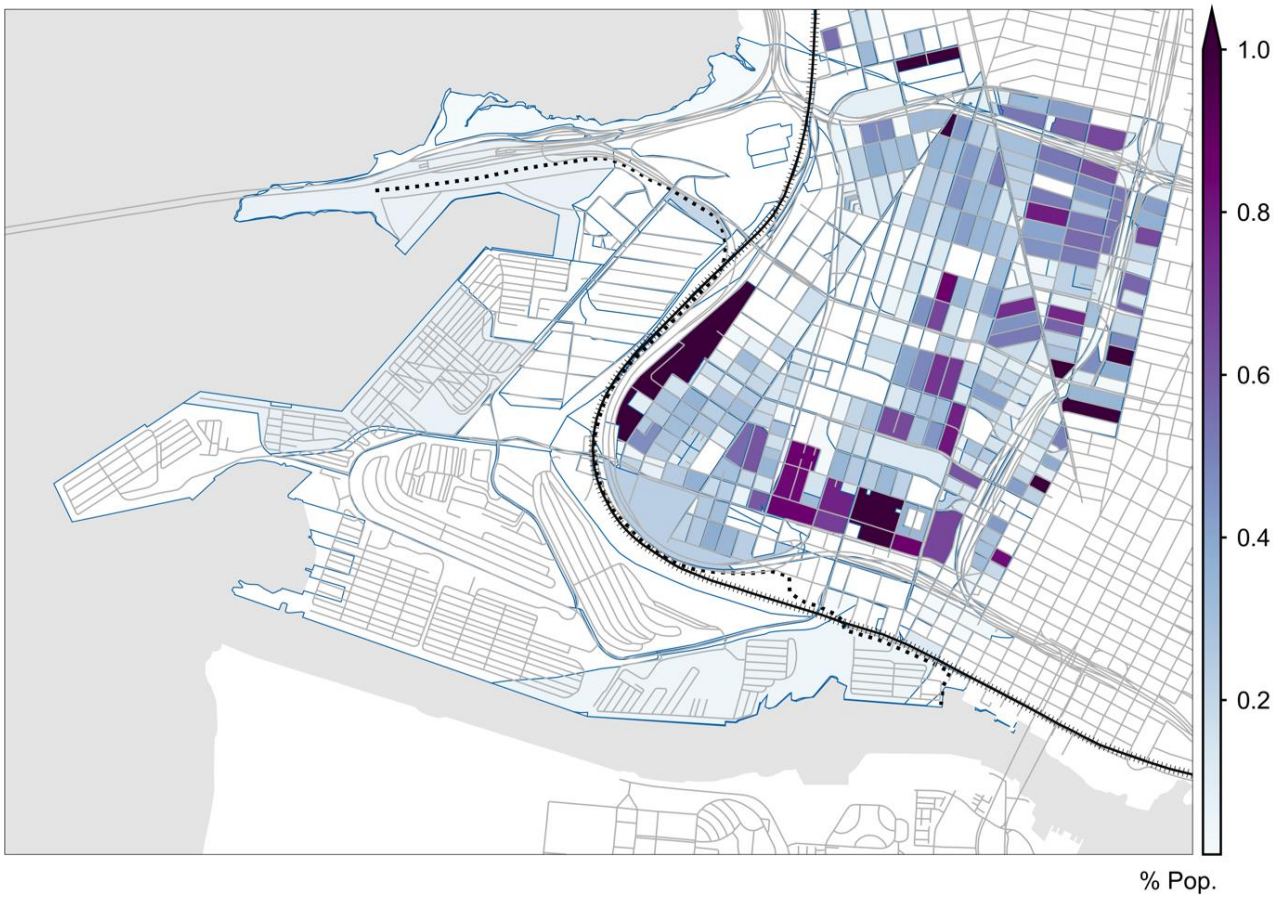


Figure 5-3. Percent of West Oakland Population by Census Block

POLLUTANTS, SOURCES, AND EMISSIONS

In the Plan's technical assessments of impacts, the Air District focused on the following:

- Diesel PM;
- Fine particulate matter ($PM_{2.5}$); and
- Cancer risk posed by toxic air contaminants.

As discussed in Chapter 1, these three pollutants — especially diesel PM — have been identified by our community partners, and by previous work, as being the air pollutants of greatest concern in West Oakland.

This Plan estimates emissions of the pollutants listed above for most known major sources of air pollution in West Oakland. Table 5-1 lists all these sources of air pollution. However, the community-scale modeling only included sources for which locations and activity could be determined within the timeframe of the Plan schedule. The sources that were both inventoried and modeled are shown on the left side of Table 5-1; the right side shows the sources that were inventoried but not modeled.

Table 5-1. List of West Oakland Sources Inventoried and Modeled vs. Inventoried Only

Sources Included in Community-Scale Modeling	Sources Inventoried Only
Highway	**Some stationary sources**
On-road vehicles, like cars and trucks, including exhaust, fuel evaporation, brake & tire wear, and road dust	Restaurants
Street	Food & agriculture
On-road vehicles, like cars and trucks, including exhaust, fuel evaporation, brake & tire wear, and road dust	Residential wood burning
Port	Commercial & industrial fuel combustion
Ships maneuvering & berthing, harbor craft, dredging, bunkering, Port trucks, cargo handling equipment, and OGRE & BNSF railyards	Smaller industrial processes
Rail	Solvent uses
Rail lines (including passenger rail), and UP railyard	Consumer products
Permitted	**Some non-road sources**
Schnitzer, EBMUD, Dynegy, Pinnacle Ag Services, Sierra Pacific, CASS, California Cereal, CA Waste (10th St), and many others	Construction equipment
Other	Construction dust
Ferries, Schnitzer (ships), Schnitzer trucks and other truck-related businesses	Commercial & industrial mobile equipment
	Lawn & garden equipment
	Transport refrigeration units (TRUs)

Emissions summaries for all these sources are shown in Table 5-2 for $PM_{2.5}$, diesel PM, and cancer risk-weighted toxics. This inventory of emissions reflects current best estimates. Like all emissions inventories, these are estimates and subject to change as more and better information becomes available. The cancer risk weighting applied to toxic emissions does not produce an estimate of cancer risk; rather, it provides a way to rank emissions based on pollutant toxicity as well as the amount emitted.[25] The top portion of Table 5-2 lists emissions from sources both inventoried and modeled; the bottom portion lists emissions from sources inventoried but not modeled. From Table 5-2, one can calculate that most emissions of diesel PM (85%) and cancer-causing toxics (83%) were included in the community-scale modeling. About two-thirds (66%) of the $PM_{2.5}$ emissions were included in the community-scale modeling.

Construction equipment, which is a non-negligible source of diesel PM emissions and cancer risk (Table 5-2) and often operates close to people, was omitted from the modeled local sources due to lack of data on specific locations.[26] Construction equipment emissions were inventoried within West Oakland and were accounted for in the regional sources. While construction equipment emissions were not modeled, there are measures in the Plan that address construction-related emissions.

Transport refrigeration units have relatively small diesel PM emissions in West Oakland but may operate close to people in some parts of West Oakland. However, here again, data on specific locations were not available in time to include in the Plan.

Table 5-2 shows that commercial cooking (restaurants), residential fuel combustion (mostly wood burning), and construction (exhaust and dust) are sources that contribute about 30% of local $PM_{2.5}$ but emissions were not included in local modeling. These are all sources where information on specific locations of emissions was not readily available and could not be obtained in time for inclusion in the Plan. However, this emissions assessment, along with the direct experience of community members, did inform certain strategies to address these sources, as well as the need to further study these sources to better understand and reduce their impacts in the West Oakland community.

One of the larger sources of $PM_{2.5}$ in current estimates shown in Figure 5-2 is road dust. Road dust is both inventoried and included in the local modeling, but there is a high level of uncertainty in road dust emission estimates (few studies are available to evaluate them). Road dust emissions are estimated to be large and growing as traffic volumes increase over time. This assessment informed the addition of a street sweeping strategy in the Plan.

Figure 5-4 shows a visual summary of the top-level categories of emissions sources in Table 5-2.

[25] For example, diesel PM is more toxic than benzene, therefore a pound of emitted diesel PM gets a higher ranking than a pound of emitted benzene.

[26] While the Steering Committee expressed a strong interest in including construction in the modeling, the Air District determined that collecting the needed activity and locations of construction emissions, especially for future years, at the hyper-local scale of the modeling, would take too long to meet the Plan schedule.

Table 5-2. 2017 West Oakland Emissions Summary in tons per year (with cancer risk weighting for toxics)

Source	$PM_{2.5}$	Diesel PM	Cancer Risk-Weighted TACs[27]
West Oakland sources included in community-scale modeling			
Highway	**20.29**	**2.12**	**1,791**
Non-truck vehicles	12.23	0.19	331
HD/Medium HD trucks	2.48	1.84	1,392
Light HD trucks	0.41	0.09	69
Road dust	5.17	–	–
Street	**22.38**	**2.07**	**1,692**
Non-truck vehicles	4.82	0.09	183
HD/Medium HD trucks	2.44	1.88	1,434
Light HD trucks	0.35	0.09	76
Road dust	14.77	–	–
Port	**21.99**	**15.87**	**11,817**
OGV maneuvering	3.94	3.84	2,859
OGV berthing	7.83	4.31	3,212
Harbor craft	3.82	3.94	2,932
Dredging	1.12	1.16	864
Bunkering	0.27	0.28	209
Port trucks	0.93	0.50	372
Road dust	2.25	–	–
Cargo handling	1.59	1.58	1,177
OGRE Railyard	0.07	0.08	57
BNSF Railyard	0.17	0.18	136
Rail	**2.04**	**2.20**	**1,637**
Rail lines	1.02	1.09	810
UP Railyard	1.02	1.11	826
Permitted	**17.84**	**0.30**	**1,101**
Schnitzer (stationary)	5.20	–	823
EBMUD	3.99	0.09	110
Dynegy	1.96	< 0.01	1
Pinnacle Ag Services	1.48	–	–
Sierra Pacific	0.91	–	–
CASS	0.72	–	< 1
California Cereal	0.58	–	< 1
CA Waste (10th St)	0.46	–	–

[27] Appendix A describes the method applied for cancer risk weighting of toxic air contaminants (TACs).

Source	$PM_{2.5}$	Diesel PM	Cancer Risk-Weighted TACs[27]
Other	2.53	0.21	168
Other	**1.36**	**1.36**	**1,016**
Ferries	0.91	0.93	695
Schnitzer (ships)	0.30	0.30	225
Schnitzer (trucks)	0.04	0.01	8
Truck-related businesses	0.11	0.12	87
Total	**85.91**	**23.91**	**19,054**
West Oakland sources not included in community-scale modeling			
Area	**30.40**	**–**	**413**
Commercial cooking	20.63	–	9
Food and Agriculture	–	–	13
Residential fuel combustion	6.93	–	18
Commercial/industrial fuel combustion	2.30	–	17
Industrial processes	0.03	–	176
Solvent utilization	0.00	–	125
Consumer products	0.00	–	41
Other area sources	0.50	–	13
Non-road	**13.00**	**4.12**	**3,358**
Construction equipment	4.10	3.33	2,501
Construction dust	6.74	–	–
Commercial/industrial equipment	1.17	0.51	436
Lawn & garden equipment	0.12	0.02	79
Transport refrigeration units (TRUs)	0.24	0.26	192
Other non-road sources	0.63	0.00	151
Total	**43.40**	**4.12**	**3,771**
Grand Total	**129.31**	**28.03**	**22,825**

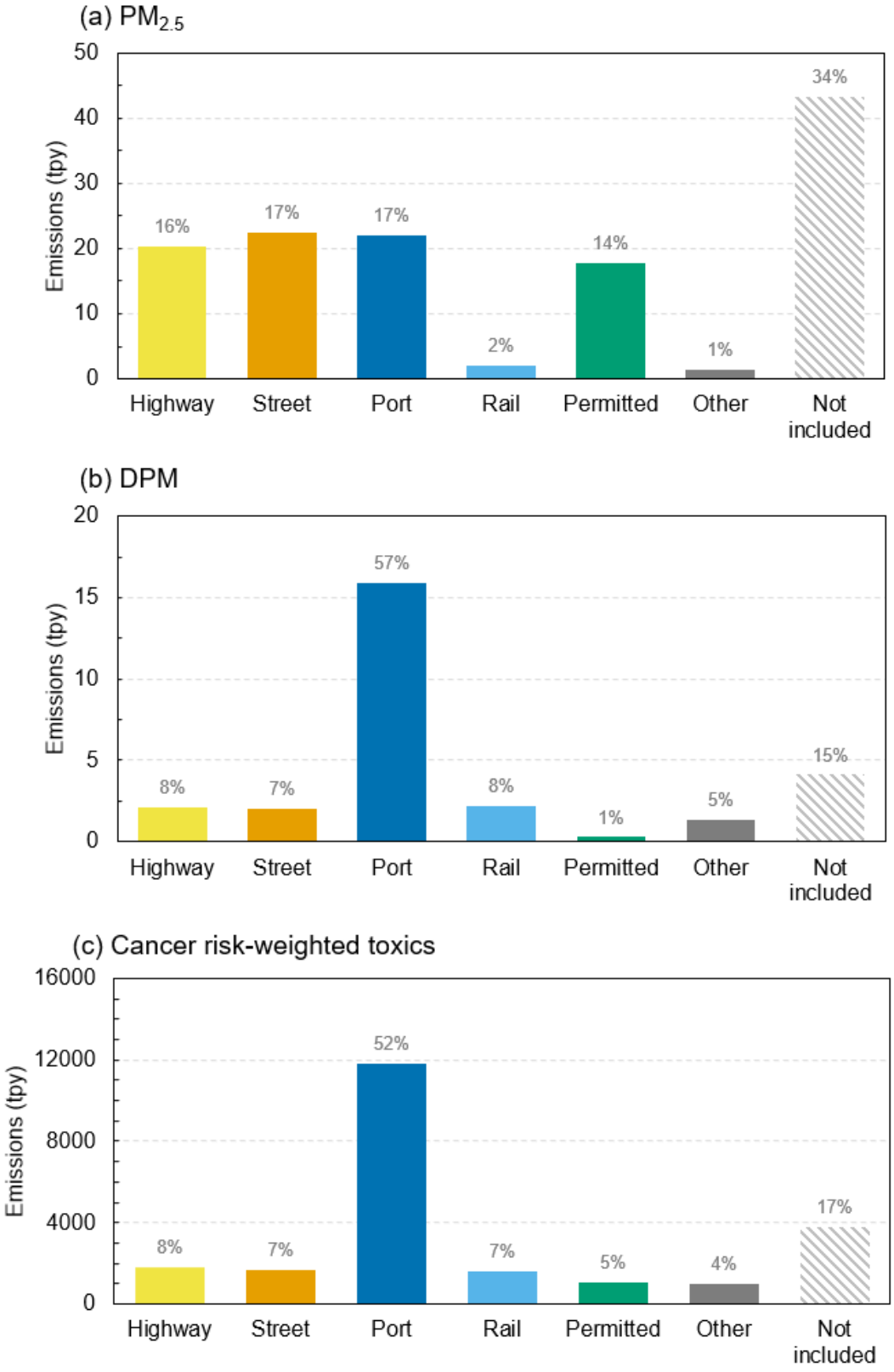


Figure 5-4. 2017 West Oakland Emissions Summary for Top-Level Source Categories in tons per year (with cancer risk weighting for toxics)

MEASURES OF IMPACT

The word "impact" is used throughout this chapter and in Chapter 6 where we report the assessed Plan benefits. We can assess the impacts of air pollution in several ways. The technical assessment for this Plan has focused on "residential impact." Residential impacts, and other kinds of impacts, are described below.

Concentration as impact. Figure 5-5 depicts an important kind of impact—the increased intensity of air pollution that is due to local sources. This intensity is quantified in terms of increased *average concentration*. The total concentration of diesel PM or $PM_{2.5}$ is the amount of material — soot and other particles — one would find on filters, after a specified amount of air is drawn through them. Figure 5-5 shows modeling estimates of annual average concentrations of diesel PM attributed to local sources in and around West Oakland. These modeling estimates are not total concentrations. They are the part of the total concentration that we are attributing, through modeling, to local sources.

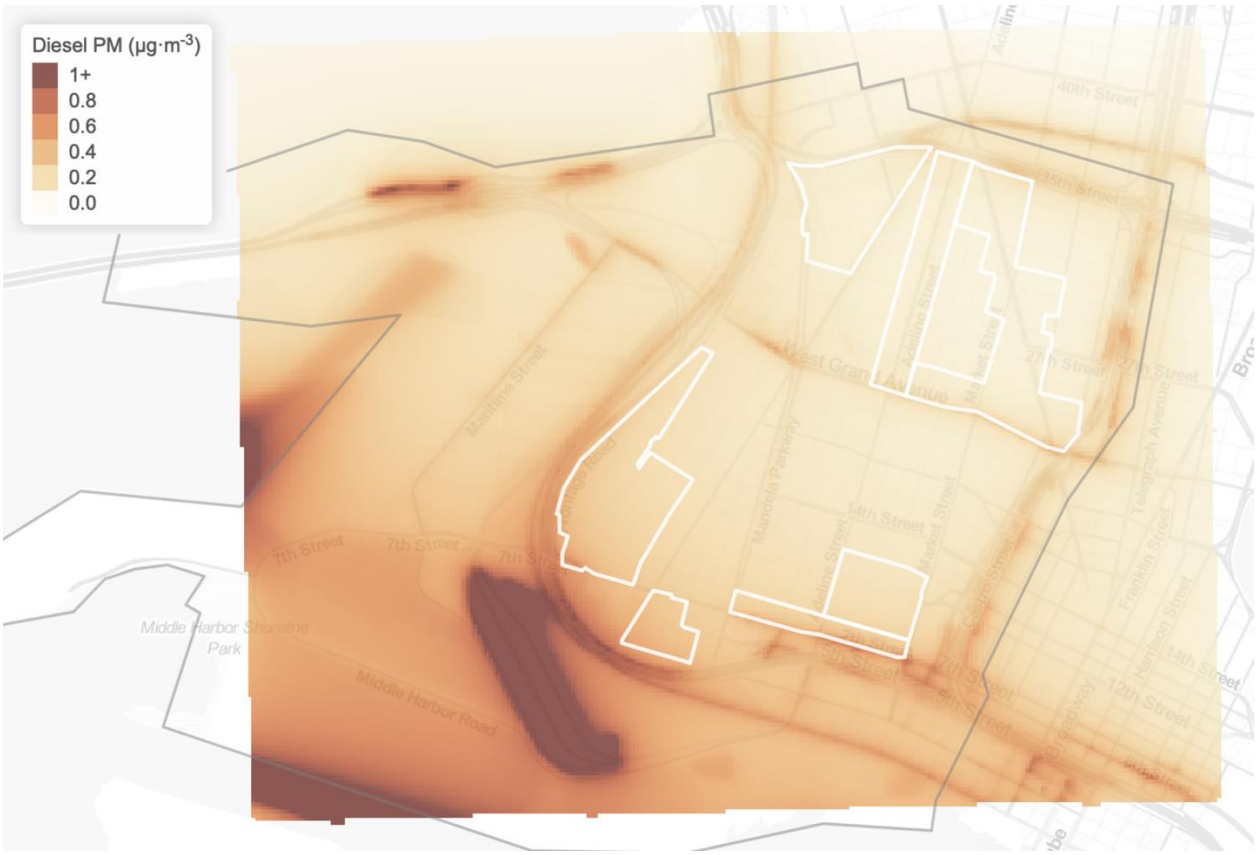


Figure 5-5. Intensity of Diesel PM Air Pollution Contributed by Local Sources in West Oakland (2017). (*Map tiles: Stamen Design; Data: OpenStreetMap)*

Exposure as impact. When we refer to *ambient concentration*, we are talking about the intensity of pollution in outdoor air, whether people are located there or not. *Exposure* is a way of expressing how intense the pollution is *where people are breathing it*. From a community-impact perspective, this second kind of impact is of greater concern.

Residential impact. Figure 5-6 shows an approximation of exposure to diesel PM, which we refer to as "residential impact." Each rectangle represents a Census block, with height proportional to the people living in the block. Because we do not know where every person is or what they are breathing all the time, we approximate it in a way that makes a practical, policy-relevant difference. In this analysis, we approximate exposure in terms of "residential impact." This is simply the average ambient (outdoor) concentration across each residential block in West Oakland, weighted by the number of people residing in that block.[28]

Figure 5-6 shows that there are unequal air quality impacts within West Oakland. Some people are closer to sources of air pollution and breathe dirtier air. The exposures indicated on the far right of Figure 5-6 are higher than those at the left. The average amount, when we account for the number of people exposed, is indicated by the black diamond in this figure. Reducing this disparity in exposure, these unequal impacts, is a central focus of this Plan. As discussed in Chapter 4, we carried out the assessment of unequal impacts by examining exposures within "impact zones." The Census blocks used to represent the impact zones in this assessment are shown in Figure 5-7. The Findings section of this chapter provides additional discussion of these unequal impacts.

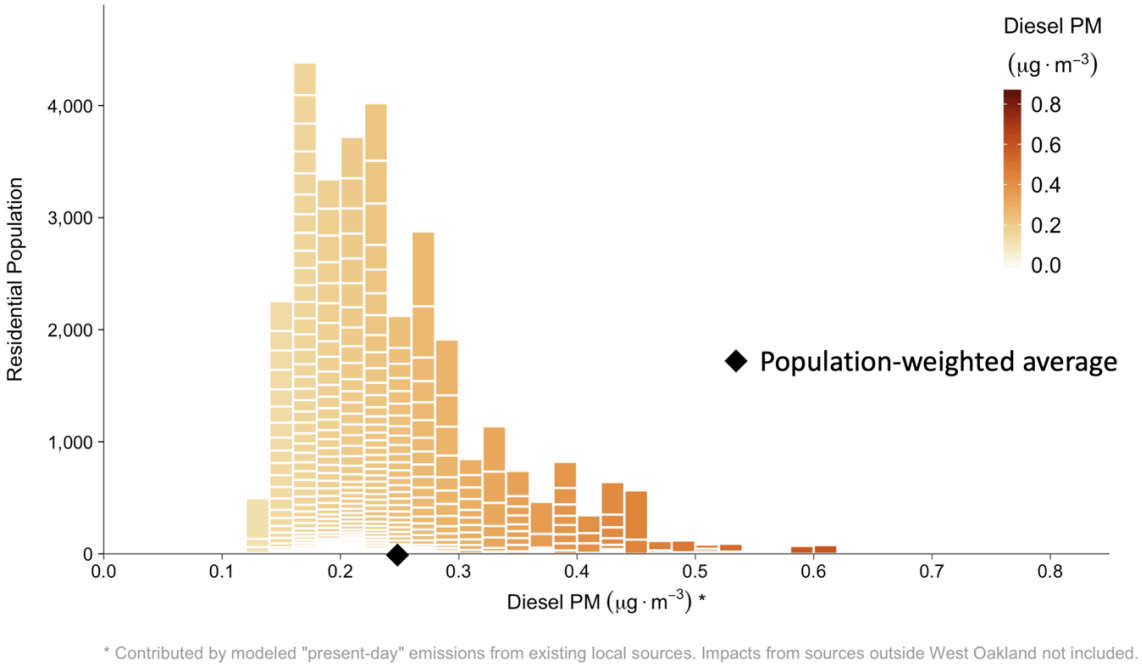


Figure 5-6. Unequal Impacts: Diesel PM Across West Oakland (2017)

[28] Because people spend some time away from their residence, and some time indoors, residential impact is not a perfect estimate of exposure. For example, it does not take into account whether or not the air that people are breathing is filtered outdoor air. Filtration is a key piece of several proposed Plan actions. Breathing filtered indoor air would reduce exposure, but "residential impact" only considers the quality of outdoor air. On the other hand, "residential impact" is a more useful metric than ambient concentration, because it takes the proximity of people into account. Also, it is the same approach used by most large, population-based, scientific studies of the health effects of ambient air pollution.

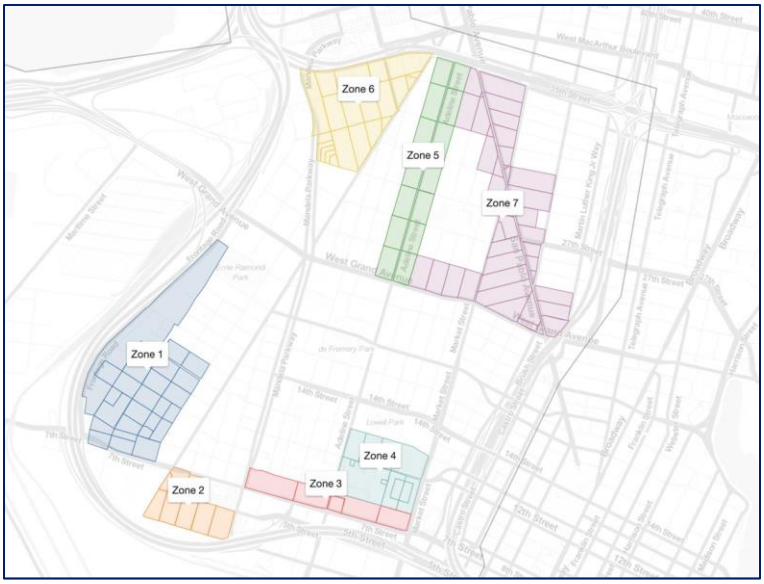


Figure 5-7. Local Impact Zones

FINDINGS: BASELINE (2017) CONDITIONS

This section presents answers to Question 1, "What sources contribute most to community impacts from air pollution in West Oakland?" The technical assessment addresses this using information from the community-scale modeling. No matter the pollutant, air pollution in West Oakland comes from either outside or within West Oakland. Because this Plan focuses on local actions to reduce emissions and exposure, one of the first questions our community partners asked was, "How much is local?"

HOW MUCH IS LOCAL?

This technical assessment used the regional-scale model (with West Oakland emissions omitted) to estimate the contribution of sources outside West Oakland and used the community-scale model to estimate the inside (or local) contribution. Figure 5-8 shows modeling-based estimates of the annual average concentrations across West Oakland of diesel PM, cancer risk, and $PM_{2.5}$, weighted by (residential) population. In each case, Figure 5-8 shows the portion of residential impact contributed from sources outside West Oakland (gray bars) versus from local sources (purple bars):[29] about 40% of diesel PM is local; about 30% of cancer risk is local; and about 20% of $PM_{2.5}$ is local.

Figure 5-8 shows that, for both diesel PM and cancer risk, the top local contributors to West Oakland average impacts are heavy-duty diesel trucks (about 40%), marine vessels (about 30%), and rail (about 20%). These estimates comprise trucks at all locations (port, street, or highway); marine vessels at all locations (including ferry berths, private berths, and the Port of Oakland); and locomotive activity at all locations (BNSF, OGRE, and UP railyards, as well as on rail lines anywhere in West Oakland), respectively. For $PM_{2.5}$, the top local contributors are road dust (about 40%), on-road cars and trucks (including exhaust and brake and tire wear, about 30%), and permitted sources (about 20%).

[29] As discussed above, construction equipment, restaurants, and wood burning were omitted from the "modeled local sources" due to lack of data on specific locations. They are accounted for under "regional sources."

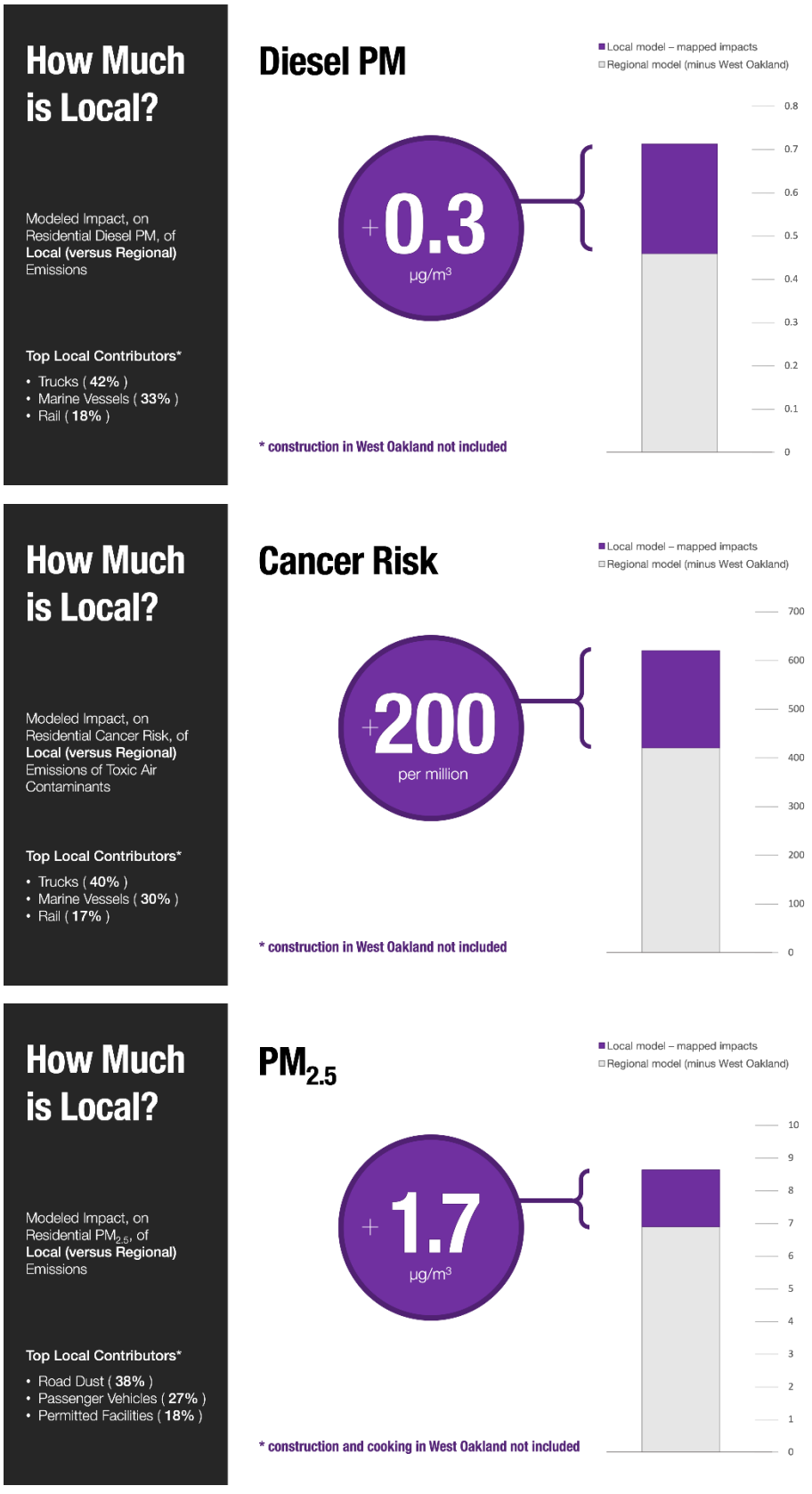


Figure 5-8. Local vs. Regional Contributions for Diesel PM, Cancer Risk, and $PM_{2.5}$

Road dust, to which over one-third of local fine particulate matter modeled impacts ($PM_{2.5}$) was attributed, is dust that has landed on a road and is kicked up into the air by passing vehicles. Road dust may be worth targeting with specific interventions. The residential impacts of road dust in West Oakland are due primarily to traffic on local streets, rather than highways. This estimate, which is large but uncertain, requires further study. For example, it may warrant a field measurement campaign to see whether the estimates (which are based on a few studies of road dust in other regions) are accurate enough to guide policy aside from increasing the frequency and quality of the street sweeping.

An important finding of this study is that the great majority – over 90% – of cancer risk from local air pollution in West Oakland is attributable to diesel PM. This is consistent with findings from previous studies by the Air District, CARB, and others. And much of the remaining cancer risk from other toxic air pollutants will be reduced by the Air District's recently adopted Rule 11-18.

IMPACTS VARY BY LOCATION

Contributions to impacts from local air pollution sources vary by location within West Oakland, as one would expect. As discussed in Chapter 2, West Oakland has grown over the decades into a community with some residential areas, schools, and recreation areas within close proximity to industrial sources, highways, and busy roadways. These land-use decisions that took place over decades have resulted in different impacts for different areas of West Oakland. Places that are closer to a specific source, like a highway or a rail line, are impacted more by that source. This technical assessment quantifies this influence. Whereas Figure 5-8 showed community-wide "average residential impact" across West Oakland, Figure 5-9 shows contributions and source apportionments at different locations: the community-identified local impact zones. For each of the pollutants, Figure 5-9 maps annual average concentrations from local sources. The pie charts in Figure 5-9 are located over the local impact zones; chart size indicates concentration levels for each impact zone and colors illustrate the share contributed by each source at each zone. For diesel PM (Figure 5-9a) and cancer risk (Figure 5-9b), concentrations increase from the top right, where highways and streets contribute a greater share, to the bottom left of each figure – where rail and Port of Oakland sources contribute more. For $PM_{2.5}$ (Figure 5-9c), concentrations are more varied. All zones see large contributions from streets. Zones 1 and 6 see sizable contributions from permitted sources. In Zone 1, about 20% of the contribution of $PM_{2.5}$ is from California Waste, a recycling and waste transfer facility, and about 10% is from Pinnacle Agriculture, a grain processing and shipping facility. In Zone 6, about 15% of the contribution is from Sierra Pacific, a ready-mix concrete supplier, and about 10% is from East Bay Municipal Utilities District wastewater treatment plant. In both these zones, fugitive $PM_{2.5}$ emissions, which are difficult to estimate and uncertain, make up a significant portion of the total contribution from permitted sources. More fine-grained, zone-specific tables are available in Appendix A and in online technical support resources.[30]

[30] Online Technical Support Resources provide more information about emissions and zone-specific impacts. Visit http://www.baaqmd.gov/ab617woak.

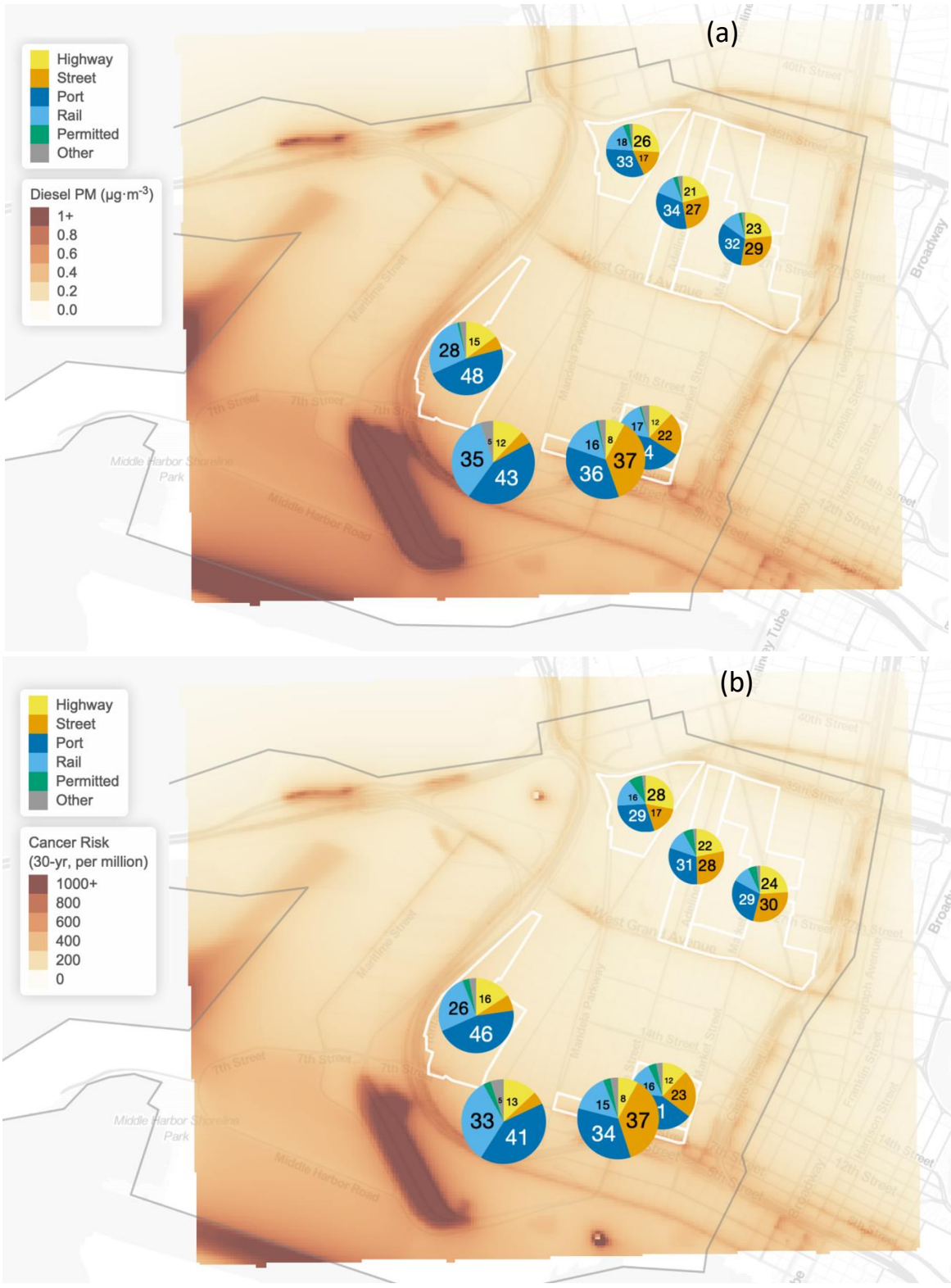


Figure 5-9. a-b. Pie Charts Showing the Mix of Sources Contributing to Local Enhancement of Ambient Concentrations (2017) for (a) Diesel PM and (b) Cancer Risk. (Map tiles: Stamen Design; Data: OpenStreetMap)

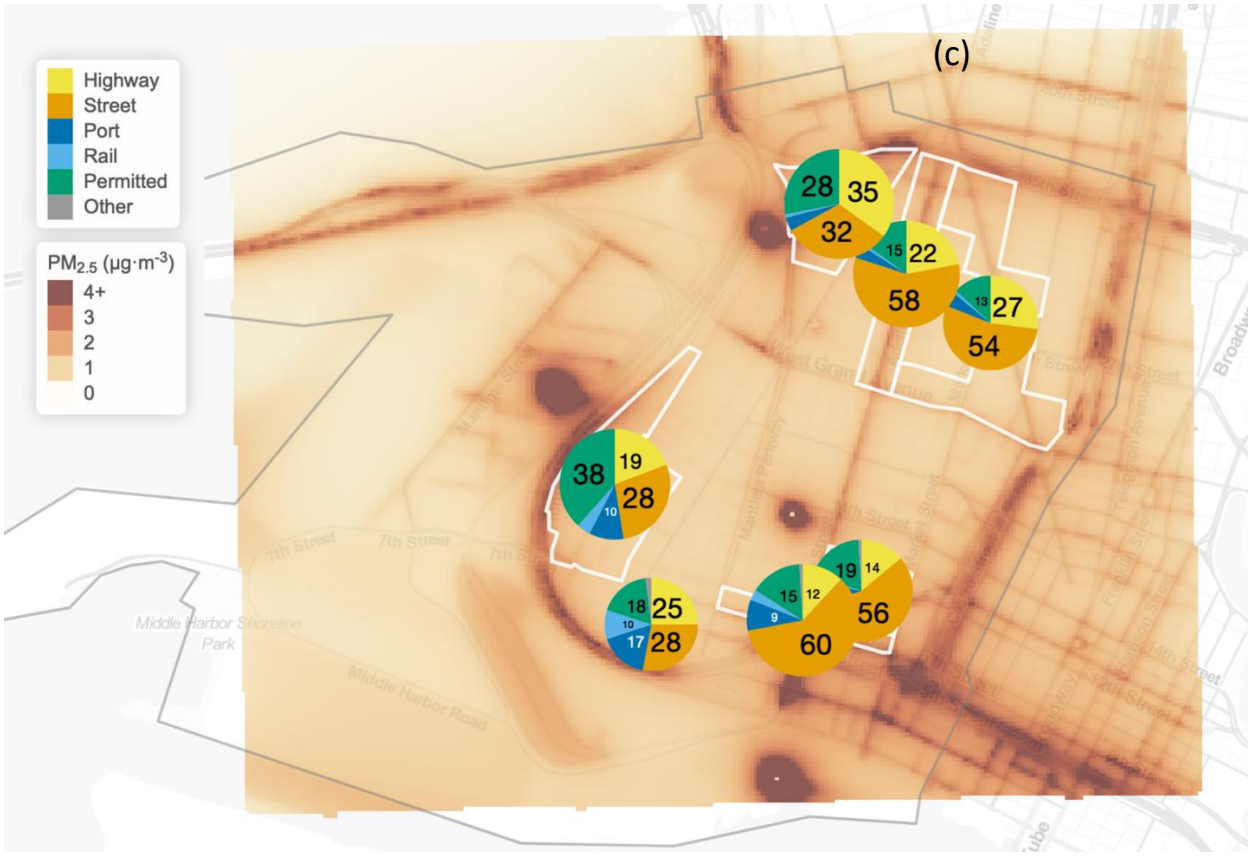


Figure 5-9. c. Pie Charts Showing the Mix of Sources Contributing to Local Enhancement of Ambient Concentrations (2017) for $PM_{2.5}$. (Map tiles: Stamen Design; Data: OpenStreetMap)

IMPACT PER TON VARIES BY SOURCE

Figure 5-10 shows how much residential impact is caused by a ton of diesel PM emissions. Circles are modeled local sources. Red circles create more impact per ton; blue circles, less. Knowing which sources contribute the most impact per ton helps to inform the Plan strategies. It also allows us to calculate the improvement in residential conditions — in other words, the progress toward our goals — that we expect to result from a given reduction in emissions. As the figure illustrates, the answer to this depends on the source.

The vertical sides (y-axes) of Figure 5-10 show residential impacts in units of population-weighted concentrations (left side) and as a percent of the total residential impact (right). The horizontal axes show emissions in units of tons per year (bottom) and as a percent of total local emissions (top). Sources that fall near the dashed diagonal line have a share of emissions roughly equal to their share of impacts. Sources above the line contribute more impact per ton than sources below it. Trucks, for example, are above the line. They operate near people throughout West Oakland. Ocean-going-vessels (OGVs) are below the line. A ton of diesel PM emitted from trucks, therefore, contributes more to

residential impacts than a ton emitted from OGVs. However, this does not mean that sources below the line are not important. The residential impact from an emission source depends not only on this ratio (impact per ton), but also on how many tons the source emits. Sources with lower impact-per-ton factors, like OGVs, can still generate substantial impacts.

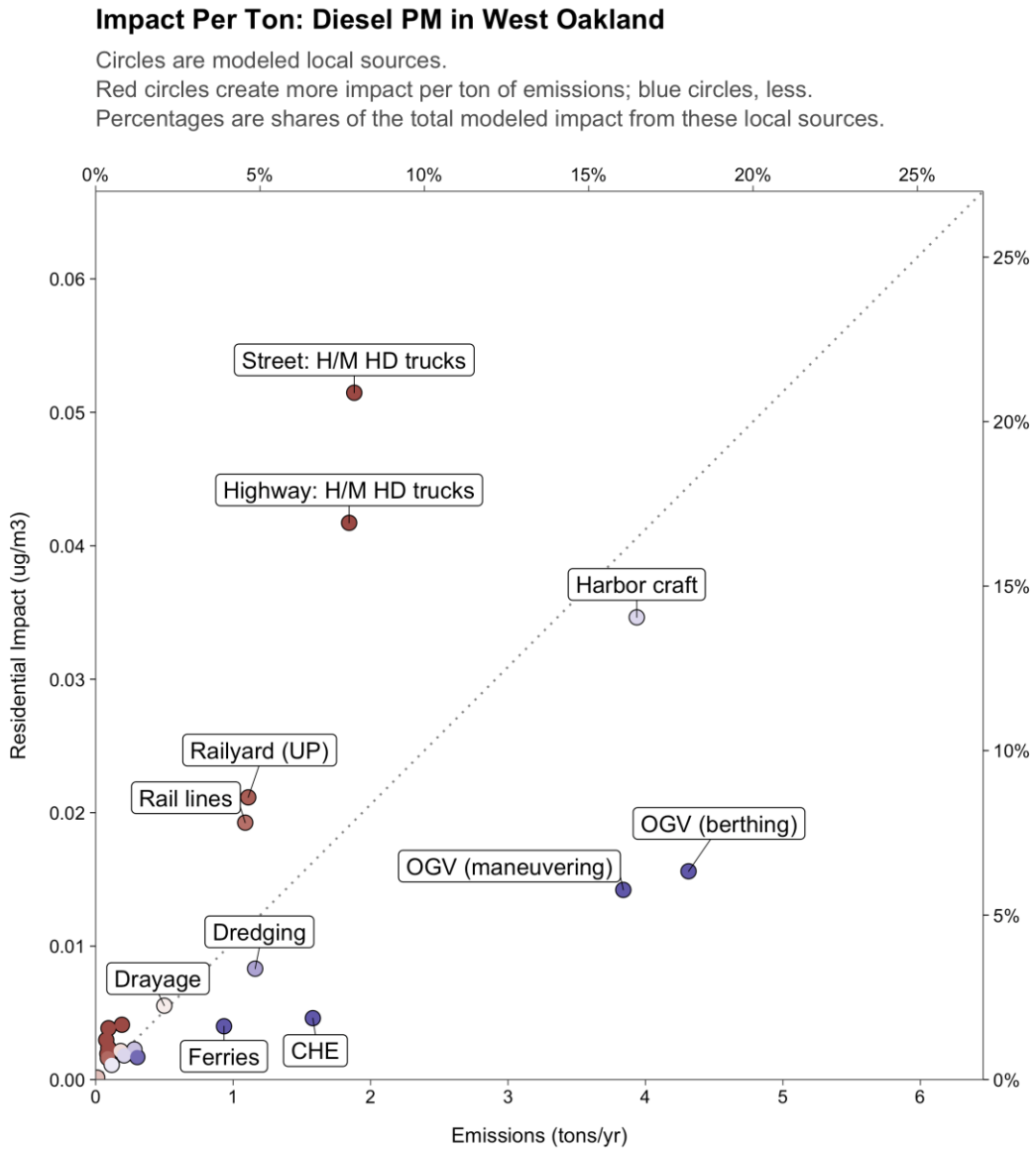


Figure 5-10. Impact per Ton of Emissions: Diesel PM in West Oakland (2017)

BASELINE TARGETS AND FUTURE YEAR 2024 (WITHOUT THE PLAN)

This section begins to address Question 2, "How much must emissions be reduced, and from what sources, to meet the community's goals?" Specifically, this section presents modeled results to show how strategies already approved, but not fully implemented, will reduce impacts. Chapter 6 shows modeled results to show how Plan strategies move us further toward meeting the community goals.

The assessments in this section and in Chapter 6 show that emissions reductions quantified here will improve conditions by 2024 and move us toward the Plan targets, but not reach them all.[31]

Baseline Conditions at Local Impact Zones. Figure 5-9 showed pie charts layered on a map of air pollution concentrations and cancer risk for 2017. The same information is shown in Figure 5-11, Figure 5-13, and Figure 5-15, this time in the form of a bar chart, to show how different sources are responsible for the concentrations at each of the community-identified impact zones. Colored bars show total impacts in local neighborhoods from sources included in community-scale modeling. In Zone 2, for example, Figure 5-11 shows that most of the local enhancement of diesel PM concentrations is attributable to maritime and rail emissions. In Zone 3, a substantial portion is due to trucks on local streets. The dashed lines in these figures show the 2025 target ("average neighborhood" today) and the 2030 target ("cleanest neighborhood" today).

Using a bar chart allows us to superimpose targets and illustrates how much the total impacts from modeled sources need to come down to meet the targets. The targets are defined by the Plan's desired future conditions which were established based on the baseline (2017) model year. These conditions reflect and are scoped to the impact of local sources, without the regional background.

The different impact zones are affected by different mixtures of sources. However, to meet the 2025 and 2030 targets in all impact zones, emissions from several source types will need to be reduced.

Future Year 2024 Conditions (without the Plan) at Local Impact Zones. For diesel PM, Figure 5-11 shows that in 2017 only three of the seven impact zones meet the 2025 target, and none meet the 2030 target. Figure 5-12 shows that in 2024, without the Plan, all but Zones 1 and 2 will meet the 2025 target, and three out of seven will meet the 2030 targets. To meet the 2025 target in Zone 2, and to meet the 2030 targets, more reductions are needed for diesel PM emissions from Port and rail sources. Figure 5-13 and Figure 5-14 illustrate a similar story for cancer risk.

For $PM_{2.5}$, Figure 5-15 shows that local impacts are largely determined by emissions from surface streets and highways. Only two out of seven impact zones meet the Plan 2025 target in 2017. As noted earlier, permitted sources near Zones 1 and 6 also add to the local $PM_{2.5}$ impacts. Figure 5-16, for 2024 without the Plan, shows only small changes in local $PM_{2.5}$ relative to 2017.

The next section summarizes the forecasted emission changes that, given the impact/emission relationships shown in Figure 5-10, will produce these changes in impacts. Assessments in Chapter 6 highlight the benefits of the Plan in 2024 that we can quantify relative to 2024 without the Plan; it also discusses what elements of the Plan produce the changes in impacts.

[31] This section assesses improvements achieved "by 2025" or in future year 2024. Initial assessments of future year 2029 were made. However, because of uncertainties in 10-year forecasts, we only emissions estimates for 2029 in Appendix A were presented.

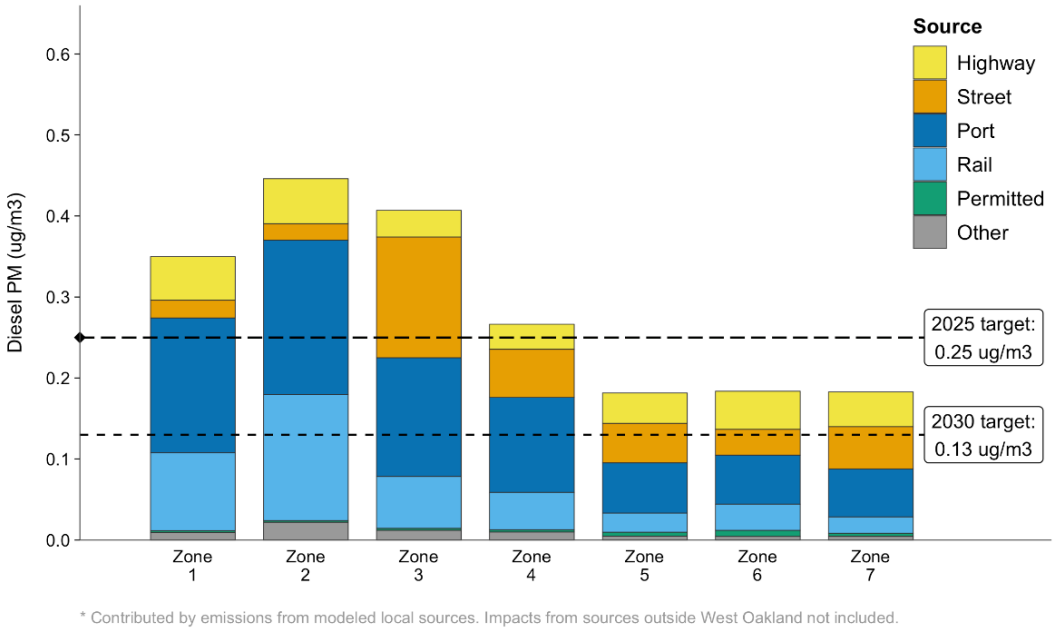


Figure 5-11. Targets and Source Apportionment for Diesel PM in 2017 (Baseline)

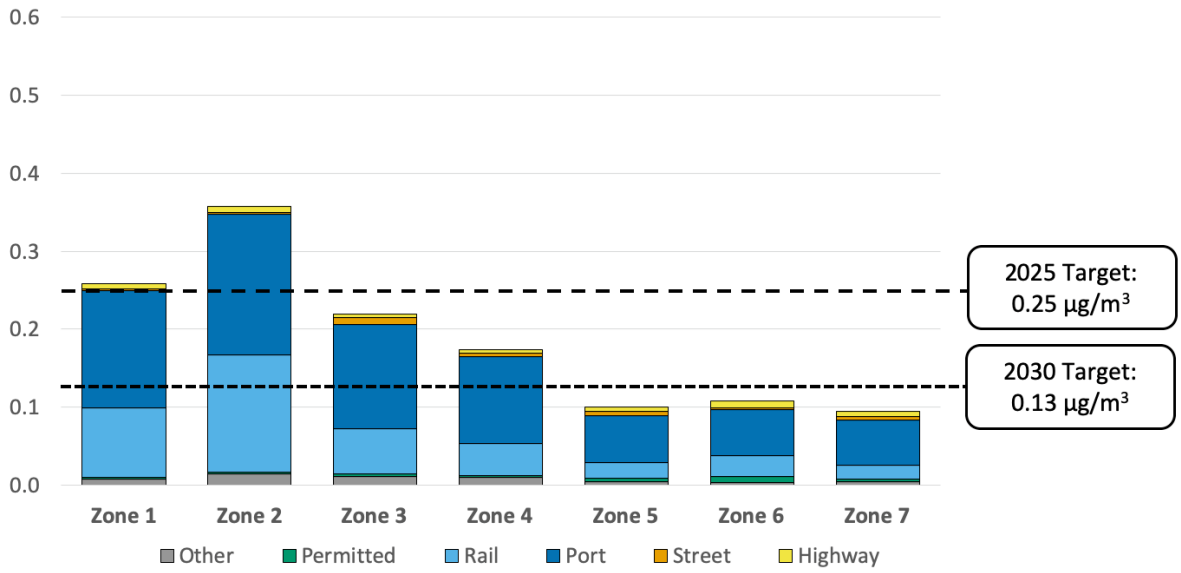


Figure 5-12. Targets and Source Apportionment for Diesel PM in 2024 (Without the Plan)

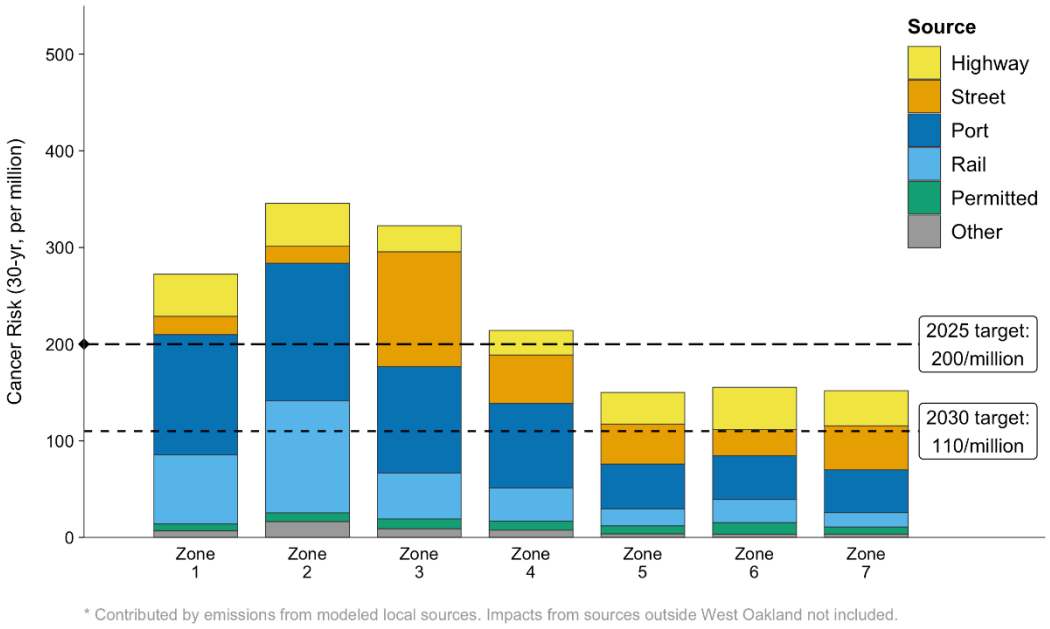


Figure 5-13. Targets and Source Apportionment for Cancer Risk in 2017 (Baseline)

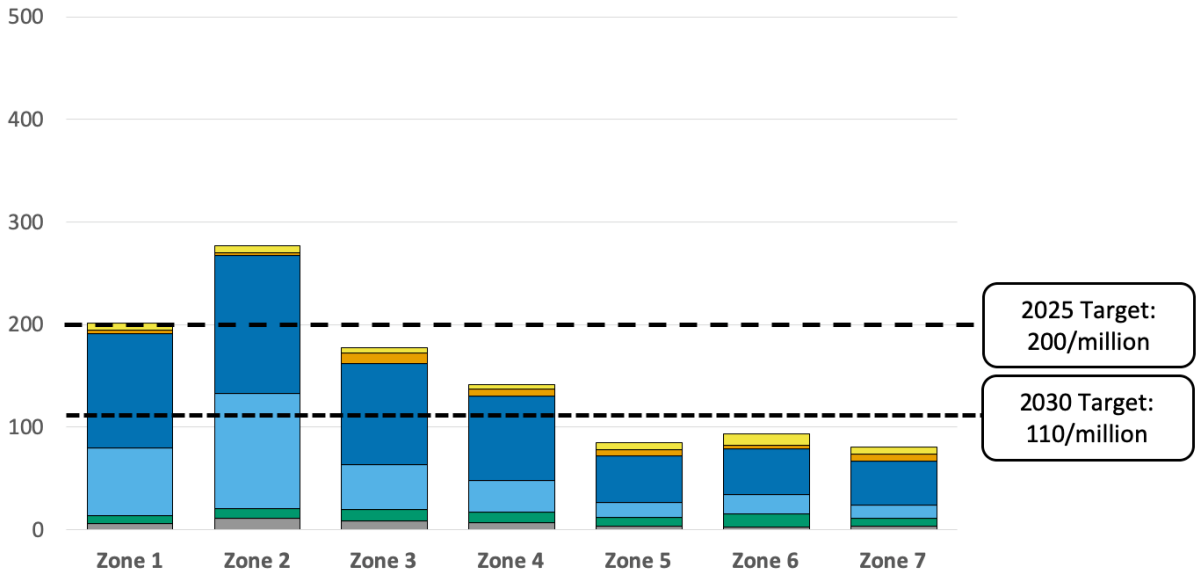


Figure 5-14. Targets and Source Apportionment for Cancer Risk in 2024 (Without the Plan)

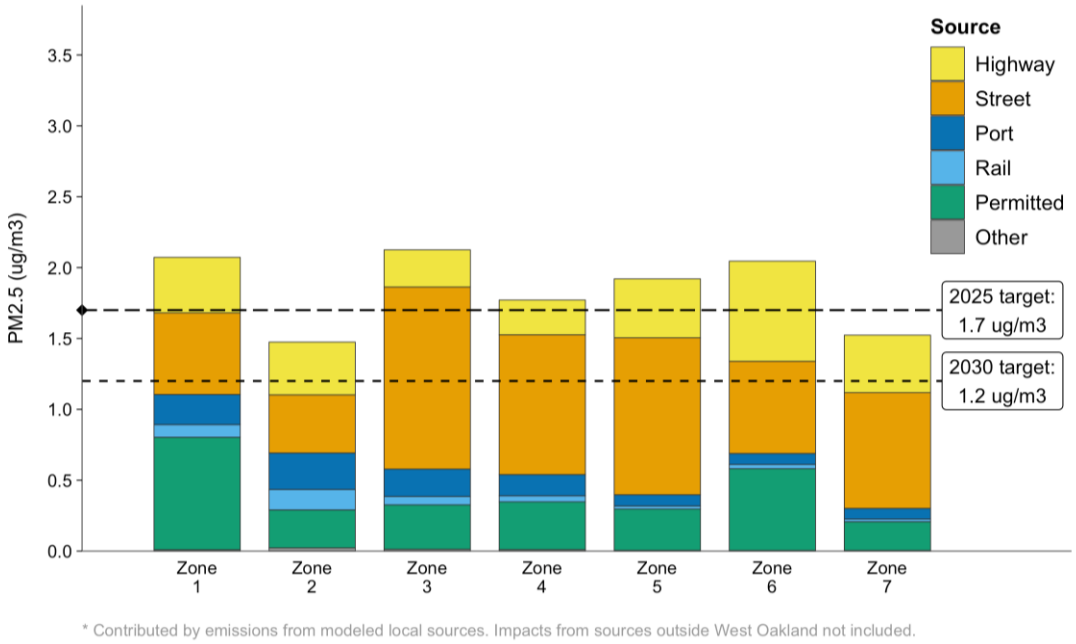


Figure 5-15. Targets and Source Apportionment for $PM_{2.5}$ in 2017 (Baseline)

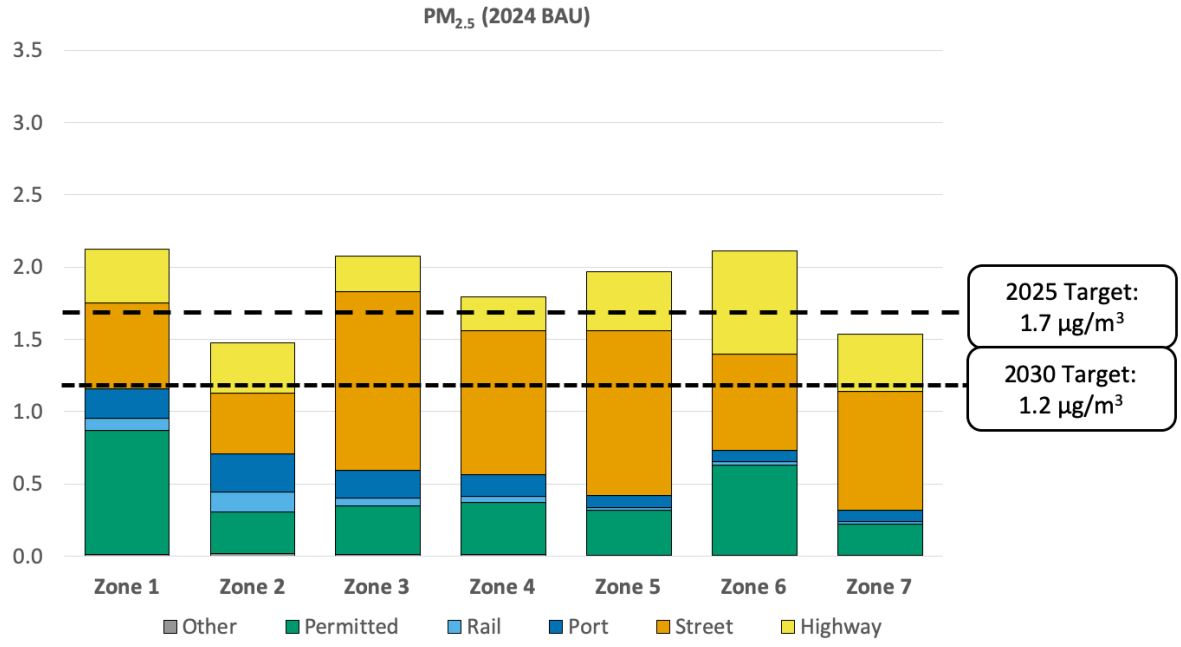


Figure 5-16. Targets and Source Apportionment for $PM_{2.5}$ in 2024 (Without the Plan)

SUMMARY OF MODELED CHANGES, 2017 TO 2024 (WITHOUT THE PLAN)

This section describes key differences between the 2024 without-Plan scenario, and the 2017 base case, with respect to the emissions and impacts from modeled pollutants.

Diesel PM

On-road Trucks. Emissions and impacts from on-road sources of diesel PM (orange and yellow bars in Figure 5-11) are dramatically reduced in 2024. These reductions occur because of "fleet turnover" — newer vehicles replacing older ones to meet the 2023 compliance requirements of CARB's Truck and Bus Rule.[32] CARB's model for on-road car and truck emissions (EMFAC2017), which was used for this Plan, forecasts 100% compliance with the Truck and Bus Rule by 2023. Senate Bill 1,[33] which makes in-state vehicle registration conditional on compliance, will support this.

Ocean-Going Vessels. This assessment forecasts growth in container shipping using CARB's forecasts.[34] CARB's forecasts call for about a 5% compound annual container ship activity growth rate between 2017 and 2030. Because most Ocean-Going Vessels (OGV) that call on the Port are container ships, OGV emissions and impacts generally will, absent any reductions, grow at this rate. The 2024 forecast without the Plan assumes that OGV emissions will grow at this rate. The Air District will continue to work with CARB on refining base year and future year emissions estimates.

Harbor Craft. Cleaner engines will be responsible for about a 30% decrease in diesel PM emissions from tugboats between 2017 and 2024, without the Plan. This is based on a bottom-up forecast of changes in tug fleet emissions, assembled by consultant Ramboll at the request of the Air District. CARB's Commercial Harbor Craft (CHC) Regulation requires tugs to have Tier 2 or cleaner engines by 2022. The 2024 "without Plan" scenario envisions compliance by all tugs that do not yet meet or exceed this requirement. It also assumes that the requirement will not be surpassed, except by those vessels that already surpass it.

Between 2017 and 2019, the Air District provided incentive funding for Tier 3 repowers of two tugs frequently serving the Port of Oakland, resulting in reduction of approximately -1 ton/year in diesel PM in the West Oakland modeling domain. This surpassed the regulatory standard.

Rail. In 2024, without the Plan, emissions forecasts for the UP rail yard and for passenger rail considered growth and fleet turnover, consistent with CARB's forecasts. At the UP rail yard, emissions

[32] https://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm.

[33] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1.

[34] Base year and forecasted emissions for ocean-going vessels at berth were provided by CARB to BAAQMD via email communication on July 12, 2019. These emissions are consistent with the 2019 Draft Ocean-Going Vessels At Berth Inventory. (A final version will be publicly posted 60 days before the CARB Board hearing for the At Berth Regulation Amendment.)

from line haul locomotives, switchers, and cargo handling equipment reflect CARB's growth and fleet turnover projections.[35]

Cancer Risk

The maps of diesel PM and cancer risk in Figure 5-9 look very similar. This is because diesel PM contributes over 90% of the cancer impacts caused by toxic air contaminants in our model. Because of the large contribution of diesel PM to overall cancer risk from air pollution, all the reductions in diesel PM described above will similarly contribute to reducing cancer risk in West Oakland.

Permitted Sources. The main differences between the diesel PM and cancer risk maps in Figure 5-9 are visible spots associated with permitted stationary sources at two facilities: EBMUD and Schnitzer Steel. These facilities emit toxics other than diesel PM.[36] There is also a less obvious difference due to gasoline exhaust emissions, mostly from light heavy-duty trucks, which add a small increment of cancer risk spread across West Oakland. Toxic emissions from EBMUD and Schnitzer Steel will be reduced by Air District Rule 11-18: Reduction of Risk from Air Toxic Emissions at Existing Facilities, adopted in November 2017. Rule 11-18 requires existing facilities with high toxic risk in the Bay Area to reduce their risk to below 10 per million or install the cleanest available technologies. The Air District organized facilities into two categories to prioritize implementation: Phase I and Phase II. Prior to this Plan, both facilities were listed as Phase II facilities in the implementation schedule.[37] In 2024, without the Plan, a small amount of growth (1% annual) is assumed to occur, based on regional growth rates, but no reduction in emissions due to Rule 11-18. As discussed in Chapter 6, this Plan accelerates the Rule 11-18 implementation schedule for Schnitzer Steel.

$PM_{2.5}$

Highway and Street: Brake Wear, Tire Wear, and Road Dust. Exhaust emissions from on-road vehicles are forecast to decline as gasoline and diesel engines continue to become cleaner. But even as engines become cleaner, overall $PM_{2.5}$ emissions from highways and surface streets are projected to increase. These projected increases in $PM_{2.5}$ are from brake wear, tire wear, and road dust, which grow as the number of miles that Bay Area residents drive continues to increase. Although emissions from brake and tire wear and from road dust are uncertain, our current best projections indicate that, with increasing vehicle-miles-driven on highways and streets, these types of emissions from on-road vehicles will continue to climb in future years unless additional actions are taken to reduce them.

Permitted Sources. Reductions from the Dynegy plant decommissioning are included in the 2024 projection. Since this plant is not close to residents, the $PM_{2.5}$ reduction for impact zones is modest.

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[35] Cargo handling equipment emissions at the UP railyard are grown consistently with CARB's 2016 SIP Inventory v1.05. Due to the availability of updated projections, switcher emissions at the UP rail yard, line haul locomotives, and passenger rail emissions are grown consistently with the projections found in CARB's 2019 SIP Inventory v1.00.

[36] The top non-diesel toxic air contaminants (TACs) from EBMUD are formaldehyde, chloroform, and benzene. Top non-diesel TACs from Schnitzer Steel are polychlorinated biphenyls (PCB), hexavalent chromium, and benzene.

[37] Discussion of Phase I and Phase II facilities and the Rule 11-18 procedures have been posted on the Air District's web site: Regulation 11, Rule 18 Implementation Procedures, Bay Area Air Quality Management District, April 2018, http://www.baaqmd.gov/community-health/facility-risk-reduction-program.

Port and Rail. Most of the modeled $PM_{2.5}$ reductions from Port and Rail sources come from diesel combustion, so the mechanisms discussed above (for diesel PM) also apply here.

The emissions in future year 2024 (without the Plan) are listed in Table 5-3. As in Table 5-2, in Table 5-3, emissions are listed both for sources included in the community-scale modeling and for sources that were not included in the community-scale modeling but only inventoried. This inventory of emissions reflects best available current forecasts. Like all emissions inventories, these are estimates and subject to change as more and better information becomes available. As in Table 5-2, in Table 5-3, the cancer risk weighting applied to toxic emissions does not produce an estimate of cancer risk; rather, it provides a way to rank emissions based on pollutant toxicity as well as the amount emitted.

Table 5-3. 2024 West Oakland Emissions Summary in tons per year (with cancer risk weighting for toxics)

Source	$PM_{2.5}$	Diesel PM	Cancer Risk-Weighted TACs[38]
West Oakland sources included in community-scale modeling			
Highway	**19.77**	**0.30**	**332**
Non-truck vehicles	12.88	0.07	159
HD/Medium HD trucks	0.94	0.16	120
Light HD trucks	0.42	0.07	52
Road dust	5.53	–	–
Street	**21.97**	**0.18**	**204**
Non-truck vehicles	5.02	0.03	87
HD/Medium HD trucks	0.77	0.08	60
Light HD trucks	0.35	0.07	57
Road dust	15.83	–	–
Port	**25.24**	**17.15**	**12,769**
OGV maneuvering	5.61	5.57	4,145
OGV berthing	10.29	5.24	3,901
Harbor craft	3.07	3.16	2,355
Dredging	0.80	.79	592
Bunkering	0.25	0.26	190
Port trucks	0.66	0.12	89
Road dust	2.53	–	–
Cargo handling	1.78	1.74	1,293
OGRE Railyard	0.08	0.08	62
BNSF Railyard	0.18	0.19	143
Rail	**1.84**	**1.96**	**1,462**
Rail lines	0.70	0.74	554
UP Railyard	1.12	1.22	909

[38] Appendix A describes the method applied for cancer risk weighting of toxic air contaminants (TACs).

Source	$PM_{2.5}$	Diesel PM	Cancer Risk-Weighted TACs[38]
Permitted	**16.94**	**0.30**	**1,185**
Schnitzer (stationary)	5.53	–	900
EBMUD	4.28	0.09	117
Dynegy	0.00	–	–
Pinnacle Ag Services	1.62	–	–
Sierra Pacific	1.00	–	–
CASS	0.78	–	< 1
California Cereal	0.63	–	< 1
CA Waste (10th St)	0.51	–	–
Other	2.59	0.21	167
Other	**1.36**	**1.33**	**987**
Ferries	0.92	0.92	688
Schnitzer (ships)	0.37	0.37	277
Schnitzer (trucks)	0.04	< 0.01	< 1
Truck-related businesses	0.03	0.03	21
Total	**87.09**	**21.22**	**16,939**
West Oakland sources not included in community-scale modeling			
Area	**33.83**	**–**	**439**
Commercial cooking	23.90	–	10
Food and Agriculture	–	–	13
Residential fuel combustion	6.99	–	16
Commercial/industrial fuel combustion	2.39	–	18
Industrial processes	0.03	–	192
Solvent utilization	–	–	135
Consumer products	–	–	44
Other area sources	0.50	–	11
Non-road	**11.71**	**1.72**	**1,523**
Construction equipment	2.39	1.42	1,074
Construction dust	7.70	–	–
Commercial/industrial equipment	0.97	0.21	205
Lawn & garden equipment	0.13	0.02	77
Transport refrigeration units (TRUs)	0.07	0.07	57
Other non-road sources	0.46	0.00	109
Total	**45.54**	**1.72**	**1,962**
Grand Total	**132.63**	**22.94**	**18,901**

Chapter 6 – Strategies and Implementation

To implement the Plan, government agencies, community members, business owners, and other stakeholders need to commit resources and funding. Over the past fifteen years, a variety of public agencies have adopted plans that directly or indirectly affect air quality and quality of life in West Oakland (see Appendix D). The Plan builds on these planning activities by identifying 84 Strategies and four Further Study Measures that add to or extend existing plan actions. The Strategies and Further Study Measures are listed in Table 6-4 and Table 6-5 at the end of this chapter, along with the collaborating authorities and implementation schedule.

As this Plan is implemented, the Strategies and Further Study Measures will be refined, and specific elements fleshed out. Public agencies will need to commit resources to the Strategies and Further Study Measures to conduct further investigation to understand authority, legality, effectiveness, and feasibility. Over the lifetime of the Plan, if additional feasible strategies are identified, these strategies will be reported in the annual reports to CARB.

KEY AGENCIES WITH ROLES IMPLEMENTING THE PLAN

Air District

The Air District is the regional agency responsible for assuring clean air in the nine counties that surround the San Francisco Bay (except northeastern Solano and northern Sonoma counties). The Air District writes and implements air quality plans, adopts and enforces regulations to control air pollution from stationary sources, offers incentives to government agencies, businesses, and individuals to voluntarily reduce air pollution, engages with communities and provides technical and policy guidance regarding air quality, and manages the Spare the Air program.

City of Oakland

The City of Oakland is the local agency responsible for land-use and transportation decisions. The City Council makes land-use decisions by adopting general and specific plans, zoning regulations, and certifying environmental reports for land-use projects, such as housing, commercial, and industrial developments.

Metropolitan Transportation Commission (MTC)

The Metropolitan Transportation Commission (MTC) is the regional agency responsible for transportation planning, financing, and coordinating for the nine-county San Francisco Bay Area. MTC works with other public agencies in the Bay Area to support the streets, roads, highways, transit systems, and other transportation resources. MTC is currently working on Plan Bay Area 2050. Plan Bay Area 2050 is a long-range plan for the future of the nine-county region, focusing on the economy, the environment, housing, and transportation. Plan Bay Area 2050 will identify West Oakland as a designated Priority Development Area (PDA), which means that it has convenient public transit service prioritized by local government for housing, jobs, and services. As a PDA, West Oakland has access to dedicated funding for plans and infrastructure improvements, and MTC recognizes PDAs as important locations for growth that will help address the region's climate emission reduction goals.

Port of Oakland

The Port of Oakland is the local agency responsible for managing the Oakland Seaport, Oakland International Airport, and Jack London Square. The City of Oakland's Charter establishes the Port of Oakland as an independent department with its own governing board.

Alameda County Public Health Department

The Alameda County Public Health Department is the county department responsible for providing public health services. The Health Department delivers services such as access to quality medical care services, disease prevention education and control, community education and outreach, and health policy development.

California Air Resources Board (CARB)

CARB is the state agency responsible for controlling emissions from mobile sources and consumer products (except where federal law preempts CARB's authority), controlling toxic emissions from mobile sources, controlling greenhouse gases from mobile and stationary sources, developing fuel specifications, and coordinating State-level air quality planning strategies with other agencies. CARB is also responsible for establishing the state's air quality standards to protect human health.

Alameda County Transportation Commission

The Alameda County Transportation Commission (Alameda CTC) is the county agency responsible for managing the county's one-cent transportation sales tax funds and funding transportation projects and programs. The Alameda CTC is responsible for delivering the County's bicycle, pedestrian, highway improvements, road, and transit projects.

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) is the state agency responsible for maintaining and improving state highways and transportation projects.

STRATEGIES

The Steering Committee is recommending 84 Strategies based on its local knowledge of their community, the health issues confronting residents, air pollution monitoring data, and the Air District's modeling of pollution concentrations and cancer risks. This list of Strategies was consolidated from an initial, broader list that included many similar concepts. These Strategies include lowering emissions from the most important sources in West Oakland, reducing exposure by filtering pollutants, and moving pollution sources away from residents. In this section, an overview of the Strategies by category are presented along with the key authorities and examples. Improvement and expansion of enforcement programs are described in Chapter 7.

Land Use Strategies

The Steering Committee identified air pollution issues closely tied to land use decisions. Non-conforming or incompatible land uses can result in increased exposure, particularly when industrial facilities or truck routes are sited near residences.

The City of Oakland adopted the West Oakland Specific Plan to facilitate development in West Oakland. Consistent with the West Oakland Specific Plan, the City plans to identify locations to relocate heavy industrial businesses currently in West Oakland (Strategy #4). Relocating two recycling companies (California Waste Solutions and CASS, Inc.) to the former Oakland Army Base has been the subject of community concerns. Relocating these two firms by the end of 2024, if not sooner, will reduce exposure from both their onsite operations and from trucks traveling and idling on local streets within Zones 1 and 6 (Strategy #1).

In addition to relocating polluting businesses out of residential areas, the Steering Committee also identified strategies to relocate truck yards and truck routes away from residences (Strategy #5). Exposure from trucks can be reduced by shifting and enforcing truck routes and hours within the community and enforcing existing restrictions on truck parking, truck idling (Strategy #9). Exposure from open burning and pollution from industrial sources also may be reduced with better agency coordination and updated enforcement procedures (Strategy #24).

The Steering Committee also identified strategies to support emissions reductions at the Port, such as adopting an Electrical Infrastructure Plan for the maritime waterfront areas of Oakland (Strategy #19) and working with other agencies and local partners to create a Sustainable Freight Advisory Committee to address air quality issues (Strategy #21).

In addition, the Steering Committee identified two Strategies to plant vegetative borders as living filters between sources of PM and residences, parks, schools, and community centers. The first is a community participatory design process being led by the WOEIP for a biofilter system for the Prescott neighborhood (Strategy #12). The second is a recommendation that the City of Oakland develop a comprehensive urban canopy and vegetation plan for West Oakland that identifies the locations where trees can be added, such as parks and along Caltrans' highway and freeway rights-of-way, and that provides for the long-term maintenance of trees (Strategies #10, 16).

Mobile Source Strategies

The Steering Committee identified that most of the community's air pollution issues stem from mobile sources in and within the vicinity of the community. Mobile sources include on-road and off-road vehicles, marine, and locomotives. Various agencies share authority over mobile sources of air pollution.

The City of Oakland has the authority to set truck routes and parking policies. Proximity to truck emissions can be reduced by keeping trucks on designated routes and out of residential neighborhoods. For example, the City adopted the West Oakland Truck Management Plan to reduce the effects of transport trucks on local streets in West Oakland. For the Plan, the City of Oakland will implement strategies that address air pollution impacts from transportation (Strategies #33-35).

The Steering Committee also identified the need for improving modes of transportation in West Oakland. For example, the Steering Committee emphasized the need for completion of the transit proposals from the West Oakland Specific Plan, particularly increases in current AC Transit service and the introduction of new direct service to Downtown Oakland akin to the successful Broadway Shuttle

(Strategy #45). In addition, the Steering Committee recognizes that improving the design and safety of the local streets will help to indirectly reduce emissions by encouraging residents to walk or ride bicycles and scooters instead of driving cars (Strategy #56). Other mobile strategies include working with Alameda CTC to improve bicycling and pedestrian infrastructure in West Oakland (Strategy #44) and with MTC to extend car sharing to low-income individuals and groups (Strategy #46).

At the Port, the Steering Committee recommended the following strategies to reduce emissions from movement of inbound and outbound freight on cargo equipment, port trucks, locomotives, and ocean-going ships and harbor craft in the San Francisco Bay:

- Working with the City of Oakland to award long-term leases to vendors that will deliver trucker services (including mini-market and convenience stores, fast food and fast casual restaurants), and parking to keep trucks off West Oakland streets (Strategy #42);
- Studying the effects on truck flow and congestion due to increasing visits from larger container ships, the feasibility of an off-terminal container yard that utilizes zero-emission trucks to move containers to and from the marine terminals, and the potential efficiency gains from increasing the number of trucks hauling loaded containers on each leg of a roundtrip to the Port (Strategy #43); and
- Studying the feasibility of using electric switcher locomotives at the two Port railyards (Strategy #65).

CARB plays an important role in implementing Plan Strategies. CARB regulates motor vehicle fuel specifications, emission standards for on- and off-road vehicles, and consumer product emissions. One of CARB's relevant regulatory authorities is to adopt measures to reduce emissions of toxic air contaminants from mobile sources, known as Airborne Toxic Control Measures (ATCM).[39] These regulatory measures include emissions limits, process requirements, and/or specify low emission technology. Much of the progress to-date in improving air quality in West Oakland is due to compliance with CARB's existing diesel particulate matter ATCMs and new engine standards. CARB is proposing a suite of amendments to existing ATCMs and adoption of new programs to further reduce emissions of diesel PM.

Several of the Strategies will require CARB to consider and to adopt new or amended regulations. Prior to starting formal regulatory proceedings, CARB staff will need to undertake studies of some of these Strategies.

- CARB develops a new Advanced Clean Truck Regulation and amendments to the existing drayage truck regulations to increase the number of zero-emission trucks operating in West Oakland (Strategy #29);
- CARB, in partnership with the Steering Committee, WOEIP, and the Air District, conducts a pilot study to assess local impacts from idling trucks and buses. The Steering Committee, WOEIP and

[39] California Health and Safety Code § 39650 et seq.

the Air District advocate for "Clean Idle" trucks and buses to idle no more than 5 minutes when in West Oakland (Strategy #30);

- CARB develops amendments to the transport refrigeration unit (TRU) regulation to transition the TRU fleet to zero emission operations by requiring both zero-emission technology and supporting infrastructure (Strategy #31);
- CARB develops amendments to the existing cargo handling equipment regulation, which includes yard trucks, rubber-tired gantry cranes, and top handlers, that may reduce idling and transition the various types of equipment to zero emission operation (Strategy #32);
- CARB develops regulations to expand California-specific standards for new light-duty vehicles, impacting 2026 and later model year vehicles, to increase the number of new zero emission and plug-in hybrid electric vehicles sold in California and increase the stringency of fleet-wide emission standards for greenhouse gases and criteria pollutants (Strategy #34);
- CARB develops new standards for small off-road engines (SORE), which are spark-ignition engines rated at or below 19 kilowatts and used primarily for lawn, garden, and other outdoor power equipment (Strategy #35);
- CARB develops amendments to the At-Berth ATCM to further reduce ship emissions at berth by strengthening the regulation to cover more vessel visits and types of ships (Strategy #60);
- CARB develops amendments to the Commercial Harbor Craft Air Toxics Control Measure to achieve additional control of harbor craft emissions. The Steering Committee, WOEIP and the Air District advocate for early compliance by Harbor Craft operating near West Oakland (Strategy #61); and
- CARB develops regulations to reduce idling emissions from locomotives at rail yards, with an emphasis on reducing emissions from locomotives not pre-empted under the federal Clean Air Act. The Steering Committee, WOEIP and the Air District advocate for early compliance for locomotives operating in West Oakland (Strategy #62).

Stationary Source Strategies

The Steering Committee identified several strategies to reduce exposure of emissions from stationary sources of pollution. Stationary sources in West Oakland include the East Bay Municipal Utility District wastewater treatment plant; recycling facilities like Schnitzer Steel, CASS, and California Waste Solutions; gas stations; back-up diesel generators; and auto-body shops.

The Air District is the regional agency responsible for assuring clean air in the San Francisco Bay Area. For the Plan, the Air District will implement strategies that include enhancing existing and adopting new regulations, enhancing compliance and enforcement, funding emissions- and exposure-reducing projects, and working with community and agency partners to advocate for, study, and implement innovative ways to decrease emissions and exposure to emissions in West Oakland.

A primary Strategy to control two significant stationary sources of toxic air contaminants, Schnitzer Steel and the EBMUD Wastewater Treatment Plant, are health risk assessments scheduled in 2020 and 2021 under the Air District's Rule 11-18 (Strategy #69). The Air District's Rule 11-18 is a health risk-based rule that was adopted in 2017 to enhance the Air District's existing Toxic "Hot Spots" Program. Compared to the Hot Spots Program, which is often called the "AB 2588 Program" after the enacted bill, Rule 11-18 sets risk action levels that are significantly more stringent and health-protective. Facilities subject to Rule 11-18 will be evaluated through a health risk assessment and are required to develop and implement a facility-specific risk reduction plan if risks exceed specified action levels. Additional controls at these two facilities will be guided by the results of the risk assessments. For more information on the Rule 11-18 implementation process, visit http://www.baaqmd.gov/community-health/facility-risk-reduction-program.

The Air District also will consider potential amendments to Rule 6-4, Metal Recycling and Shredding Operations, and Rule 12-13, Foundry and Forging Operations, to further reduce fugitive particulate matter emissions (Strategy #68). In addition, the Air District will consider other potential rule amendments related to the AB 617 schedule for expedited implementation of Best Available Retrofit Control Technology. As required by AB 617, the Air District adopted a schedule for implementation of Best Available Retrofit Control Technologies, which identified potential rule amendments for further development and consideration. This schedule includes potential amendments to Rule 8-5 to further reduce emissions from tanks used for organic liquid storage. Emissions from organic liquid storage tanks subject to Rule 8-5 may be further reduced by these potential rule amendments.

Health Programs Strategies

The Steering Committee identified several strategies to improve health in the West Oakland community. As discussed in Chapter 2, West Oakland residents face higher rates of asthma, cardiovascular disease, premature death, and other poor health outcomes compared to other regions in the Bay Area.

The Alameda County Public Health Department is the county department responsible for providing public health services. For the Plan, the Public Health Department will implement strategies such as those that help the community access health services and educate the community about health risks, treatment, and prevention (Strategies #79, #80, #81).

Installation of high-efficiency filtration systems at schools, community centers, and retirement homes have been identified by the Steering Committee as means for reducing exposure of high pollution levels among sensitive populations (Strategy #75). As an initial step in completing this Strategy, by 2021, the Air District will develop a funding program to assist with the installation of filtration systems. The Air District recently approved funding for an initial effort to install filtration systems at schools located within West Oakland and other AB 617 communities. The lessons learned from this pilot effort will be used to expand installations to community centers, retirement homes, and other appropriate facilities.

A complementary Strategy by the City of Oakland will be the implementation of recent changes to the State of California's Building Energy Efficiency Standards. Beginning with building permit applications submitted on or after January 1, 2020, the air ventilation systems for residential buildings of four or more habitable floors will incorporate high-efficiency air filters to reduce exposure from outdoor air pollutants (Strategy #78).

FURTHER STUDY MEASURES

The Co-leads and the Steering Committee devoted considerable time and effort to identifying the proposed strategies shown in Table 6-4, and the resulting list of actions is expected to improve air quality in West Oakland. However, it is quite likely that additional strategies or research questions will emerge during public review of the Draft Plan, as well as during the long-term implementation of this Plan. For example, further work will be needed to identify effective measures to reduce local impacts of backyard wood fires, refinements or ideas for additional measures may emerge as the various collaborating agencies implement the Plan measures. Additional research may be needed to better target our measures such as analyzing appropriate road dust emission rates for local streets or investigating potential rulemaking to limit fugitive dust from construction activity. A list of anticipated future study measures is presented in Table 6-5. The Co-leads will track such unresolved or emerging issues to make sure the Plan continues to include as robust a set of measures as possible. Any additional measures, research projects, or other emerging issues will be discussed with the Steering Committee and addressed in the annual reports submitted to CARB.

IMPLEMENTATION

Incentives

The Plan calls on multiple agencies to commit resources to implement the strategies. Incentive programs work to complement regulations to achieve additional emission reductions and accelerate the timing of reductions. Specifically, many of the strategies require incentive dollars awarded to businesses and equipment owners, individuals, and local government agencies to leverage private investment, accelerate the turnover of older equipment, and encourage the voluntary purchase of cleaner equipment and vehicles.

We have been making progress to reduce air pollution in West Oakland through incentives. Since 2009, the Air District has awarded over $39 million in incentive dollars for particulate filters and truck replacements at the Port. Port tenants, tug operators, and local drayage trucking firms have already taken the initial steps to reduce emissions through retrofitting 13 gantry cranes, repowering five tugboats, and participating in demonstrations of zero-emission trucks and equipment. (See Appendix D for a list of grant programs and a sample list of projects the Air District has funded in West Oakland over the next five years.)[40]

While the success of incentive funding requires willingness by equipment owners to apply for assistance, the use of public funding to accelerate the deployment of low- and zero emission engines,

[40] See http://www.baaqmd.gov/funding-and-incentives for additional information about grant programs.

equipment, and trucks is a critical tool for delivering emissions reductions in West Oakland. Based on current sources of funding, the Air District anticipates the following:

- Owners of tugboats and barges operating at the Port of Oakland voluntarily upgrade to cleaner engines in at least one tug or barge annually through 2025 (Strategy #50);
- The railways operating in or through West Oakland and the Port of Oakland voluntarily replace one locomotive with a U.S. EPA Tier 4 version annually (Strategy #51);
- Owners of trucks that are operated in or through West Oakland and the Port of Oakland voluntarily replace eight diesel trucks with zero emission trucks annually (Strategy #52);
- Owners of cargo-handling equipment and other off-road equipment operating within West Oakland or at the Port of Oakland voluntarily upgrade to cleaner engines or hybrid and zero-emission drivetrains annually (Strategy #54); and
- West Oakland residents voluntarily retire 100-130 qualifying older automobiles annually through 2025 with financial assistance from the Air District's Vehicle Buy Back and the Clean Cars for All programs (Strategy #48).

Some equipment owners believe these incentive programs can be onerous for small operators. The Air District will work with stakeholders to help potential grantees meet eligibility requirements, enter into funding contracts, and meet reporting requirements during the life of the contract. In addition, the Air District will work with CARB to streamline the grant application process and requirements for various projects. Furthermore, the Air District will increase outreach and assistance to individual owner-operators and small companies in West Oakland by providing coordinating workshops with the Steering Committee, the City of Oakland, the Port of Oakland, and CARB (Strategy #41).

Advocacy

After the Plan is adopted, the Co-leads and the Steering Committee will continue to advocate for the implementation of the Plan. The Steering Committee will meet regularly to review plans, evaluate programs and budgets, and make recommendations. In addition, Steering Committee members, community members, business owners, and other stakeholders will likely need to communicate with the collaborating agencies to ensure their continued support for Plan strategies and the resources needed for implementation.

QUANTIFYING BENEFITS OF PLAN STRATEGIES

Baseline Targets and Future Year 2024 With the Plan

This section continues to address the question posed in Chapter 5, “How much emissions must be reduced, and from what sources to meet the community’s goals?” Specifically, this section presents modeled results to show how the Plan measures move us toward meeting the community’s equity targets. The assessments in this section show 2024 impact forecasts without the Plan and 2024 forecasts with the Plan strategies included. Key differences are highlighted between the 2024 forecast of impacts without the Plan and the 2024 forecast of impacts with the Plan.

This section also presents the emission reduction benefits associated with strategies in the Plan. These emission reduction benefits provide the emission reduction targets called for in CARB's Community Air Protection Blueprint. However, these emission reduction targets do not meet the Plan's equity-based targets presented in Chapter 4: additional emission reductions, yet to be identified, are needed to achieve the Plan's goals.

Diesel PM

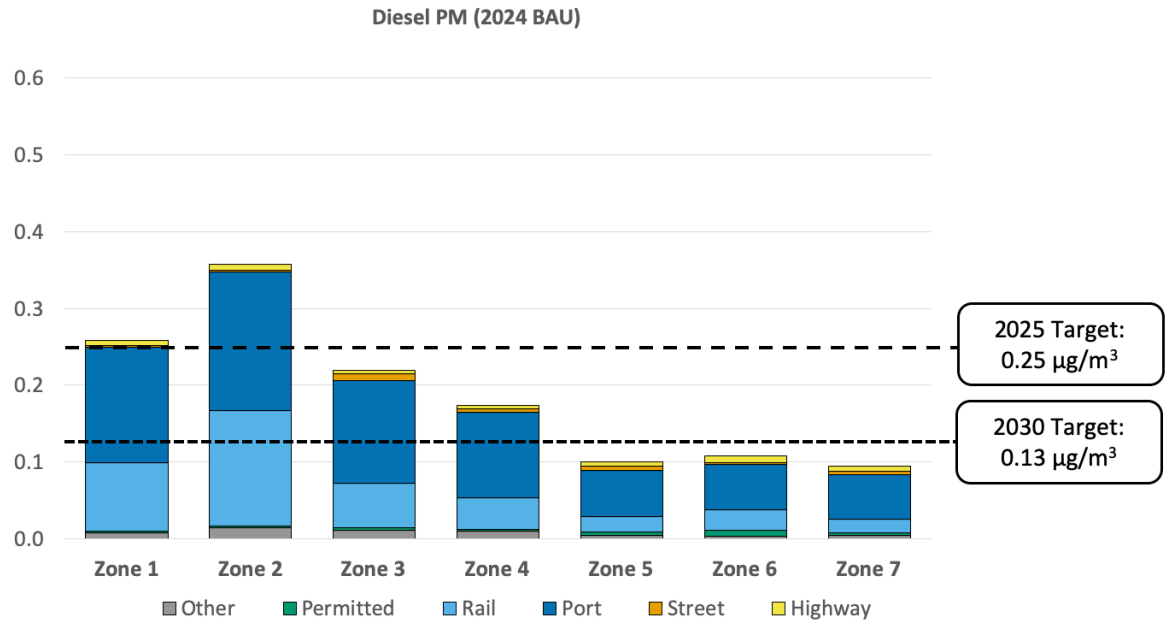


Figure 6-1. Targets and Source Apportionment for Diesel PM in 2024 Without the Plan

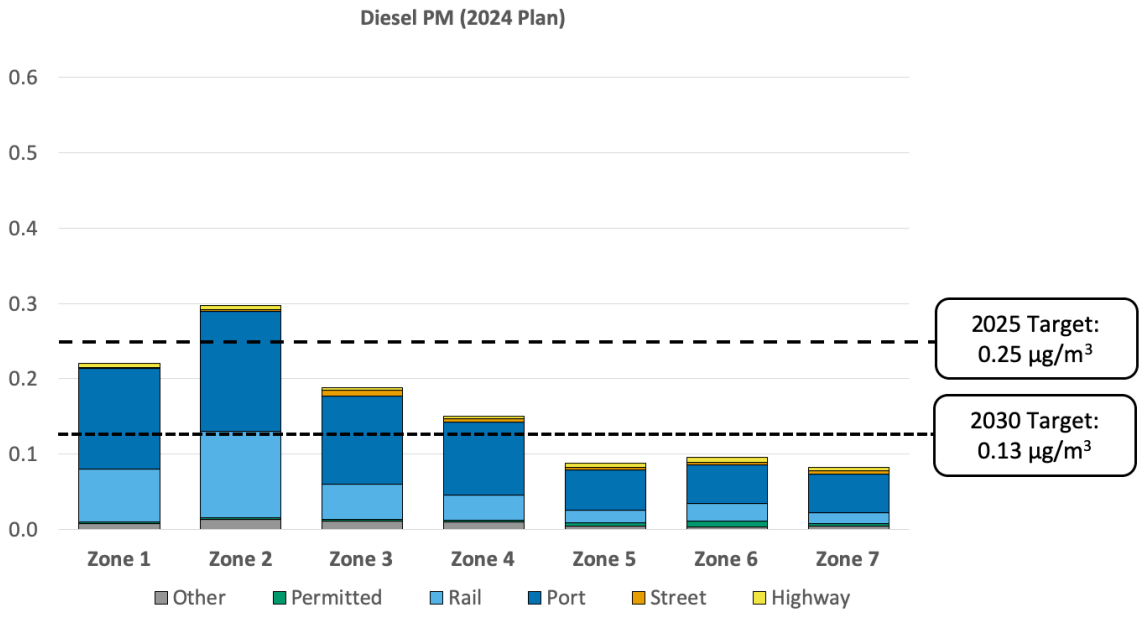


Figure 6-2. Targets and Source Apportionment for Diesel PM in 2024 With the Plan

Figure 6-1 shows modeled levels of diesel PM in 2024 without the Plan at each of the impact zones. Figure 6-2 shows the same information with the Plan. Impact reductions from the Plan—progress toward the Plan's equity-based targets—can be seen by comparing these two figures. Changes in diesel PM levels from the categories of modeled emission sources of diesel PM can also be compared between the bar charts in these figures.

On-road Trucks. As discussed in Chapter 5, emissions and impacts from on-road sources of diesel PM (orange and yellow bars in Figure 6-1) are dramatically reduced in 2024 relative to 2017 from fleet turnover and rules on the books. Some added benefits will be realized if additional CARB regulations, which would be part of this Plan, are adopted such as the Advanced Clean Trucks and Heavy-Duty Inspection and Maintenance rules.[41]

Ocean-Going Vessels. This Plan forecasts growth in container shipping using CARB's forecasts, which estimates about a 5% compound annual container ship activity growth rate between 2017 and 2030. Because most Ocean-Going Vessels (OGV) that call on the Port are container ships, OGV emissions and impacts generally will, absent any reductions, grow at this rate.[42] This Plan assumes that OGV "maneuvering" will grow at this rate. In contrast, diesel PM from the auxiliary engines that OGVs run while at berth will see reductions, resulting from increased use of shore power (plugging in) while at berth. The "with Plan" scenario assumes reductions from amendments to CARB's At-Berth regulation. These regulatory concepts have not been finalized or adopted by CARB's Board, and the emissions reduction estimates are draft and subject to change. As with any regulation, achieving expected reductions requires ongoing implementation efforts, including enforcement and, in some cases, new infrastructure. The Air District and CARB will continue to work together to estimate emissions reductions from this and other CARB strategies in West Oakland. For more information on the regulatory development process, visit https://ww3.arb.ca.gov/ports/shorepower/shorepower.htm.

Harbor Craft. The Air District has incentivized repowers of three more assist tugs, in addition to the two discussed in the previous chapter. These repowers, scheduled for completion before 2022, will result in an additional reduction of approximately -0.7 tons per year of diesel PM emitted in the modeling domain. Because the three tugs do not need to be repowered to meet the requirements stipulated by the existing harbor craft regulations (for 2022), we attribute these additional reductions to the Plan.

Rail. This Plan estimates that diesel PM emitted by switcher locomotives handling containerized freight at the UP railyard will be reduced by 0.32 tons between 2017 and 2024, while total diesel PM emissions at the UP railyard will decrease by 0.27 tons. These changes represent a 37% reduction in diesel PM emissions from UP switchers and a 24% reduction in total diesel PM emissions at the UP

[41] These regulatory concepts have not been finalized or adopted by CARB's Board, and the emissions reduction estimates are draft and subject to change.

[42] Base year and forecasted emissions for ocean-going vessels at berth were provided by CARB to BAAQMD via email communication on July 12, 2019. These emissions are consistent with the 2019 Draft Ocean Going Vessel At Berth Inventory. (A final version will be publicly posted 60 days before the CARB Board hearing for the At Berth Regulation Amendment.)

railyard, relative to 2017. To derive these estimates, emission reductions associated with AB 617-funded upgrades of five switcher engines to Tier 4 were calculated and applied to existing 2024 emission estimates for the railyard without the Plan. Note that total diesel PM emissions at the UP Railyard include emissions from line haul locomotives and cargo handling equipment as well as switchers; anticipated growth in emissions from cargo handling equipment somewhat offsets the emission reductions achieved through switcher replacements.

Emission Reductions. Columns on the left in Table 6-1 list diesel PM emission totals by source category for the base year and for 2024 with and without the Plan. Columns on the right list differences in diesel PM emissions: 2024 forecasts with and without the Plan are compared to the base year, and the 2024 forecast with the Plan is compared to 2024 without the Plan. The 2024 Plan versus without the Plan comparison shows the benefits, and emission-reduction targets, of the Plan by source category. The total diesel PM emission benefits of the Plan in 2024 relative to 2024 without the Plan is about -2.4 tons per year (-10.5%). The reductions in diesel PM in 2024 with the Plan relative to the base year is about -7.6 tons per year (-27%).

Table 6-1. West Oakland Diesel PM Emissions Summaries and Differences (tons per year)

Source	Emissions (tons per year)			Difference (tons per year)		
	2017 Base	2024 no Plan	2024 with Plan	No Plan-Base	Plan-Base	Plan-No Plan
West Oakland sources included in community-scale modeling						
Highway	**2.12**	**0.30**	**0.24**	**-1.82**	**-1.88**	**-0.06**
Non-truck vehicles	0.19	0.07	0.07	-0.12	-0.12	> -0.01
HD/Medium HD trucks	1.84	0.16	0.10	-1.68	-1.74	-0.06
Light HD trucks	0.09	0.07	0.07	-0.02	-0.02	> -0.01
Street	**2.07**	**0.18**	**0.15**	**-1.89**	**-1.92**	**-0.03**
Non-truck vehicles	0.09	0.03	0.03	-0.06	-0.06	> -0.01
HD/Medium HD trucks	1.88	0.08	0.05	-1.80	-1.83	-0.03
Light HD trucks	0.09	0.07	0.07	-0.02	-0.02	> -0.01
Port	**15.87**	**17.15**	**15.22**	**+1.28**	**-0.64**	**-1.92**
OGV maneuvering	3.84	5.57	5.57	+1.73	+1.73	–
OGV berthing	4.31	5.24	3.93	+0.93	-0.38	-1.31
Harbor craft	3.94	3.16	2.57	-0.77	-1.37	-0.59
Dredging	1.16	0.79	0.79	-0.37	-0.37	–
Bunkering	0.28	0.26	0.26	-0.03	-0.03	–
Port trucks	0.50	0.12	0.10	-0.38	-0.40	-0.02
Cargo handling	1.58	1.74	1.74	+0.16	+0.16	–
OGRE Railyard	0.08	0.08	0.08	+0.01	+0.01	–
BNSF Railyard	0.18	0.19	0.19	+0.01	+0.01	–
Rail	**2.20**	**1.96**	**1.59**	**-0.23**	**-0.61**	**-0.38**
Rail lines	1.09	0.74	0.74	-0.34	-0.34	–

Source	Emissions (tons per year)			Difference (tons per year)		
	2017 Base	2024 no Plan	2024 with Plan	No Plan-Base	Plan-Base	Plan-No Plan
UP Railyard	1.11	1.22	0.84	+0.11	-0.27	-0.38
Permitted	**0.30**	**0.30**	**0.30**	**+0.01**	**+0.01**	**0.00**
Schnitzer (stationary)	–	–	–	0.00	0.00	–
EBMUD	0.09	0.09	0.09	+0.01	+0.01	–
Dynegy	< 0.01	–	–	< 0.01		–
Pinnacle Ag Services	–	–	–	–	–	–
Sierra Pacific	–	–	–	–	–	–
CASS	–	–	–	–	–	–
California Cereal	–	–	–	–	–	–
CA Waste (10th St)	–	–	–	–	–	–
Other	0.21	0.21	0.21	0.00	0.00	–
Other	**1.36**	**1.33**	**1.31**	**-0.04**	**-0.05**	**-0.01**
Ferries	0.93	0.92	0.92	-0.01	-0.01	–
Schnitzer (ships)	0.30	0.37	0.37	+0.07	+0.07	–
Schnitzer (trucks)	0.01	< 0.01	0.00	-0.01	-0.01	> -0.01
Truck-related businesses	0.12	0.03	0.02	-0.09	-0.10	> -0.01
Total	**23.91**	**21.22**	**18.82**	**-2.70**	**-5.10**	**-2.40**
West Oakland sources not included in community-scale modeling						
Area	**–**	**–**	**–**	**–**	**–**	**–**
Commercial cooking	–	–	–	–	–	–
Food and Agriculture	–	–	–	–	–	–
Residential fuel combustion	–	–	–	–	–	–
Commercial/industrial fuel combustion	–	–	–	–	–	–
Industrial processes	–	–	–	–	–	–
Solvent utilization	–	–	–	–	–	–
Consumer products	–	–	–	–	–	–
Other area sources	–	–	–	–	–	–
Non-road	**4.12**	**1.72**	**1.72**	-2.39	-2.39	–
Construction equipment	3.33	1.42	1.42	-1.91	-1.91	–
Commercial/industrial equipment	0.51	0.21	0.21	-0.31	-0.31	–
Lawn & garden equipment	0.02	0.02	0.02	< 0.01	< 0.01	–
TRUs	0.26	0.07	0.07	-0.18	-0.18	–
Other non-road sources	0.00	0.00	0.00	0.00	0.00	–
Total	**4.12**	**1.72**	**1.72**	**-2.39**	**-2.39**	**–**
Grand Total	**28.03**	**22.94**	**20.54**	**-5.09**	**-7.49**	**-2.40**

Cancer Risk

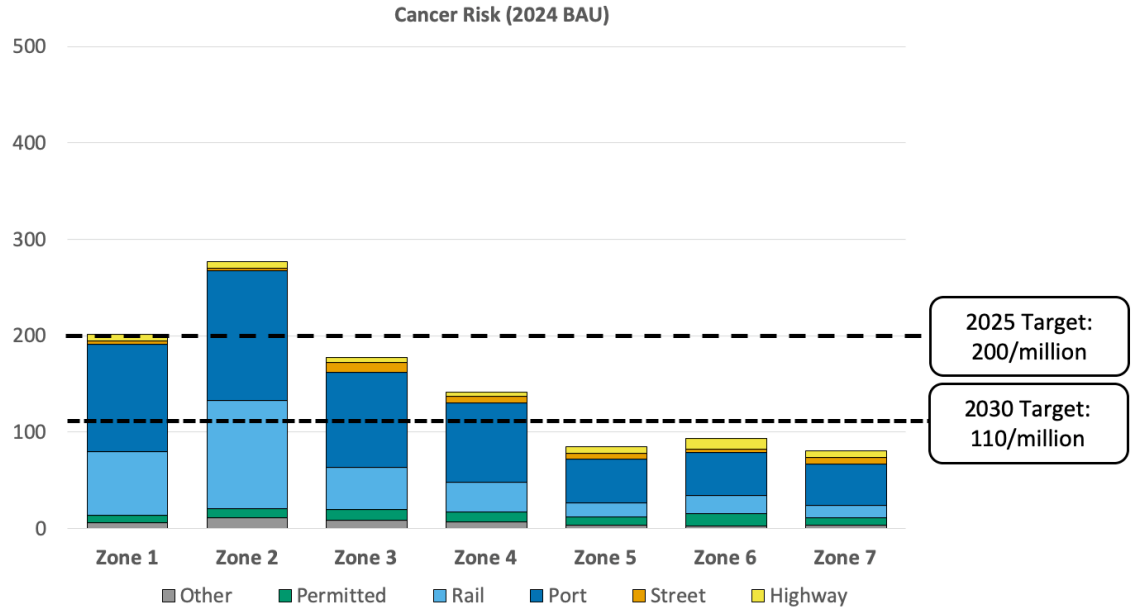


Figure 6-3. Targets and Source Apportionment for Cancer Risk in 2024 Without the Plan

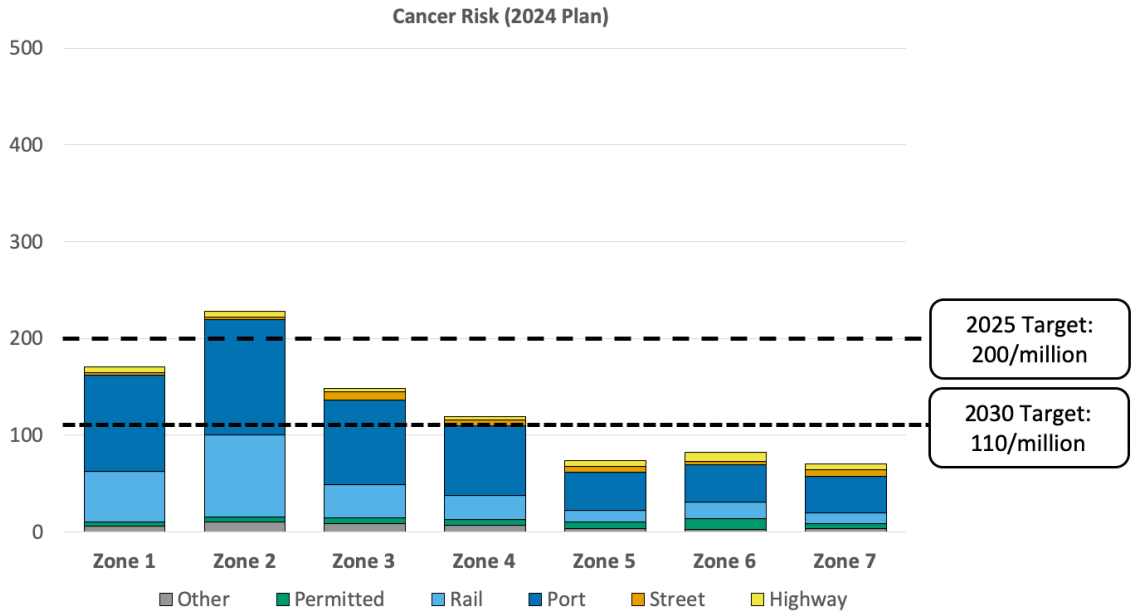


Figure 6-4. Targets and Source Apportionment for Cancer Risk in 2024 With the Plan

The charts of diesel PM (Figure 6-1 and Figure 6-2) and cancer risk (Figure 6-3 and Figure 6-4) look similar. This is because diesel PM contributes over 90% of the cancer impacts caused by toxic air contaminants in our model. Because of the large contribution of diesel PM to overall cancer risk from air pollution, all the reductions in diesel PM described above will similarly contribute to reducing cancer risk in West Oakland. Figure 6-4 shows some benefits in reducing levels of cancer risk with the Plan in 2024 relative to 2024 without the Plan, as shown in Figure 6-3.

Permitted Sources. To reduce the toxic emissions from EBMUD and Schnitzer Steel, this Plan will rely on Air District Rule 11-18: Reduction of Risk from Air Toxic Emissions at Existing Facilities, adopted in November 2017. Accelerated implementation of Rule 11-18 will drive down the toxic emissions at Schnitzer Steel. Specifically, accelerated implementation of Rule 11-18 will reduce toxic emissions from Schnitzer Steel by at least 70% due to use of a thermal oxidizer. These emission reductions are slated to occur by 2025, and so associated emission reductions are included in the 2024 forecast with the Plan. Changes in the associated impacts on the community will be modeled and assessed by the Air District once the specific changes needed at the facility to comply with Rule 11-18 are determined. [43]

Emission Reductions. Columns on the left in Table 6-2 list cancer risk-weighted toxic emission totals by source category for the base year and for 2024 with and without the Plan. Columns on the right list differences in cancer risk-weighted emissions: 2024 forecasts with and without the Plan are compared to the base year, and the 2024 forecast with the Plan is compared to 2024 without the Plan. The 2024 Plan versus no Plan comparison shows the benefits, and emission-reduction targets, of the Plan by source category. There is about a 12% reduction in total cancer risk-weighted toxic emissions from the Plan in 2024, relative to 2024 without the Plan. There is about a 28% reduction in cancer risk-weighted toxic emissions in 2024 with the Plan, relative to the base year.

[43] Under Rule 11-18, this facility will apply Toxic Best Available Control Technology (TBACT). Modeled risks once TBACT controls are installed are yet to be determined.

Table 6-2. West Oakland Cancer Risk-Weighted Toxics Emissions Summaries and Differences (risk-weighted tons per year)

Source	Emissions (risk-weighted tons per year)			Difference (risk-weighted tons per year)		
	2017 Base	2024 No Plan	2024 with Plan	No Plan-Base	Plan-Base	Plan-No Plan
West Oakland sources included in community-scale modeling						
Highway	**1,791**	**332**	**287**	**-1,460**	**-1,505**	**-45**
Non-truck vehicles	331	159	158	-172	-172	> -1
HD/Medium HD trucks	1,392	120	76	-1,272	-1,316	-44
Light HD trucks	69	52	52	-16	-16	> -1
Street	**1,692**	**204**	**182**	**-1,488**	**-1,510**	**-22**
Non-truck vehicles	183	87	86	-96	-96	< -1
HD/Medium HD trucks	1,434	60	39	-1,374	-1,395	-22
Light HD trucks	76	57	57	-18	-18	> -1
Port	**11,817**	**12,769**	**11,337**	**+951**	**-480**	**-1431**
OGV maneuvering	2,859	4,145	4,145	+1,286	+1,286	–
OGV berthing	3,212	3,901	2,926	+689	-286	-975
Harbor craft	2,932	2,355	1,914	-577	-1,018	-441
Dredging	864	592	592	-272	-272	–
Bunkering	209	190	190	-19	-19	–
Port trucks	372	88	73	-284	-299	-15
Cargo handling	1,177	1,293	1,293	+117	+117	–
OGRE Railyard	57	62	62	+4	+4	–
BNSF Railyard	136	143	143	+7	+7	–
Rail	**1,637**	**1,462**	**1,182**	**-174**	**-455**	**-281**
Rail lines	810	554	554	-256	-256	–
UP Railyard	826	909	628	+82	-199	-281
Permitted	**1,101**	**1,185**	**634**	**+84**	**-467**	**-551**
Schnitzer (stationary)	823	900	350	+78	-473	-551
EBMUD	110	117	117	+7	+7	–
Dynegy	1	0	0	-1	0	–
Pinnacle Ag Services	–	–	–	–	–	–
Sierra Pacific	–	–	–	–	–	–
CASS	< 1	< 1	0	< 1	< 1	–
California Cereal	< 1	< 1	0	< 1	< 1	–
CA Waste (10th St)	–	–	0	0	0	–
Other	168	167	167	< 1	< 1	–
Other	**1,016**	**987**	**979**	**-29**	**-37**	**-8**
Ferries	695	688	688	-7	-7	–

Source	Emissions (risk-weighted tons per year)			Difference (risk-weighted tons per year)		
	2017 Base	2024 No Plan	2024 with Plan	No Plan-Base	Plan-Base	Plan-No Plan
Schnitzer (ships)	225	277	277	+52	+52	–
Schnitzer (trucks)	8	< 1	0	-8	-8	< 1
Truck-related businesses	87	21	14	-65	-73	-8
Total	**19,054**	**16,939**	**14,601**	**-2,115**	**-4,453**	**-2,337**
West Oakland sources not included in community-scale modeling						
Area	**413**	**439**	**439**	**+26**	**+26**	**–**
Commercial cooking	9	10	10	+1	+1	–
Food and Agriculture	13	13	13	0	0	–
Residential fuel combustion	18	16	16	-2	-2	–
Commercial/industrial fuel combustion	17	18	18	+0	+0	–
Industrial processes	176	192	192	+16	+16	–
Solvent utilization	125	135	135	+10	+10	–
Consumer products	41	44	44	+3	+3	–
Other area sources	13	11	11	-2	-2	–
Non-road	**3,358**	**1,523**	**1,523**	**-1,835**	**-1,835**	**–**
Construction equipment	2,501	1,074	1,074	-1,427	-1,427	–
Construction dust	–	–	0	0	0	–
Commercial/industrial equipment	436	205	205	-231	-231	–
Lawn & garden equipment	79	77	77	-2	-2	–
TRUs	192	57	57	-135	-135	–
Other non-road sources	151	109	109	-42	-42	–
Total	**3,771**	**1,962**	**1,962**	**-1,809**	**-1,809**	**–**
Grand Total	**22,825**	**18,901**	**16,563**	**-3,925**	**-6,262**	**-2,337**

PM2.5

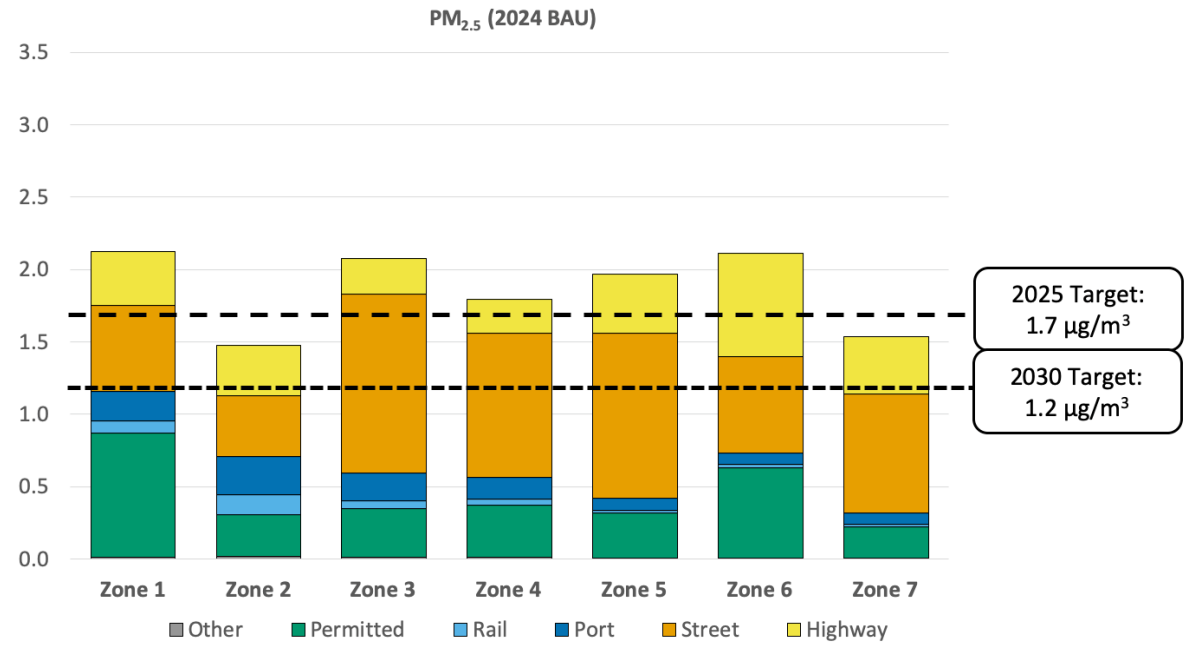


Figure 6-5. Targets and Source Apportionment for $PM_{2.5}$ in 2024 Without the Plan

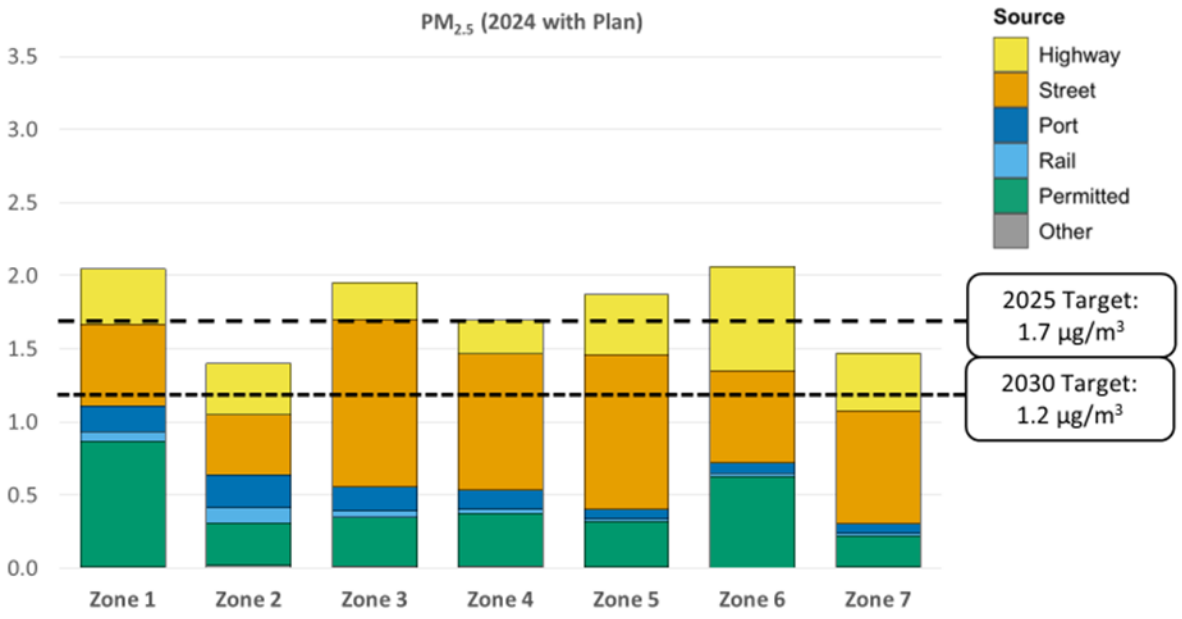


Figure 6-6. Targets and Source Apportionment for $PM_{2.5}$ in 2024 With the Plan

Figure 6-6 shows some benefits in reducing levels of $PM_{2.5}$ with the Plan in 2024 relative to 2024 without the Plan, as shown in Figure 6-5.

Road Dust. The Plan includes a Strategy that calls on the City of Oakland and Caltrans to implement an enhanced street sweeping program in West Oakland. This assessment reviewed existing street sweeping programs, including South Coast Air Quality Management District Rule 1186 for PM_{10} emissions from paved and unpaved roads, which was adopted in 1997 and required new sweepers to be certified by the South Coast Air District. In the rulemaking report and appendices, the South Coast Air District estimated the control effectiveness from street sweeping to be 10% annually. This assessment for 2024 with the Plan includes a 10% reduction in road dust, to be achieved through enhanced street sweeping (streets; not highways).

Permitted Sources. The Air District will evaluate $PM_{2.5}$ emissions estimates from permitted facilities, especially those near Zones 1 and 6 to reduce the uncertainty associated with these emissions estimates and to assess the degree to which additional regulations could be effective in reducing impacts. The City of Oakland has begun discussions with the California Waste Solutions facility (near Zone 1) to relocate that facility further from residents, to the former Oakland Army Base near the East Bay Municipal Utilities District wastewater treatment plant.

Port and Rail. $PM_{2.5}$ reductions will occur along with diesel PM for Port and Rail, so the mechanisms discussed above (for diesel PM) also drive similar reductions here.

Emission reductions. Columns on the left in Table 6-3 list $PM_{2.5}$ emission totals by source category for the base year and for 2024 with and without the Plan. Columns on the right list differences in $PM_{2.5}$ emissions: 2024 forecasts with and without the Plan are compared to the base year, and the 2024 forecast with the Plan is compared to 2024 without the Plan. The 2024 Plan versus without the Plan comparison shows the benefits, and emission-reduction targets, of the Plan by source category. The total $PM_{2.5}$ emission benefits of the Plan in 2024, relative to 2024 without the Plan, is about -3.7 tons per year (-3%). The reductions in $PM_{2.5}$ in 2024 with the Plan, relative to the base year, is about -0.5 tons per year (-0.4%).

Table 6-3 West Oakland $PM_{2.5}$ Emissions Summaries and Differences (tons per year)

Source	Emissions (tons per year)			Difference (tons per year)		
	2017 Base	2024 no Plan	2024 with Plan	no Plan-Base	Plan-Base	Plan-no Plan
West Oakland sources included in community-scale modeling						
Highway	**20.29**	**19.77**	**19.70**	**-0.53**	**-0.60**	**-0.07**
Non-truck vehicles	12.23	12.88	12.87	+0.65	+0.64	-0.01
HD/Medium HD trucks	2.48	0.94	0.88	-1.54	-1.60	-0.06
Light HD trucks	0.41	0.42	0.42	+0.01	+0.01	< -0.01
Road dust	5.17	5.53	5.53	+0.36	+0.36	–

Source	Emissions (tons per year)			Difference (tons per year)		
	2017 Base	2024 no Plan	2024 with Plan	no Plan-Base	Plan-Base	Plan-no Plan
Street	**22.38**	**21.97**	**20.48**	**-0.41**	**-1.90**	**-1.49**
Non-truck vehicles	4.82	5.02	5.02	+0.20	+0.20	> -0.01
HD/Medium HD trucks	2.44	0.77	0.74	-1.67	-1.70	-0.03
Light HD trucks	0.35	0.35	0.35	> -0.01	> -0.01	> -0.01
Road dust	14.77	15.83	14.37	+1.06	-0.40	-1.46
Port	**21.99**	**25.24**	**23.44**	**+3.25**	**+1.45**	**-1.80**
OGV maneuvering	3.94	5.61	5.61	+1.66	+1.66	–
OGV berthing	7.83	10.29	9.09	+2.46	+1.26	-1.20
Harbor craft	3.82	3.07	2.49	-0.75	-1.33	-0.57
Dredging	1.12	0.80	0.80	-0.32	-0.32	–
Bunkering	0.27	0.25	0.25	-0.02	-0.02	–
Port trucks	0.93	0.66	0.64	-0.27	-0.29	-0.02
Road dust	2.25	2.53	2.53	+0.28	+0.28	–
Cargo handling	1.59	1.78	1.78	+0.19	+0.19	–
OGRE Railyard	0.07	0.08	0.08	+0.01	+0.01	–
BNSF Railyard	0.17	0.18	0.18	+0.01	+0.01	–
Rail	**2.04**	**1.84**	**1.47**	**-0.22**	**-0.57**	**-0.35**
Rail lines	1.02	0.70	0.70	-0.32	-0.32	–
UP Railyard	1.02	1.12	0.78	+0.10	-0.25	-0.35
Permitted	**17.84**	**16.94**	**16.94**	**-0.91**	**-0.91**	**0.00**
Schnitzer (stationary)	5.20	5.53	5.53	+0.32	+0.32	0.00
EBMUD	3.99	4.28	4.28	+0.29	+0.29	–
Dynegy	1.96	0.00	0.00	-1.96	–	–
Pinnacle Ag Services	1.48	1.62	1.62	+0.14	+0.14	–
Sierra Pacific	0.91	1.00	1.00	+0.09	+0.09	–
CASS	0.72	0.78	0.78	+0.06	+0.06	–
California Cereal	0.58	0.63	0.63	+0.05	+0.05	–
CA Waste (10th St)	0.46	0.51	0.51	+0.04	+0.04	–
Other	2.53	2.59	2.59	+0.06	+0.06	–
Other	**1.36**	**1.36**	**1.35**	**< 0.01**	**-0.01**	**-0.01**
Ferries	0.91	0.92	0.92	+0.02	+0.02	–
Schnitzer (ships)	0.30	0.37	0.37	+0.07	+0.07	–
Schnitzer (trucks)	0.04	0.04	0.04	> -0.01	> -0.01	> -0.01
Truck-related businesses	0.11	0.03	0.02	-0.08	-0.09	-0.01
Total	**85.91**	**87.09**	**83.38**	**+1.18**	**-2.53**	**-3.71**

Source	Emissions (tons per year)			Difference (tons per year)		
	2017 Base	2024 no Plan	2024 with Plan	no Plan-Base	Plan-Base	Plan-no Plan
West Oakland sources not included in community-scale modeling						
Area	30.40	33.83	33.83	+3.43	+3.43	–
Commercial cooking	20.63	23.90	23.90	+3.27	+3.27	–
Food and Agriculture	–	0.00	0.00	0.00	0.00	–
Residential fuel combustion	6.93	6.99	6.99	+0.06	+0.06	–
Commercial/industrial fuel combustion	2.30	2.39	2.39	+0.09	+0.09	–
Industrial processes	0.03	0.03	0.03	< 0.01	< 0.01	–
Solvent utilization	0.00	0.00	0.00	0.00	0.00	–
Consumer products	0.00	0.00	0.00	0.00	0.00	–
Other area sources	0.50	0.52	0.52	+0.01	+0.01	–
Non-road	13.00	11.71	11.71	-1.29	-1.29	–
Construction equipment	4.10	2.39	2.39	-1.71	-1.71	–
Construction dust	6.74	7.70	7.70	+0.96	+0.96	–
Commercial/industrial equipment	1.17	0.97	0.97	-0.20	-0.20	–
Lawn & garden equipment	0.12	0.13	0.13	+0.01	+0.01	–
TRUs	0.24	0.07	0.07	-0.17	-0.17	–
Other non-road sources	0.63	0.46	0.46	-0.17	-0.17	–
Total	**43.40**	**45.54**	**45.54**	**+2.14**	**+2.14**	**–**
Grand Total	**129.31**	**132.63**	**128.92**	**+3.33**	**-0.38**	**-3.71**

STRATEGIES AND IMPLEMENTATION SCHEDULES

The Strategies and the proposed five-year implementation schedules are shown in Table 6-4. Implementation of some Strategies will be ongoing while others will occur in a single year or span multiple years. For Strategies that are regulatory in nature, the implementation schedule denotes the anticipated timing of action such as when a regulatory agency such as CARB or the Air District initiates rule development, adopts a new or revised regulation, or when rule or regulation implementation begins.

The implementation schedule and other aspects of the Strategies may evolve during implementation. The anticipated timing of regulatory development, action and implementation is subject to change, and for some Strategies extend beyond the 5-year implementation schedule provided in Table 6-4.

Table 6-4. Owning Our Air: The West Oakland Community Action Plan Implementation Schedule

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	Land Use						
1	The City of Oakland continues working with California Waste Solutions and CASS, Inc. to relocate operations to the former Oakland Army Base and works with the property owners and local residents to redevelop the former sites in West Oakland with new business and light industrial uses that fit into a green economy.	City of Oakland					
2	The Air District will continue to engage in environmental review processes for development projects in West Oakland, such as the Oakland A's Ballpark and the MacArthur Maze Vertical Clearance Project, including coordinating with community partners and lead agency staff, providing data and technical assistance, and reviewing and commenting on CEQA documents through 2025.	Air District					
3	The Air District will study the potential air pollution and health outcomes of allowing truck traffic on I-580 and designating a truck lane on I-880. Allowing truck traffic on I-580 would require legislative approval, re-engineering, and re-construction.	Air District					
4	Consistent with measures in the West Oakland Specific Plan, the City of Oakland identifies locations outside of West Oakland for heavier industrial businesses currently in West Oakland that contribute to air pollution emissions and negative health outcomes in West Oakland.	City of Oakland					
5	The City of Oakland and Port of Oakland amends existing Ordinances, Resolutions, or Administrative policies to accelerate relocation of truck yards and truck repair, service, and fueling businesses in West Oakland currently located within the freeway boundaries that do not conform with the zoning designations adopted in the West Oakland Specific Plan.	City of Oakland, Port of Oakland					
6	The City of Oakland uses incentives and subsidies to relocate businesses away from West Oakland that do not conform with the zoning designations adopted in the West Oakland Specific Plan. The Air District will provide emissions data and technical support to assist the City in these efforts and to ensure that any relocated businesses do not cause exposure issues at the new location.	City of Oakland, Air District					
7	The City of Oakland revises business licensing procedures to require current and proposed businesses to disclose truck visits per day and works with Caltrans to determine the number of trucks that park in the Caltrans right-of-way near West Oakland. Caltrans works with WOEIP and the Air District to address air quality issues from truck parking leases, such as by modifying leases	City of Oakland, Caltrans					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	to allow for collecting surveys and partnering with the Air District and CARB to allow enforcement access.						
8	The City of Oakland amends existing City Ordinances and Administrative policies to list new truck yards and truck service, repair and fueling businesses as prohibited uses within the area of West Oakland that is inside the freeways (excluding the Port, OAB, and 3rd St. corridor of Jack London Square from Brush St. to Union St.).	City of Oakland					
9	The City of Oakland develops a plan to limit the hours that trucks can operate in the community.	City of Oakland					
10	The City of Oakland creates a comprehensive, area-wide urban canopy and vegetation plan that identifies locations that trees can be added and maintained, such as parks and along Caltrans' right-of-ways and develops a plan to protect existing trees that reduce exposure to air pollution emissions in West Oakland. This includes partnering with local nonprofit groups, encouraging trees on private property, and working with the community on tree maintenance and (as needed) removal. The development of the Oakland Urban Forest Master Plan will inform this work.	City of Oakland, Caltrans					
11	The City of Oakland works with local groups to train residents to maintain biofilters.	City of Oakland					
12	The Air District and the West Oakland Environmental Indicators Project intends to implement the green infrastructure project currently under development between Interstate I-880 and the Prescott neighborhood in West Oakland by 2021.	Air District					
13	The City of Oakland conducts a study regarding development fees for environmental mitigations.	City of Oakland					
14	The Air District provides subsidized loans for local small businesses to install energy storage systems (e.g. batteries, fuel cells) to replace stationary sources of pollution (e.g. back-up generators).	Air District					
15	The City of Oakland continues requiring new developments to provide infrastructure for electrical vehicle charging stations.	City of Oakland					
16	The City of Oakland, in partnership with the Steering Committee, CARB and the Air District, studies the exposure reduction benefit of requiring solid or vegetative barriers to be incorporated into site design between buildings and sources of air pollution (for example, a freeway).	City of Oakland CARB, Caltrans, Air District					
17	The City of Oakland adopts policies to lessen air quality impacts of residential and office buildings through the reduction or elimination of natural gas systems.	City of Oakland					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
18	The Air District advocates for more electrical infrastructure and power storage, including development of (1) fast-charging facilities, (2) truck charging stations and (3) better land use support for electric trucks by 2025.	PG&E					
19	The Port of Oakland adopts an Electrical Infrastructure Plan for the maritime waterfront areas of Oakland. This Plan seeks to remove barriers to adoption of zero-emission trucks, such as cost, land, and ownership of charging equipment.	Port of Oakland					
20	The City of Oakland revises development requirements to require the implementation of as many transportation demand management (TDM) strategies as feasible by developers of new buildings.	City of Oakland					
21	The Air District works with the City and Port of Oakland and other agency and local partners to create a Sustainable Freight Advisory Committee to provide recommendations to each agency's governing board or council. The Committee's scope includes: air quality issues, enhanced/increased enforcement of truck parking and idling, improved referral and follow-up to nuisance and odor complaints related to goods movement, improvements to the Port appointment system, charging infrastructure and rates, developing land-use restrictions in industrial areas, funding, and consideration of video surveillance to enforce truck parking, route, and idling restrictions.	Air District, Port of Oakland, City of Oakland					
22	The City of Oakland adopts more stringent air quality construction and operations requirements.	City of Oakland					
23	The City adds the AB 617 Steering Committee Co-Chairs to the official lists to receive notification of "Applications on File" for discretionary planning projects and "Meeting Agendas" of the Planning Commission and its five subcommittees, and the Landmarks Preservation Board.	City of Oakland					
24	The Air District works with agency and local partners to improve referral and follow-up on nuisance and odor complaints by 2021. This work includes updates to complaint processes, enforcement procedures, and coordination with other public agencies regarding odors, backyard burning, and other complaints.	Air District					
25	To address potential changes in local pollution exposure, the City of Oakland works with local community groups to address gentrification and the pricing out of long-term residents caused by gentrification. This effort includes meetings with local community groups and incentives and loans targeted to existing businesses and residents. Funding for this effort is identified as needed.	City of Oakland					
26	The City and Port of Oakland will work to establish permanent locations for parking and staging of Port related trucks and cargo equipment, i.e. tractors, chassis, and containers. Such facilities will	City of Oakland, Port of Oakland					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	provide long-term leases to parking operators and truck owner-operators at competitive rates. Such facilities will be at the City or Port logistics center or otherwise not adjacent to West Oakland residents.						
27	The City of Oakland and other appropriate local agencies limit fugitive dust from construction activity through better enforcement of existing regulations and permit requirements.	City of Oakland					
	Mobile Sources						
28	The California Air Resources Board develops improvements to the existing truck and bus inspection and maintenance programs. Potential improvements include increasing warranty requirements, adding a lower in-use emissions performance level, increasing inspections in West Oakland, using aggregated GPS and other telecommunication records to identify locations of idling trucks and buses, and partnering with the Air District to develop a system using on-board diagnostic and remote sensing devices to identify and fix faulty emissions abatement devices on trucks and buses.	CARB	A				
29	The California Air Resources Board develops the following regulations to increase the number of zero-emission trucks and buses operating in West Oakland: • The Advanced Clean Trucks regulation to transition to zero-emission technology those truck fleets that operate in urban centers, have stop-and-go driving cycles, and are centrally maintained and fueled. • Amendment to the drayage truck regulation to transition the drayage truck fleet to zero emissions.	CARB	A				I
30	The California Air Resources Board, in partnership with the Steering Committee, WOEIP and the Air District, conduct a pilot study to assess local idling impacts from trucks and buses. The Steering Committee, WOEIP and the Air District advocate for “Clean Idle” trucks and buses to idle no more than 5 minutes when in West Oakland.	CARB	I				
31	The California Air Resources Board develops amendments to the transport refrigeration unit (TRU) regulation to transition the TRU fleet to zero-emission operations by requiring both zero-emission technology and supporting infrastructure.	CARB	A		I		
32	The California Air Resources Board develops amendments to the existing cargo handling equipment regulation, which includes yard trucks, rubber-tired gantry cranes, and top handlers, that may reduce idling and transition the various types of equipment to zero-emission operation.	CARB			A		

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
33	The California Air Resources Board develops a handbook that identifies best practices for the siting, design, construction, and operation of freight facilities to minimize community exposure to air pollution.	CARB	A				
34	The California Air Resources Board develops regulations to expand California-specific standards for new light-duty vehicles, impacting 2026 and later model year vehicles, to increase the number of new zero-emission and plug-in hybrid electric vehicles sold in California and increase the stringency of fleet-wide emission standards for greenhouse gases and criteria pollutants.	CARB		A			
35	The California Air Resources Board develops new standards for small off-road engines (SORE), which are spark-ignition engines rated at or below 19 kilowatts and used primarily for lawn, garden, and other outdoor power equipment.	CARB	A				
36	The City of Oakland requires industrial and warehouse facilities to provide electrical connections for electric trucks and transport refrigeration units in support of CARB regulations.	City of Oakland					
37	The Port of Oakland, as part of the 2020 and Beyond Seaport Air Quality Plan, supports the transition to zero-emission drayage truck operations, including setting interim year targets out to 2035, coordinating an extensive zero-emission truck commercialization effort, working with the City of Oakland to amend local ordinances to increase the allowable weight limits for single-axle, zero-emission trucks on local streets located within the Port and the Oakland Army Base/Gateway areas, and developing an investment plan for needed upgrades to the Port's electrical infrastructure. The Port of Oakland also works with the California Public Utilities Commission and the California Energy Commission to study the development of time-of-day electric rate structures favorable to truck operators.	Port of Oakland					
38	The City of Oakland, consistent with the West Oakland Truck Management Plan: 1) improves training for police officers, community resource officers, and parking control technicians who issue truck and trailer parking tickets; 2) changes the parking regulations so they are easier to enforce; 3) increases truck parking fines; 4) targets enforcement at specific times and locations; and 5) improves signage directing drivers to available truck parking.	City of Oakland					
39	The City of Oakland, consistent with the West Oakland Truck Management Plan: 1) improves signage regarding existing truck routes; 2) works with businesses on preferred routes to use when destinations are not located on truck routes; and 3) adds to, or changes, truck routes and prohibited streets.	City of Oakland					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
40	The City of Oakland, consistent with the West Oakland Truck Management Plan, implements, in consultation with West Oakland residents, traffic calming measures to keep truck traffic off residential streets.	City of Oakland					
41	The Air District works with CARB to streamline the process for providing financial incentives for fueling infrastructure, and for low and zero-emission equipment. The Air District increases outreach and assistance to individual owner-operators and small companies by providing two workshops and enhanced outreach in West Oakland by 2022.	Air District					
42	The City and Port of Oakland award long-term leases to vendors that will deliver trucker services (including mini-market and convenience stores, fast food, and fast casual restaurants), and parking to keep trucks off West Oakland streets.	City of Oakland, Port of Oakland					
43	The Port of Oakland studies the effects on truck flow and congestion due to increasing visits from larger container ships, the feasibility of an off-terminal container yard that utilizes zero-emission trucks to move containers to and from the marine terminals, and the potential efficiency gains from increasing the number of trucks hauling loaded containers on each leg of a roundtrip to the Port.	Port of Oakland					
44	The Alameda County Transportation Commission works with West Oakland residents and businesses to develop mitigations to short- and long-term impacts caused by the construction of the 7th St Grade Separation East Project and the implementation of other elements of the GoPort Initiative.	ACTC					
45	The City of Oakland collaborates with AC Transit, BART, Emery-Go-Round, and the local community to implement the broad array of transit improvements identified in the West Oakland Specific Plan.	City of Oakland, AC Transit, BART, City of Emeryville					
46	The City of Oakland collaborates with MTC and ACTC to consider a program for extending car sharing to low-income individuals and groups.	City of Oakland, MTC, ACTC					
47	AC Transit implements the Grand Avenue transit improvements identified in its Bus Rapid Transit Plan, as well as mitigations if the improvements cause increases in truck and auto idling on Grand Avenue.	AC Transit					
48	The Air District plans to offer up to $7 million per year to replace older autos through the Vehicle Buy Back program, and up to $4 million per year through the Clean Cars for All program to replace	Air District					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	older autos and provide an incentive for a hybrid electric, plug-in hybrid electric, battery electric vehicle, or Clipper Card for public transit.						
49	The Air District offers financial incentives to replace box and yard diesel trucks with zero emission trucks owned by West Oakland businesses every year.	Air District					
50	The Air District plans to offer financial incentives to upgrade tugs and barges operating at the Port of Oakland with cleaner engines every year.	Air District, Port of Oakland					
51	The Air District plans to offer financial incentives to upgrade line-haul, passenger, and switcher (yard) locomotives with cleaner engines every year.	Air District					
52	The Air District plans to offer financial incentives to support the development of a hydrogen refueling station and the purchase of trucks and off-road equipment powered by fuel cells every year.	Air District					
53	The Air District offers financial incentives to replace long-haul diesel trucks with zero-emission trucks owned by West Oakland businesses every year.	Air District					
54	The Air District will award up to $1 million in funding incentives to pay for the cost of purchasing cleaner equipment in West Oakland, potentially including: electric lawn and garden equipment, battery electric Transport Refrigeration Units, and cargo-handling equipment, by 2021.	Air District					
55	The Bay Area Rapid Transit District will develop a bike station with controlled access at the West Oakland BART Station.	BART					
56	The City of Oakland implements the broad array of bicycle and pedestrian improvements identified in the West Oakland Specific Plan, the 2019 Oakland Bike Plan, and the 2017 Oakland Walks Pedestrian Plan.	City of Oakland					
57	Through the Pilot Trip Reduction Program, the Air District offers incentives for the purchase of electric bicycles for bike share programs.	Air District					
58	The Oakland Unified School District and the City of Oakland, as part of the Safe Routes to Schools Program in West Oakland, begin twice a day street closures next to public schools in West Oakland to keep cars and trucks away from arriving and departing students.	Oakland Unified School District, City of Oakland					
59	The City of Oakland increases the frequency of street sweeping to decrease road dust, particularly on streets adjacent to schools, on designated truck routes, and on streets near freeways. The California Department of Transportation increases the frequency of street sweeping along the I-	City of Oakland Caltrans					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	880, I-980, and I-580 freeways. Consideration is given to technology and techniques that avoid re-suspending road dust.						
60	The California Air Resources Board develops amendments to the At-Berth Air Toxics Control Measure to further reduce ship emissions at berth by strengthening the regulation to cover more vessel visits and types of ships.	CARB	A	I			
61	The California Air Resources Board develops amendments to the Commercial Harbor Craft Air Toxics Control Measure to achieve additional control of harbor craft emissions. The Steering Committee, WOEIP, and the Air District advocate for early compliance of harbor craft operating near West Oakland.	CARB	A			I	
62	The California Air Resources Board develops regulations to reduce idling emissions from locomotives at rail yards with an emphasis on reducing emissions from locomotives not pre-empted under the federal Clean Air Act. The Steering Committee, WOEIP, and the Air District advocate for early compliance for locomotives operating in West Oakland.	CARB	A			I	
63	The Port of Oakland implements a Clean Ship Program to increase the frequency of visits by ships with International Maritime Organization Tier 2 and Tier 3 engines.	Port of Oakland					
64	The Port of Oakland implements a Clean Locomotive Program to increase the number of U.S. EPA Tier 4 compliant locomotives used by the UP, BNSF, and OGRE railways to provide service in and out of the Port of Oakland.	Port of Oakland					
65	The Port of Oakland studies the feasibility of using electric switcher locomotives at the two Port railyards.	Port of Oakland					
66	The Air District works with Schnitzer Steel to study the feasibility of installing a shore-power or bonnet system to capture and abate vessel emissions at the West Oakland facility by 2021.	Air District					
67	The Air District intends to seek authority in 2021 to reduce emissions and risk from magnet sources, such as the Port of Oakland, freight operations and warehouse distribution centers.	Air District					
	Stationary Sources						
68	The Air District proposes amendments to existing regulations to further reduce emissions from metal recycling and foundry operations, such as changes to: 1) Rule 6-4: Metal Recycling and Shredding Operations, which requires metal recycling and shredding facilities to minimize fugitive PM emissions through the development and implementation of facility Emission Minimization Plans; and 2) Rule 12-13: Foundry and Forging Operations, which requires metal foundries and	Air District					D

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	forges to minimize fugitive emissions of PM and odorous substances through the development and implementation of facility Emission Minimization Plans by 2025.						
69	The Air District's Rule 11-18: Reduce Risk from TACS at Existing Facilities requires selected Bay Area facilities to reduce risk or install best available retrofit control technology for toxics on all significant sources of toxic emissions. Based on the results of the facility-specific health risk assessment, the Air District may require Schnitzer Steel and the East Bay Municipal Utility District to adopt a Risk Reduction Plan if the health risk exceeds a risk action level per the requirements of Rule 11-18 implementation.	Air District					
70	The Air District intends to provide incentives to replace existing diesel stationary and standby engines (fire pumps, dryers, conveyor belts, cranes) with Tier 4 diesel or cleaner engines. Priority is given to upgrading Tier 0, 1 & 2 engines located closest to schools, senior citizen centers, childcare facilities, and hospitals.	Air District					
71	The Air District proposes new regulations to reduce emission sources from autobody and other coating operations, including the use of vanishing oils and rust inhibitors by 2025.	Air District				D	A
72	The Air District proposes new regulations to reduce emissions from wastewater treatment plants and anaerobic digestion facilities, such as a regulation to reduce emissions of methane, reactive organic gases, and oxides of nitrogen by 2020.	Air District	D	A			
73	The Air District proposes amendments to existing Regulation 8-5 to further reduce emissions of reactive organic gases and other toxic compounds from organic liquid storage tanks by 2020. Organic liquid storage tanks are defined in Regulation 8-5.	Air District	A				
74	The Air District advocates for a plan that East Bay Clean Energy and PG&E are spearheading to replace the Dynegy Power Plant with a cleaner and more reliable source of energy by 2022. The proposed location for this initiative is the Oakland C, Oakland L, Maritime Port of Oakland, and Schnitzer Steel substation pocket, which is located within PG&E's Oakland distribution planning area. Eligible resource types include: (1) in-front-of-the-meter renewable generation; (2) in-front-of-the-meter energy storage, and (3) behind-the-meter energy storage. EBCE is seeking to procure the energy, resource adequacy (RA), and renewable energy credits (RECs) associated with these local resources, while PG&E will focus on meeting Oakland's transmission reliability needs.	East Bay Clean Energy, PG&E					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
	Health Programs						
75	The Air District intends to develop and fund a program to reduce exposure to air pollution at schools, day care facilities, senior centers, health facilities, public facilities, apartments and homes in West Oakland by 2021. This Strategy includes policies or grants for building energy efficiency upgrades to reduce infiltration of pollutants and the installation of high-efficiency air filtration systems (rated MERV 14 or higher).	Air District					
76	The City of Oakland works with local and agency partners to implement regional and local adoption of the State Department of Public Health's Health In All Policies program.	City of Oakland					
77	Consistent with the Healthy Development Guidelines, the City of Oakland implements a project-wide smoking ban in Oakland at new developments.	City of Oakland					
78	Consistent with the State's Building Energy Efficiency Standards for air filtration in effect as of January 1, 2020, the City of Oakland requires newly constructed buildings of four or more habitable floors to include air filtration systems equal to or greater than MERV 13 (ASHRAE Standard 52.2), or a particle size efficiency rating equal to or greater than 50 percent in the 0.3-1.0 µm range and equal to or greater than 85 percent in the 1.0-3.0 µm range (AHRI Standard 680).	City of Oakland					
79	The City of Oakland works with agency and community partners to undertake participatory budgeting with West Oakland community members to allocate local health improvement grants that reduce emissions or exposure to emissions.	City of Oakland					
80	The Air District researches actions that are potentially exposure-reducing, such as: 1) an engineering evaluation of exhaust stacks and/or vents to determine if relocation will reduce local exposure; (2) a study to determine if smart air filtration systems can reduce exposure by in-taking air during daily non-peak vehicle travel times, such as between midnight and four a.m.; and (3) a study of the potential air quality benefits of a centralized package delivery site such as personal lockers by 2025.	Air District					
81	The City of Oakland works with local businesses, partner agencies, and community members to develop a Green Business Strategic Plan to attract, retain, and support innovative green companies in West Oakland. This effort includes coordination with State and local agencies to develop criteria for green business certification for new and existing businesses.	City of Oakland					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
82	The California Office of Environmental Health Hazard Assessment, in partnership with the Steering Committee, the City of Oakland, CARB, and the Air District, studies setting a limit on West Oakland's cumulative exposure to TACs.	OEHHA					
83	The City of Oakland works with community partners to implement the Healthy Development Guidelines for new building projects.	City of Oakland					
84	The Alameda County Public Health Department expands its Asthma Management programs.	Alameda County Public Health Department					
85	The City of Oakland works with Alameda County Public Health Department to improve access to medical services within West Oakland. This work expands existing programs such as: (1) Child Health and Disability Prevention Program free health check-ups for infants through teens; (2) Asthma Management at schools; (3) Building Blocks for Health Equity which works to correct inequity in health outcomes for children; (4) Urban Male Health Initiative which is charged with reducing the premature mortality of men and boys in Alameda County; and (5) Alameda County Health Improvement Plan to develop and implement a five-year county plan to improve health and achieve health equity.	City of Oakland, Alameda County Public Health Department					
86	The Alameda County Public Health Department works with agency and local partners to investigate the use of green building approaches in housing construction and renovation that will reduce emissions and exposure to air pollution emissions. This work examines weatherization/energy efficiency and renewable energy services. This work draws from the Contra Costa County Health Department's pilot effort in cooperation with the Regional Asthma Management Program.	Alameda County Public Health Department					
87	CARB conducts a technology assessment of commercial cooking rules and control strategies and proposes incentives and/or a Suggested Control Measure for commercial cooking. The Air District offers incentives and/or proposes a regulation to reduce emissions from commercial cooking.	Air District, CARB					
88	The City of Oakland studies revising standard conditions of approval and/or similar requirements for large projects to require "opt-up" to East Bay Community Energy's Brilliant 100 carbon-free electricity supply.	City of Oakland					

			Implementation Timeframe (A = regulatory action; I = regulatory implementation; D= regulatory development)				
#	**Strategies**	**Authority**	**2020**	**2021**	**2022**	**2023**	**2024**
89	The Alameda CTC and Caltrans will continually engage with the community, at a minimum through participation in quarterly meetings of the WOCAP implementation committee, on early project planning and delivery for projects in West Oakland where Alameda CTC and/or Caltrans is the project sponsor in order to ensure projects do not increase transportation impacts on residents. These projects will undergo appropriate reviews to assess the environmental and health impacts, and potential local benefits, and adopt associated mitigation measures so they do not result in a net increase in air pollution or health inequities for residents most impacted by the county's freight transportation system in West Oakland.	ACTC, Caltrans					

Table 6-5. Further Study Measures

	Further Study Measures	Authority	2020	2021	2022	2023	2024
1	The Air District will investigate local impacts of backyard wood fires and strategies to minimize these impacts.	Air District					
2	The Air District will analyze road dust emission rates for local streets.	Air District					
3	The Air District will investigate potential rulemaking to limit fugitive dust from construction activity.	Air District					
4	The Air District will work with CARB, EBMUD, and other agency and community partners to identify strategies and incentives to address community concerns about odors, health-related emissions, and disclosing to the community information about complaints and complaint resolutions from the EBMUD facility in the Owning Our Air plan area.	Air District					
5	The Air District will investigate the feasibility of amending Regulation 5 (Open Burning) and/or Reg. 6-3 (Wood Burning Devices) to prohibit recreational fires	Air District					
6	The Air District works with the Port of Oakland to optimize the Port appointment system to minimize truck idling.	Air District, Port of Oakland					

Chapter 7 – Enforcement

AB 617 requires that community emissions reduction programs include an enforcement plan to ensure Air District and CARB enforcement efforts support reducing emissions and improving air quality and public health in the West Oakland community. This enforcement plan uses three years of stationary and mobile source enforcement data to gain a better understanding of the local air quality issues in West Oakland, specifically in the 94607 and 94608 zip codes. Enforcement responsibilities are jointly shared between CARB and the Air District, with CARB primarily responsible for enforcement of mobile sources and the Air District primarily responsible for stationary sources. In West Oakland, inspections of stationary and mobile sources may be conducted jointly by Air District and CARB staff. Historical stationary and mobile source enforcement data is shared with the West Oakland Steering Committee in this plan to help identify and affirm enforcement strategies and address community concerns that are above and beyond existing Air District and CARB enforcement programs.

ENFORCEMENT AUTHORITY

The primary function of enforcement is to ensure compliance and minimize local and regional impacts from air pollution. This section explains the enforcement authorities over stationary and mobile sources.

STATIONARY SOURCES

The California Health and Safety Code grants Air Districts the authority to adopt and enforce air pollution regulations to achieve state and federal air quality standards. The Air District's Compliance and Enforcement Division enforces Air District, state, and federal regulations for a variety of stationary sources in West Oakland. The following are some examples of stationary sources in the West Oakland area and some of the corresponding Air District regulations for those types of operations:

- Metal facilities (Rule 12-13 and Rule 6-4)
- Power plants (Rule 9-9 and Rule 9-11)
- Sewage treatment plants (source specific rule under development, Rule 9-1 and Rule 9-2)
- Cement and asphalt plants (Rule 6-1 and Rule 6-6)
- Recycling facilities (Rule 6-1, Rule 6-4 and Rule 6-6)
- Gasoline stations (Rule 8-7)
- Stationary and portable engines and generators (Rule 9-8)
- Boilers (Rule 9-7)
- Auto body shops (Rule 8-45)
- Coating operations (Rule 8-4, Rule 8-19, Rule 8-31, and Rule 8-32)
- Asbestos renovation and demolition projects (Rule 11-2 and Rule 11-14)

MOBILE SOURCES

CARB is the primary authority responsible for developing and enforcing regulations to control emissions from portable and mobile sources and consumer products in California, except in cases where federal law preempts CARB's authority. Although CARB has authority to regulate emissions

from these sources, it does not have authority to enforce where vehicles drive or park. Beginning in 2009, CARB and the Air District entered a Memorandum of Understanding (MOU) that allows the Air District to enforce portable and mobile sources regulations. Per this agreement, in West Oakland inspection and enforcement for the following sources may be conducted by both CARB and Air District staff:

- Portable equipment
- Heavy-duty idling
- Cargo handling equipment
- Off-road construction equipment
- Commercial harbor craft
- Ocean-going vessels (shore power)
- Drayage trucks
- Transport refrigeration units
- On-board incineration on cruise ships
- Fuel sulfur and operational requirements within 24 nautical miles for ocean-going vessels

The authority to regulate and enforce parking and truck routes within West Oakland is held by the City's Police and Code Enforcement departments. It will be the responsibility of those departments to apply any truck parking or traffic strategies in West Oakland.

ENFORCEMENT OF STATIONARY SOURCES

AIR DISTRICT ENFORCEMENT PROGRAM

The Air District has a robust Compliance and Enforcement Division that is responsible for performing core enforcement program activities. Approximately 60 inspectors are assigned to geographic areas within the nine Bay Area counties. Two inspectors are assigned to the West Oakland area to conduct inspections and enforce Air District rules and regulations. The enforcement program includes:

- unannounced, compliance inspections of Air District permitted facilities,
- investigations of community complaints and general air quality concerns, and
- responding to and investigating major incidents such as fires associated with manufacturing or industrial processes, or other major air emission releases.

It is the Air District's goal to respond to complaints immediately, in-person, on the day they are received. In situations where complaints are received after business hours or on weekends, the inspector will respond on the next workday. In the course of their investigations, inspectors will document the compliance status of permitted sources with air pollution regulations.

Occasionally, inspectors discover unpermitted sources that fall within the Air District's jurisdiction. In these situations, the inspector may work with the facility owner to facilitate the permitting process. Inspectors also document when a facility is in violation of an air quality regulation and facilities are required to take corrective actions and prevent it from happening again. As part of this process, the

inspector will track the progress of the corrective actions and provide compliance assistance if necessary.

Stationary Sources in West Oakland

Enforcement staff conduct routine, unannounced inspections of stationary sources of air pollution. Figure 7-1 provides a closer look at the different types of Air District permitted facilities located in the West Oakland area. The chart also shows the number of each type of facility in the area. See Appendix E in the enforcement plan for a complete list of Air District permitted facilities located in 94607 and 94608 zip codes.

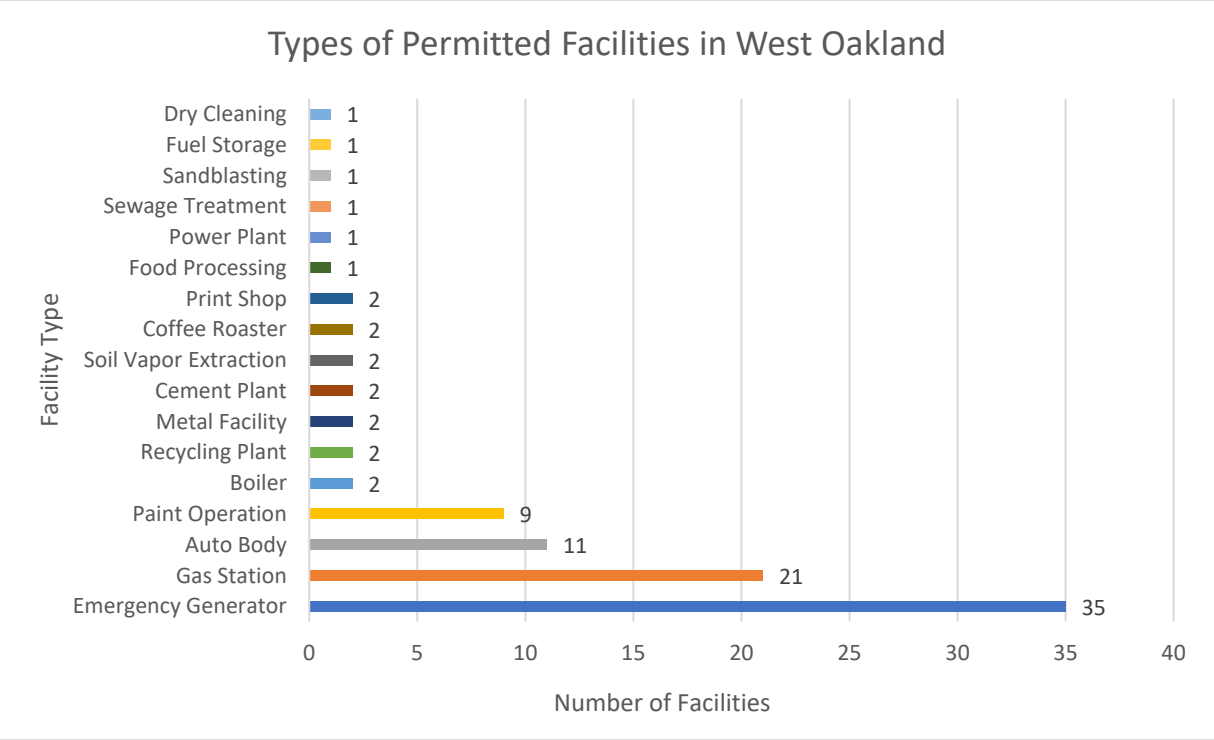


Figure 7-1. Types of Permitted Facilities in West Oakland

3-Year Enforcement History of Stationary Sources

The Air District compiled a 3-year enforcement history in the West Oakland area for stationary sources. These data include a 3-year summary of compliance inspections, complaint investigations, and violations from January 2016 through December 2018.

Compliance Inspections

West Oakland has approximately 96 Air District permitted facilities as of December 2018. Unannounced compliance inspections are conducted at sites that have an Authority to Construct or Permit to Operate. As part of the inspection, Air District inspectors meet with the owner or operator of a facility to ensure sources are operating in compliance with Air District regulations, permit requirements and other State and Federal Air Quality Regulations. Inspectors conduct inspections of equipment, operational processes and review associated records to determine a facility's compliance

status. In the 3-year period, Air District inspectors completed 196 routine compliance inspections at the 96 Air District permitted facilities.

In addition to inspections at permitted facilities, Air District inspectors also conduct compliance inspections at various sites of construction and demolition projects that are subject to the Air District's Asbestos Demolition and Renovation Program. In the 3-year period, Air District inspectors completed 50 asbestos demolition and renovation site inspections. Beyond routine compliance inspections at permitted facilities and asbestos demolition and renovation sites, Air District inspectors initiate compliance inspections at facilities when responding to complaints and investigating potential compliance concerns, such as those associated with, but not limited to:

- process upsets and equipment malfunctions at permitted facilities;
- deviations to a facility's permit, operating parameters, monitoring and recordkeeping requirements;
- major incidents such as fires or other air emission releases; and
- facilities and sites of operation that do not already have an Air District permit where there may be an air quality concern.

As shown in Figure 7-2, an analysis of the inspection program shows a compliance rate of approximately 92% for the West Oakland area, which includes inspections of permitted stationary sources and asbestos demolition and renovation sites.

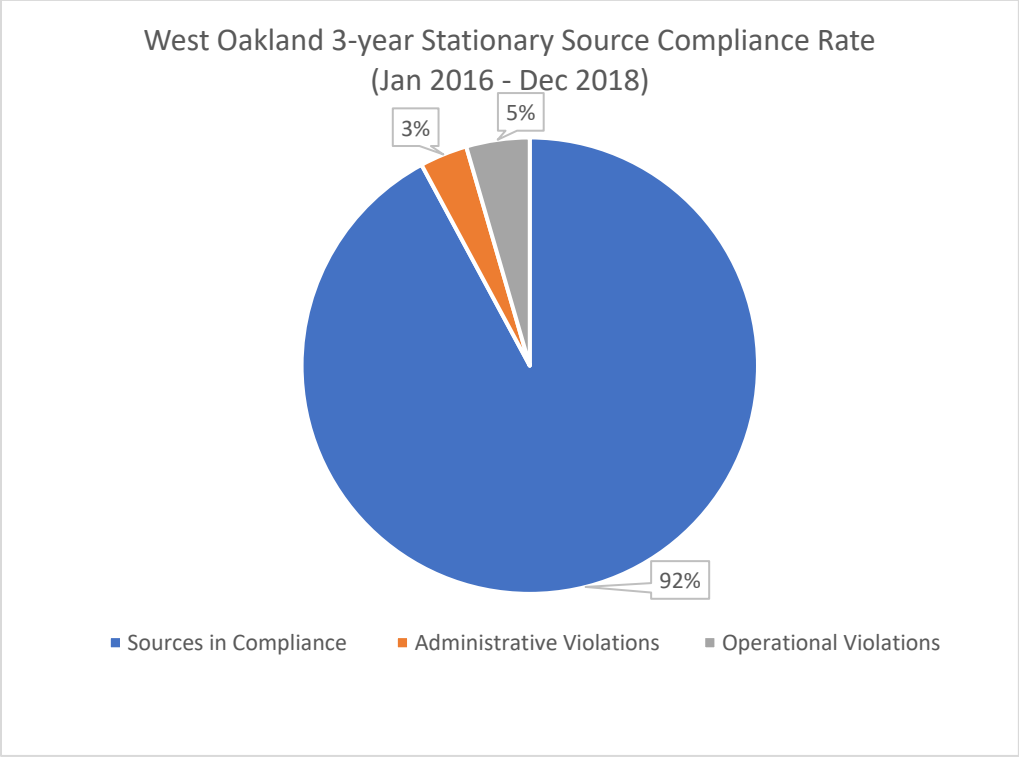


Figure 7-2. West Oakland 3-year Stationary Source Compliance Rate

Complaint Investigations

Community members are often the first to notice an air pollution concern, such as visible emissions or odors. In response to civic concerns, Air District staff investigate every complaint to achieve early intervention on potential problems and allow the District to be proactive in protecting public health. Inspectors respond and investigate air pollution complaints that have impacts on individuals, and which may result in Air District enforcement actions, including public nuisance and/or violations for smoke, odors, dust, particulate matter or other air contaminants.

The Air District receives a wide variety of air quality related complaints. For each complaint, the inspector responds and investigates to determine whether the alleged source is violating an air pollution regulation. The inspector takes appropriate enforcement actions when the alleged source is determined to be in violation. In situations where the inspector is unable to establish that a violation has occurred, the inspector notifies the facility of the complaint and works with the owner/operator to resolve the air quality concern.

Complaint investigations make up a large portion of the enforcement activities in West Oakland. In the 3-year period, a total of 124 air quality complaints were received by the Air District. Figure 7-3 summarizes the complaint type as received by the Air District. Within the West Oakland area, odors are the greatest concern of the community, followed by complaints of dust. Other types of complaints made up less than 20 complaints for the period reviewed.

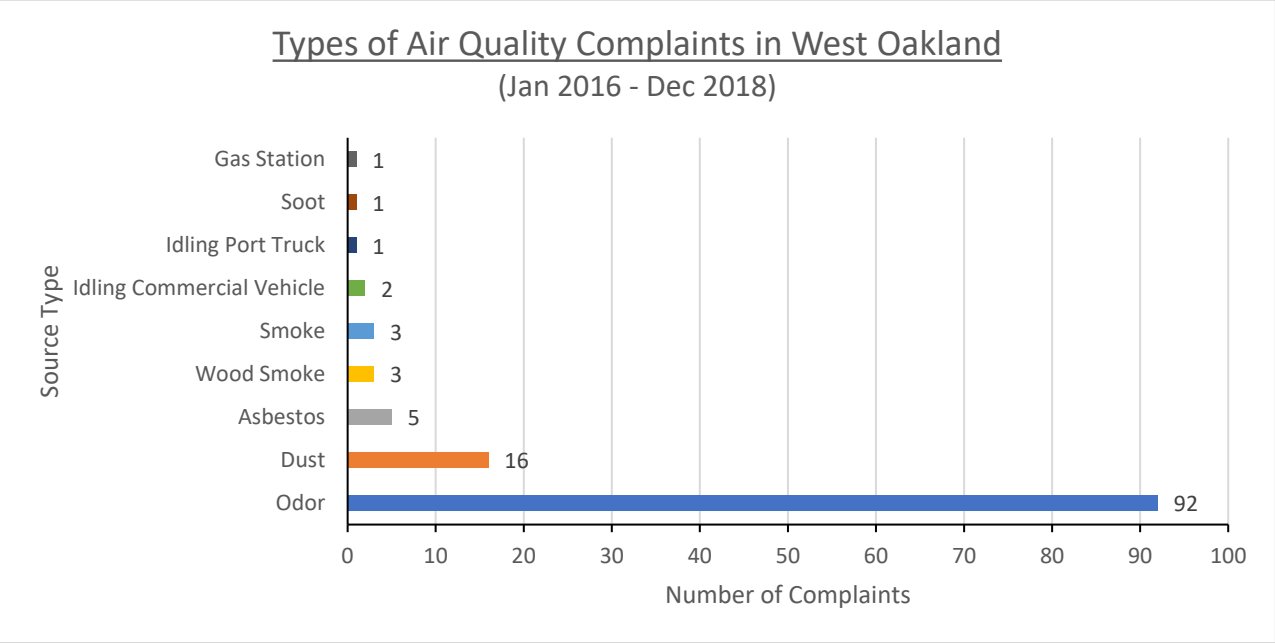


Figure 7-3. Types of Air Quality Complaints in West Oakland

Figure 7-4 below is a closer evaluation of the complaint data. The graph shows many odor complaints received by the Air District allege several specific facilities or sources. *Custom Alloy,* a metal foundry, received the most odor complaints of the facilities in West Oakland. *California Waste Solutions*, a waste processing facility, also received a notable number of odor complaints during the 3-year period.

Approximately 26 percent of the complaints filed by complainants did not allege a specific source. Additionally, 10 percent of the complaints in West Oakland were one-time, single complaints.

Of the 16 dust complaints that occurred in West Oakland, 12 were attributable to a construction activity. See Appendix E for a complete list of complaints received in West Oakland.

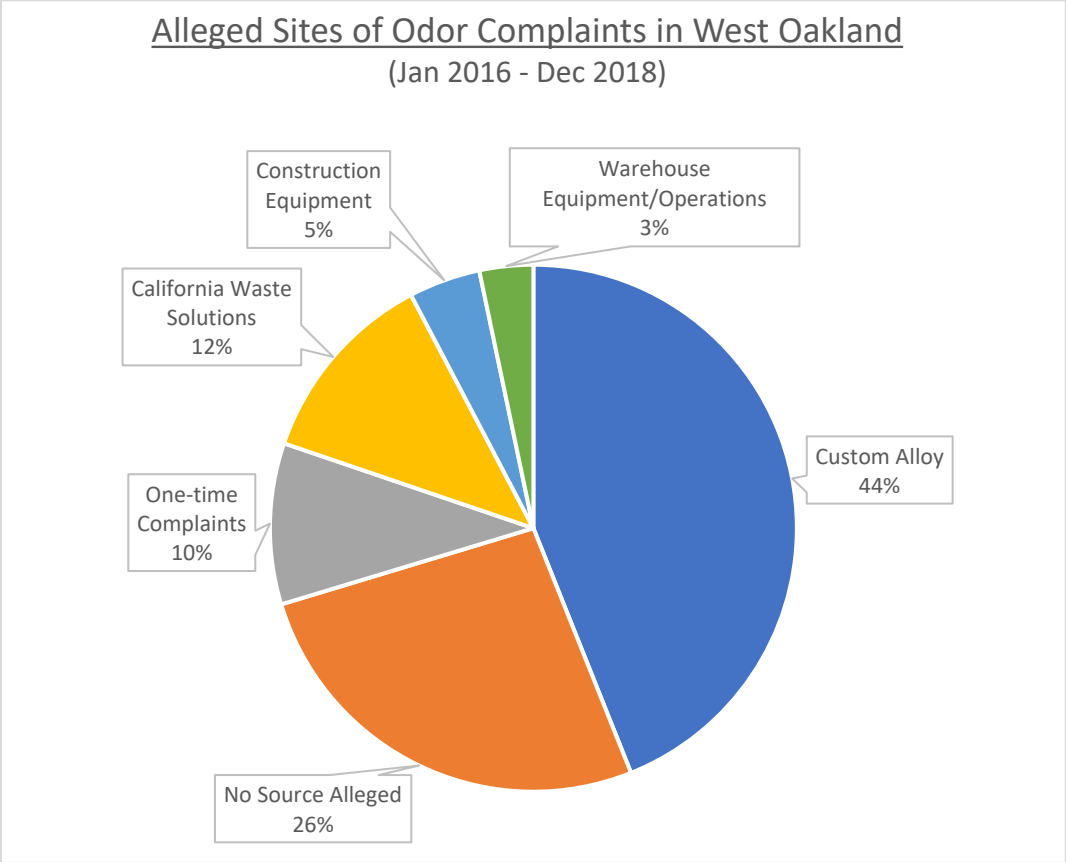


Figure 7-4. Alleged Sites of Odor Complaints in West Oakland

Notice of Violations

Notice of Violations are issued to facilities found to be operating a source in violation of air quality regulations. In addition to citing the types of sources and regulations violated, these notices document the compliance issue and cause, the extent of harm associated with the violation and how the violation was stopped or corrected.

When a Notice of Violation is issued, the facility is required to correct the violation and may have to pay a monetary penalty, including taking steps to prevent it from happening again. Facilities that do not correct violations or take measures to prevent them risk increased penalties for repeat violations. In the 3-year period, a total of 21 Notices of Violations were issued as shown in Figure 7-5.

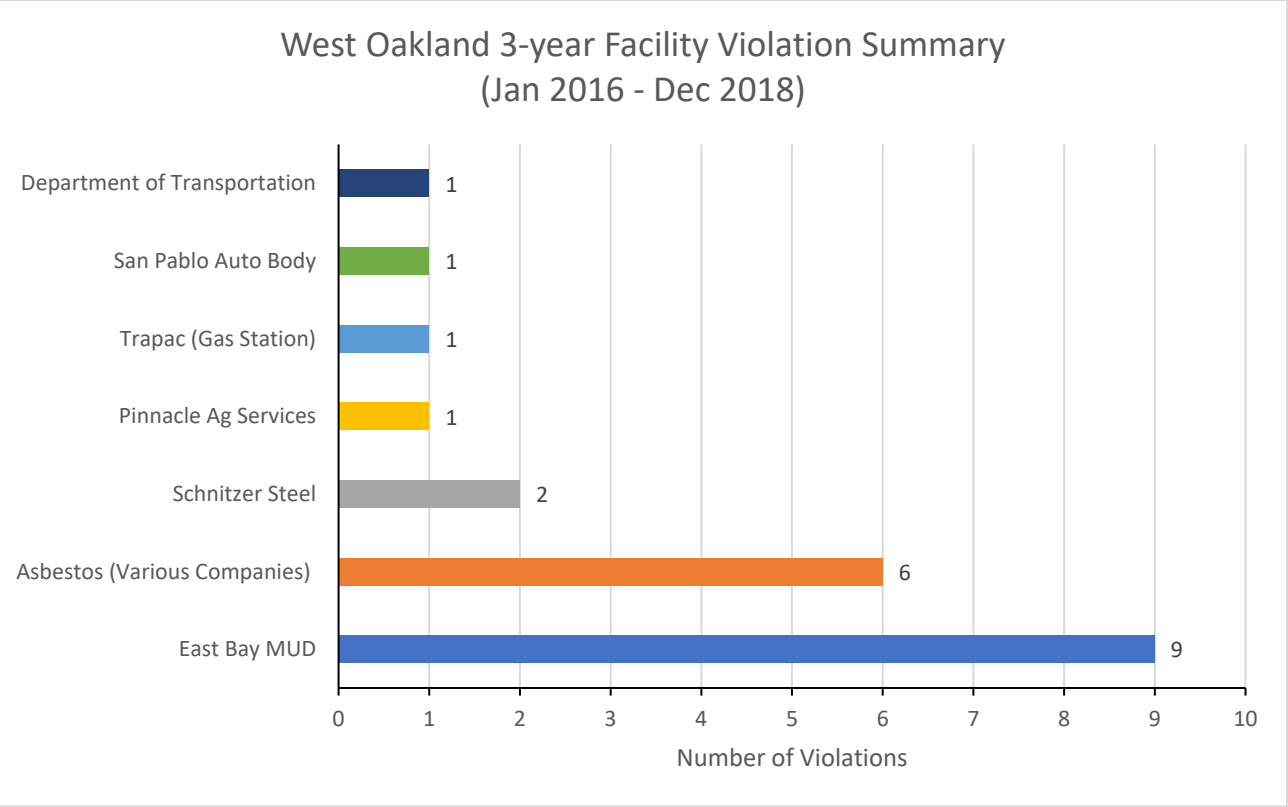


Figure 7-5. West Oakland 3-Year Violation Summary

For minor violations, a Notice to Comply may be issued to correct the violation. A Notice to Comply is an enforcement action to place the facility on notice that there is a compliance concern. A Notice to Comply may only be issued to address violations that are administrative in nature and do not cause air emissions. In the 3-year period between January 2016 and December 2018, 1 Notice to Comply was issued. See Appendix E for a complete list of violations issued in West Oakland.

ENFORCEMENT OF MOBILE SOURCES

CARB ENFORCEMENT PROGRAMS

The California Air Resources Board (CARB) enforcement programs cover the vehicles we drive, the diesel engines that power our economy, consumer products that we purchase, and greenhouse gas (GHG) emissions from our industries and activities. The goal of CARB enforcement programs is to achieve comprehensive compliance in every regulation the Board adopts. Through enforcement, we work to bring responsible parties into compliance and in doing so achieve a level playing field across industry so that no company can benefit from non-compliance at the expense of another; and to deter industry from future violations. We take compliance seriously because the success of our programs, and public health protection, depends on it.

CARB applies enforcement programs professionally in accordance with our enforcement policy, which we updated in 2017.[44] We use data and inspections to identify potential non-compliance, and then

[44] CARB's enforcement policy is available here: https://ww2.arb.ca.gov/resources/documents/enforcement-policy.

investigate each case. Once a violation is identified, we notify the responsible party and evaluate what happened. We work with the party to achieve compliance and measure the relevant facts and circumstances of each case, relative to eight factors set in law and described in our enforcement policy, to determine an appropriate penalty. The case is settled when the responsible party has achieved compliance and paid an appropriate penalty. If the case cannot be settled, we work with CARB legal staff to refer the case to California's Attorney General for litigation.

Field inspectors are a critical component of the diesel enforcement program. The inspectors work across the state to inspect trucks and other equipment for compliance with CARB's diesel regulations, such as the Heavy-Duty Diesel Vehicle Inspection Program, Solid Waste Collection Vehicle, Drayage Truck, Statewide Truck and Bus, Tractor-Trailer Greenhouse Gas, and Transport Refrigeration Unit. Field inspectors also conduct inspections for compliance with Public Agencies and Utilities, In-Use Off-Road, and School Bus Idling regulations. CARB inspectors examine heavy-duty vehicles and equipment at numerous locations throughout California, such as at California Highway Patrol scale facilities, warehouses, fleet yards, construction sites, random roadside locations, truck stops, rest areas, ports, and rail yards.

In addition, CARB has a Supplemental Environmental Project (SEP) Policy that allows community-based projects to be funded from a portion, up to 50 percent, of the penalties received during settlement of enforcement actions. SEPs can improve public health, reduce pollution, increase environmental compliance, and bring public awareness to neighborhoods most burdened by environmental harm.

CARB'S THREE-YEAR ENFORCEMENT HISTORY

Heavy-Duty Diesel Vehicles

Over the last three years, CARB has conducted 939[45] inspections on Heavy-Duty Diesel Vehicles (HDDV) within West Oakland. Table 7-1 represents a year-by-year breakdown of enforcement action for CARB HDDV programs in the community between 2016 and 2018 (inspections per year are program based and some occur concurrently). These inspections occurred across 10 of 12 CARB HDDV enforcement programs. The two programs not included in Table 7-1 are the Fleet Rule for Public Agency and Utility (PAU) and the Solid Waste Collection Vehicle Regulation (SWC). No inspections for these programs occurred in the West Oakland community from 2016-2018 because the deadline for fleets to demonstrate compliance has long past and traditionally the West Oakland area has had high compliance rates with these rules.

[45] Number is preliminary and may change as data is reviewed.

Table 7-1. Enforcement History of Heavy-Duty Vehicles in West Oakland

		2016		Violations		2017		Violations		2018		Violations	
	Program	Inspections	Compliant Units	Emission	Non-Emission	Inspections	Compliant Units	Emission	Non-Emission	Inspections	Compliant Units	Emission	Non-Emission
Heavy Duty Vehicle Inspection Program	Diesel Exhaust Fluid	3	3	0	0	6	6	0	0	8	8	0	0
	Emission Control Label	32	32	0	0	51	50	0	1	87	85	0	2
	Smoke Opacity	70	70	0	0	53	53	0	0	90	90	0	0
	Tampering	---	---	---	---	10	10	0	0	90	89	1	0
	Idling	68	68	0	0	11	11	0	0	32	32	0	0
	Off-Road	7	7	0	0	6	5	0	1	10	10	0	0
	Smart Way	---	---	---	---	1	1	0	0	32	32	0	0
	Transport Refrigeration Unit	2	1	1	0	1	1	0	0	0	---	--	---
	Drayage	56	54	2	0	53	52	0	1	89	87	1	1
	Truck and Bus	40	38	2	0	16	14	2	0	15	15	0	0
	Total	**278**	**273**	**5**	**0**	**208**	**203**	**2**	**3**	**453**	**448**	**2**	**3**

CARB Heavy-Duty Diesel Vehicle Program descriptions:

Heavy-Duty Vehicle Inspection Program (HDVIP): The HDVIP program requires heavy-duty trucks and buses to be inspected for excessive smoke and tampering, and engine certification label compliance. Any heavy-duty vehicle traveling in California, including vehicles registered in other states and foreign countries, may be tested. Tests are performed by CARB inspection teams at border crossings, CHP weigh stations, fleet facilities, and randomly selected roadside locations. Owners of trucks and buses found in violation are subject to minimum penalties starting at $300 per violation.

Idling: Idling and opacity inspections are performed to ensure a heavy-duty vehicle (HDV) is compliant with emission standards and is not violating CARB's Idling regulation. Idling for more than five minutes is prohibited unless the HDV is certified clean idle and the vehicle is more than 100 feet away from a school or restricted area (exceptions apply). Vehicle owners and drivers in violation are subject to minimum penalties starting at $300 per violation and up to $1000 per day.

Off-Road Construction Equipment (off-road regulation): Construction equipment is a major contributor to air pollution, especially when large construction projects are adjacent to neighborhoods. To address this source of air pollution, CARB adopted the nation's first regulation aimed at cleaning up off-road construction equipment such as bulldozers, graders, and backhoes. The off-road regulation requires off-road fleets to meet fleet average emission standards and be equipped with Best Available Control Technology (BACT) (a few specific exceptions apply).

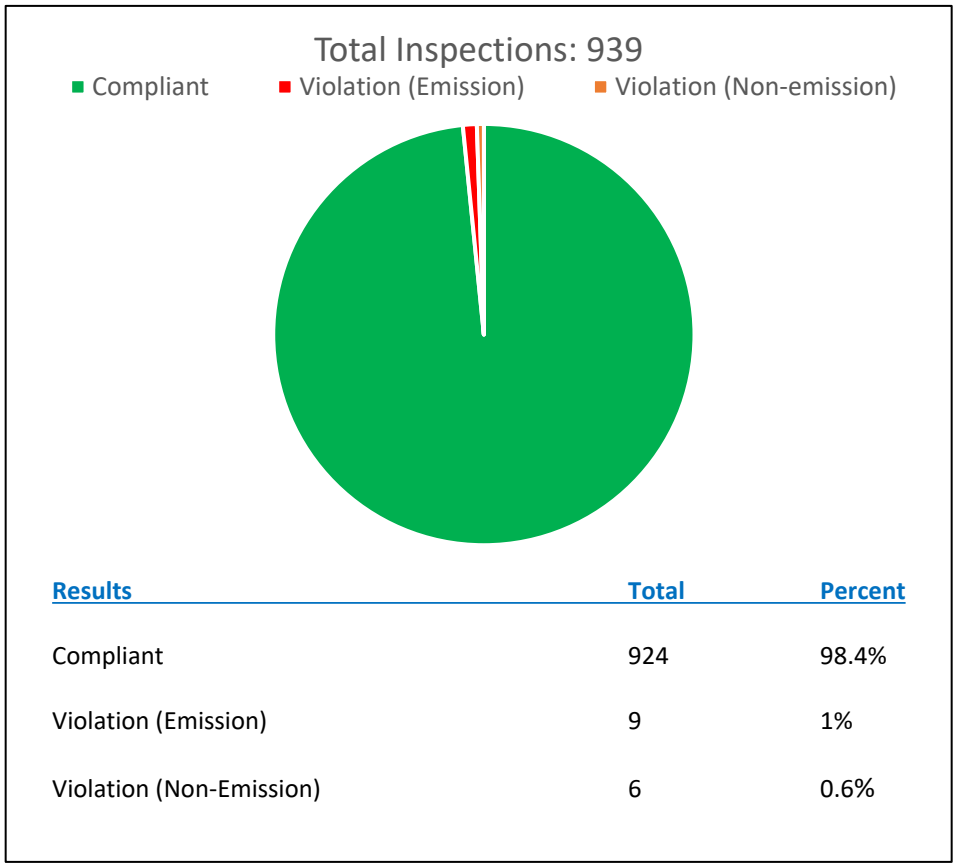
Smart Way: The Tractor-Trailer Greenhouse Gas Regulation requires 53-foot or longer dry van or refrigerated van trailers and the tractors that pull them on California highways to use certain equipment that the U.S. Environmental Protection Agency Smart Way program has verified or designated to meet their efficiency standards.

Transport Refrigeration Unit (TRU): Transport Refrigeration Units (TRUs) are refrigeration systems powered by diesel internal combustion engines designed to refrigerate or heat perishable products

that are transported in various containers, including semi-trailers, truck vans, shipping containers, and rail cars. Since diesel particulate matter has been identified as a toxic air contaminant, CARB adopted an Airborne Toxic Control Measure (ATCM) for TRUs and TRU generator sets. CARB staff inspect TRUs to ensure that the units are meeting labeling and in-use performance standards identified in the TRU regulation.

Drayage: The Drayage Truck Regulation is part of CARB's ongoing efforts to reduce particulate matter (PM) and oxides of nitrogen (NOx) emissions from diesel-fueled engines and improve air quality associated with goods movement. Heavy-Duty Vehicles that carry goods to or from a port or intermodal facility are required to be equipped with a 2007 or newer model year engine. This requirement becomes stricter in 2023, when Drayage trucks are required to be equipped with a 2010 or newer model year engine, because Drayage trucks will be required to meet the standards of the Truck and Bus Regulation.

Statewide Truck and Bus (STB): The Statewide Truck and Bus regulation requires diesel trucks with a Gross Vehicle Weight Rating (GVWR) greater than 14,000 pounds that operate in California to install diesel particulate filters or replace older engines with cleaner engine technology on a schedule based on the model year of the engine and GVWR.



Results	Total	Percent
Compliant	924	98.4%
Violation (Emission)	9	1%
Violation (Non-Emission)	6	0.6%

Figure 7-6. Heavy-Duty Vehicle Inspections (2016-2018)

Preliminary analysis of Heavy-Duty Vehicle program inspections suggests that the compliance rate within the West Oakland community is high. As seen in Figure 7-6, from 2016-2018, 98.4 percent of Heavy-Duty Vehicle program inspections showed compliance. All Heavy-Duty Vehicle programs have more than a 90 percent compliance rate when averaged over a three-year period. During this period, 15 citations were issued to Heavy-Duty Vehicles within the community. Further breakdown of the citations data indicates that nine citations were issued for emission violations and six citations were issued for non-emission violations. The difference between emission and non-emission citations is that emission violations contribute to air pollution while non-emissions violations do not. An example of a non-emission violation would be a truck not complying with labeling requirements. For a breakdown of violations per CARB enforcement program and location, see the map provided in Figure 7-7. CARB is working to compile information on the resolution of violations issued in West Oakland and will provide this data to the community Steering Committee as it becomes available.

CARB will work closely with the Steering Committee to better determine areas of non-compliance within the West Oakland area. The high compliance rate observed in the 3-year history may demonstrate the need for more targeted inspections to identify compliance issues.

The inspection history includes several program inspections that were conducted in and around the West Oakland community. The maps shown in Figure 7-8 indicate the approximate locations and number of inspections in the above-mentioned mobile program areas in the West Oakland Community in 2016-2018. The goal of the maps is to visually display the location of program inspections to help determine gaps in CARB enforcement activity as well as where enhanced enforcement is necessary to deter potential violators within the community. For an interactive web version of CARB's enforcement activity, visit CARB's enforcement data visualization tool: https://webmaps.arb.ca.gov/edvs/.

Figure 7-7. CARB Citations (2016-2018)

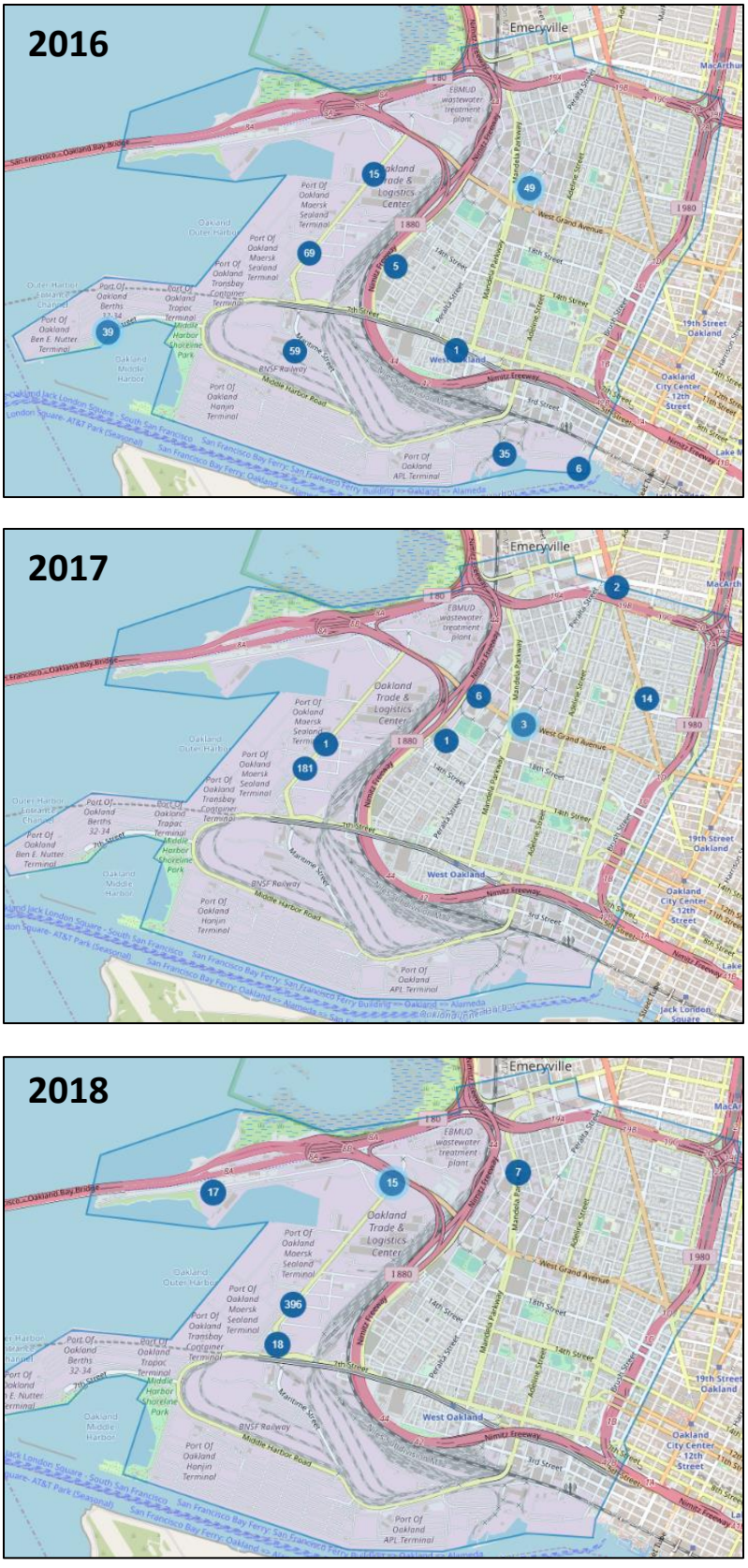


Figure 7-8. Heavy-Duty Vehicle Program Inspections (2016-2018)

Marine Enforcement

From 2016-2018 CARB staff performed at least 167 inspections in the Port of Oakland. CARB has recently developed strategies to better track the locations of Marine enforcement activities, which will improve our ability to identify the location of cargo handling equipment, shore power, and other marine inspection locations. We will include these data in future updates.

Table 7-2. Marine Enforcement History (2016-2018)

	2016		2017		2018	
Program	Inspections	Non-compliant Units	Inspections	Non-compliant Units	Inspections	Non-compliant Units
Ocean-Going Vessels	37	0	32	1	23	0
Shore Power	15	1	13	1	Pending	Pending
Cargo Handling Equipment	---	---	3	Pending	Pending	Pending
Commercial Harbor Craft	0	0	0	0	44	2
Total	**52**	**1**	**48**	**2**	**67**	**2**

CARB Marine Enforcement Program descriptions:

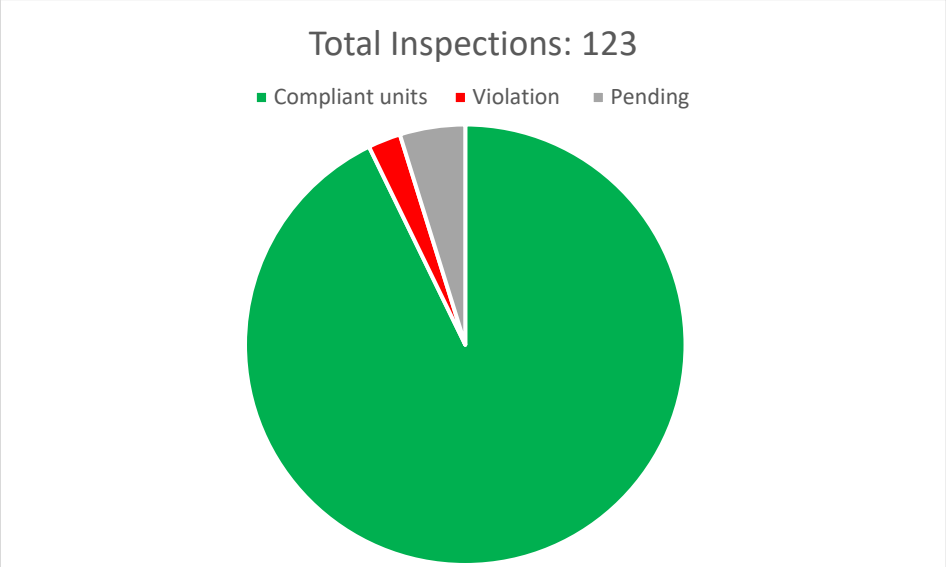
Ocean-Going Vessels (OGV) – This regulation is designed to reduce particulate matter, diesel PM, oxides of nitrogen, and sulfur oxide emissions from ocean-going vessels. Such vessels are required to switch to cleaner fuel within 24 nautical miles of the California coast.

Shore Power: The purpose of the At-Berth Regulation is to reduce emissions from diesel auxiliary engines on container ships, passenger ships, and refrigerated-cargo ships while berthing at a California Port.

Cargo Handling Equipment (CHE) – The Mobile Cargo Handling Equipment (CHE) Regulation was adopted in 2005 to reduce toxic and criteria emissions to protect public health. This regulation was fully implemented by the end of 2017, hence the lack of data prior to 2017. As part of CARB's continuing efforts to reduce greenhouse gas (GHG), diesel PM, and NOx emissions in California, the CARB staff investigate opportunities to reduce idling emissions from cargo handling equipment used at ports and intermodal rail yards. Cargo handling equipment is used to transfer goods or perform maintenance and repair activities and includes equipment such as yard trucks, rubber-tired gantry cranes, top handlers, side handlers, forklifts, and loaders.

Commercial Harbor Craft (CHC) - There are several types of harbor craft in California, including fishing vessels, ferries, excursion vessels, tugboats, tow boats, crew and supply boats, barges, dredges, and

other vessel types. The Commercial Harbor Craft (CHC) Regulation was adopted to reduce toxic and criteria emissions to protect public health.



Results	Total	Percent
Compliant	156	93.4%
Violation	3	3.0%
Pending	4	3.6%

Figure 7-9. Port of Oakland Inspections (2016-2018)

Analysis of the enforcement data for inspection activities in the Port of Oakland suggests that there is a high compliance rate. However, given the lack of spatial data for some programs within the Marine enforcement section, CARB acknowledges the need for better data management, which will allow for higher resolution of enforcement activities within the community. CARB has developed a data management measure (detailed later in this chapter as CARB measure 6 under Enforcement Goals and Strategies) to better track and manage Marine enforcement activities in the Port of Oakland California.

Therefore, while lacking spatial data in certain program areas, Figure 7-10 indicates the approximate location and number of inspections in the above-mentioned Marine program areas in the West Oakland Community from 2016-2018. Commercial harbor craft inspections are not currently included in the marine inspection map. However, as CARB's data visualization tool[46] is updated, these data will become publicly available. While most commercial harbor craft inspections were conducted across the Oakland Inner Harbor in Alameda, these vessels will often enter the Oakland Inner Harbor and can impact West Oakland residents.

[46] CARB's data visualization tool is available at https://webmaps.arb.ca.gov/edvs/.

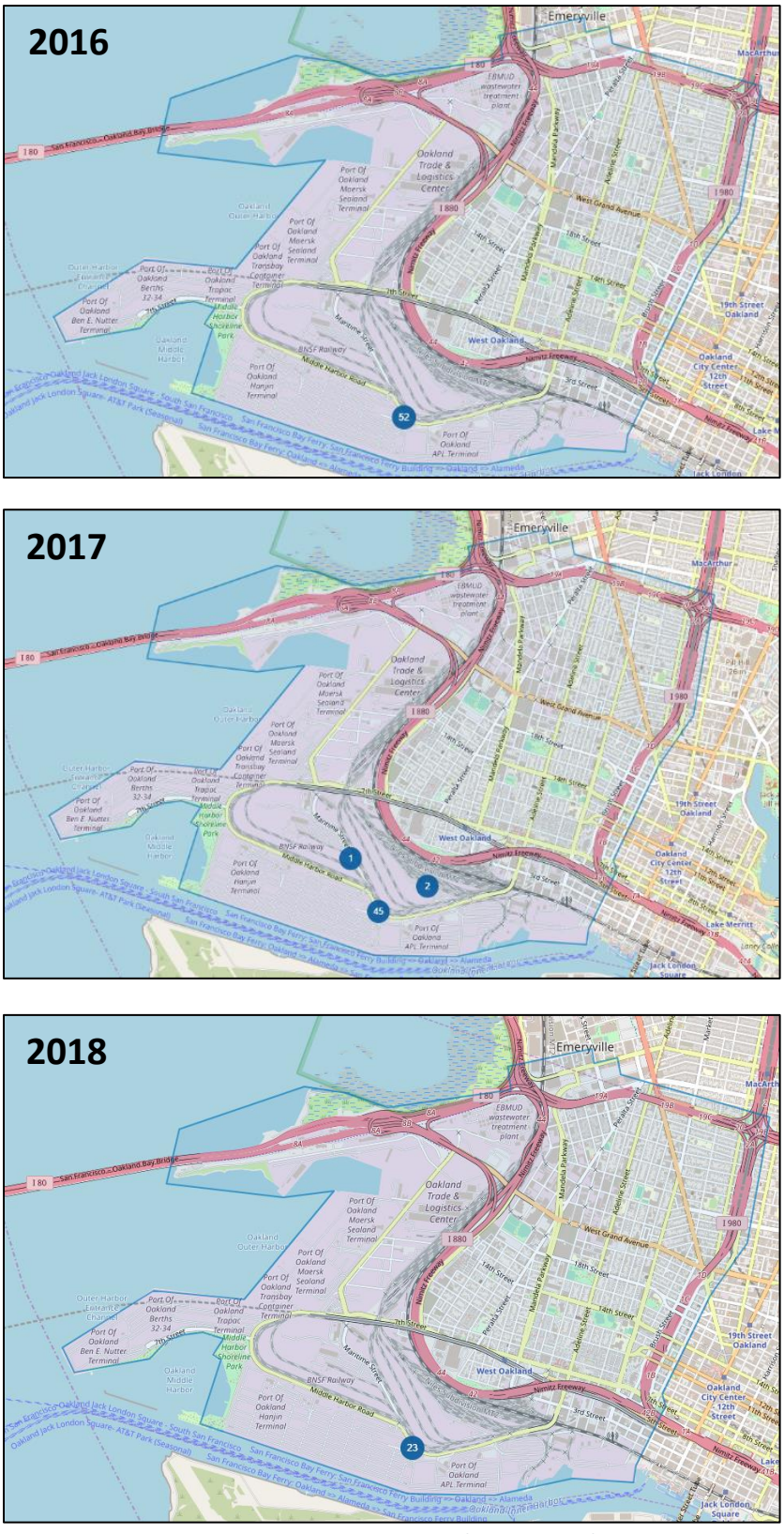


Figure 7-10. Marine Inspection Locations (2016-2018)

Consumer Products

Consumer product inspections are an important regulatory tool to improve public health in the community. Consumer products, such as hairsprays, deodorants and flooring, are widely used but can be sources of toxic air containments (TACs) and volatile organic compounds (VOC) that community members willingly bring into their homes.

In 2017, CARB conducted approximately 57 consumer products inspections within the West Oakland community. Table 7-3 represents a breakdown of enforcement action in the community in 2017:

Table 7-3. Consumer Products Investigations (2017)

Program	Investigations	Compliant Products	Violations
Composite Wood	20	19	1
Consumer Products	37	33	4
Total	**57**	**52**	**5**

Program Descriptions:

Composite Wood Products – CARB's Airborne Toxic Control Measure (ATCM) to control formaldehyde emissions from composite wood specifically focuses on three products: hardwood plywood, particleboard, and medium density fiberboard. Investigators in the Composite Wood Products program purchase samples of regulated products from outlets all over California. They inspect products and packaging for compliance with labeling requirements and send selected products to the laboratory for testing.

Consumer Products - Consumer Products are chemically formulated products used by household and institutional consumers. Some examples are: detergents, cleaning compounds; polishes, floor finishes; cosmetics and personal care products; home, lawn, and garden products; disinfectants and sanitizers; aerosol paints and automotive specialty products. Consumer Products do NOT include: other paint products, furniture coatings, or architectural coatings. Investigators in the Consumer Products program purchase samples of regulated consumer products from outlets all over California. They inspect product containers for compliance with registration and dating requirements and send selected products to the laboratory for testing.

Preliminary analysis appears to show a high compliance rate with consumer product programs. In 2017, 57 inspections occurred in the West Oakland community, of which 5 resulted in violations. CARB staff will continue to assess consumer products data as it becomes available.

Summary of Complaints Received and Their Resolution

CARB's previous complaint management system for complaints related to heavy-duty diesel vehicles lacked the ability to track complaints by specific location. However, CARB staff have begun to track all complaints through the California Environmental Protection Agency Complaint Reporting system. This will allow CARB staff to better track complaints by the community and to see the resolution of the

complaint. Furthermore, this process will enhance CARB's complaint response by encouraging better complaint referrals (e.g. referring complaints to the proper agency and/or identifying complaints that may require multiple agencies to be involved in their resolution).

ENFORCEMENT GOALS AND STRATEGIES

The goal at the Air District is to have facilities establish a robust environmental program by performing routine self-inspections, catching problems early, reporting and correcting any non-compliance issues upon discovery, mitigating compliance concerns expeditiously, and developing strategies that prevent violations from reoccurring. The Air District ensures facilities operate in compliance with air pollution regulations by conducting routine inspections and investigations into community concerns; and if violations are issued to a facility, staff provide extensive compliance assistance to help the facility return to compliance status.

Over the last year, Co-leads and members of the West Oakland Steering Committee have attended monthly meetings with a variety of Air District and CARB staff and representatives from City of Oakland planning, permitting and building departments. Community members predominantly expressed concerns regarding the following:

- truck idling near residents, schools, and elder care facilities;
- compliance concerns at an unpermitted facility – Ponoko (custom laser cutting);
- odor concerns at a permitted facility – Custom Alloy (metal foundry); and
- residential, backyard burning in West Oakland.

Acknowledging these concerns, Air District staff expeditiously conducted investigations to ensure compliance with air regulations. Compliance and Enforcement staff increased patrols to monitor for idling vehicles in West Oakland, inspected Ponoko and assisted the facility in submitting a permit application,[47] and investigated odor complaints at Custom Alloy.

Enforcement Measures

The Air District and CARB recognize that enhancing enforcement is a top priority for the West Oakland community and intends to implement the following enforcement measures, programs and policies in addition to the existing, ongoing enforcement activities to help improve air quality in West Oakland:

Air District Enforcement Measures

1. Increase Frequency of Compliance Inspections at Stationary Sources

   To ensure compliance with air quality standards, rules and regulations, the Air District's Compliance & Enforcement Division will enhance inspection frequencies in the West Oakland area for the next 5 years:

   - Inspect all the permitted facilities and sources within a 2-year period;

[47] *Application is under review by Air District Engineering Division.*

- Inspect any unpermitted facilities and sources identified by the Steering Committee; and
- Annually track and document the number of inspections conducted, including type, date and location.

2. Develop education and outreach material on open burning

   To address the community concern of illegal backyard burning in West Oakland, Air District Compliance & Enforcement staff will develop outreach materials to ensure the community understands health and air quality impacts from backyard burning. Informational fliers will help the community understand particulate emissions and air quality regulations that specifically prohibit open burning of garbage, tree pruning and other combustible material in residential fireplaces and open firepits.

3. Provide Annual Report on Enforcement Activities of Stationary Sources

   The Air District's Compliance & Enforcement Division will provide an annual update to the Steering Committee summarizing the progress of the West Oakland Enforcement Strategy at the end of each calendar year for the next 5 years. The update will include the following information:

   - Provide an annual inspection summary to the Steering Committee noting inspection results and a general description of violations in the West Oakland area;
   - Number of complaints received in the West Oakland area, including a description of the types of complaints.

4. Update Air District Complaint Policy

   While the Air District has a robust complaint policy and procedure to promptly respond to air quality complaints and other compliance incidents/episodes, the Air District recognizes the need to review the complaint procedure, including the evaluation of new technologies to streamline complaint receipt, response and investigations. Air District staff plans to conduct a series of community workshops throughout the Air District in the last quarter of 2019 to solicit input from Bay Area residents. Air District staff will work with the West Oakland Steering Committee in this endeavor.

5. Enhanced Enforcement Referral Process

   Through the course of Air District work in West Oakland, Air District inspectors may identify compliance concerns that fall within another local enforcement authority or jurisdiction. The Compliance and Enforcement Division will develop an enhanced referral system with the different agencies having jurisdiction in West Oakland. Any issues identified beyond the scope of Air District's authority will be referred to the appropriate agency on the day of the investigation.

6. Identify Unpermitted Sources

   CARB and District staff will consult the community for areas where there may be potentially unpermitted sources of emissions.

CARB Enforcement Strategies

CARB acknowledges that the high compliance rates identified in the enforcement history may not necessarily reflect compliance across the community. In cases where enhanced enforcement activities uncover non-compliance issues, CARB's goal will be to achieve the same or higher compliance rates as observed in the three-year history. CARB staff will also work closely with the community steering committee, the Air District, and other agencies (e.g. City of Oakland, Port of Oakland, etc.) to address gaps in the enforcement of mobile sources and seek opportunities to close these gaps.

To support achieving these goals, CARB is committed to enhancing enforcement activities within West Oakland by utilizing the following tools:

- Assess the enforcement history data;
- Target areas that may require additional enforcement with guidance from the community Steering Committee.

CARB will utilize current regulations and enforcement programs across all sources CARB regulates to target areas of non-compliance within the West Oakland community. In addition, CARB and Air District staff will use the above-referenced tools to continue coordination on enforcement of mobile source rules and regulations in and around the community. This cooperation is in part due to CARB and the Air District's MOU and the District's Mobile Source Compliance Plan, which lays out a comprehensive measure for enforcement of specified CARB Air Toxic Control Measures. The use of MOUs between CARB and BAAQMD may not be the only opportunity to utilize this type of relationship; CARB will explore opportunities to expand the use of MOUs with other enforcement agencies.

Listed below are CARB's enforcement strategies to help improve air quality in the West Oakland community:

1. Increase the frequency of compliance inspections with guidance from the community steering committee.

   CARB will collaborate with the West Oakland community emissions reduction program Co-leads to work with the Steering Committee to actively enhance enforcement activities. This will be done through a combination of improved complaint reporting, more focused inspections, and report-back meetings to update the community Steering Committee on both the status of inspections and to obtain additional areas of mobile source concern. CARB will work with the Co-leads to meet annually with the community Steering Committee in order to prioritize enforcement measures and identify possible locations where non-compliant vehicles are present. CARB will additionally report to the community the number of inspections performed,

mapped locations of the enforcement, and the number of citations and/or Notices of Violations issued.

As of July 2019, the community Steering Committee has guided CARB staff to focus enforcement efforts in the following areas:

a. Idling heavy-duty vehicles near 7th Street and Adeline;
b. The U.S. Postal Service Distribution Center trucking fleet;
c. Idling heavy-duty vehicles near schools and residential areas; and
d. Transport Refrigeration Units that are being operated near residents and sensitive receptors.

2. Coordinate and conduct inspections of Stationary Source with Air District staff.

   CARB will coordinate with Air District staff and will select, based on Steering Committee input, stationary sources for joint inspections. CARB is also committed to assisting Air District staff with compliance inspections of unpermitted sources identified by the Steering Committee.

3. Achieve Compliance with the Truck and Bus Regulation via Senate Bill 1.

   In April 2017, the Governor signed Senate Bill 1 (SB 1) into law which included a provision that, beginning in 2020, a vehicle must demonstrate compliance with the State Truck and Bus regulation before it can be registered with the Department of Motor Vehicles (DMV). Beginning in 2020, the DMV, in conjunction with data provided by CARB, will deny vehicle registration to non-compliant heavy-duty vehicles based on the model year of the vehicle.

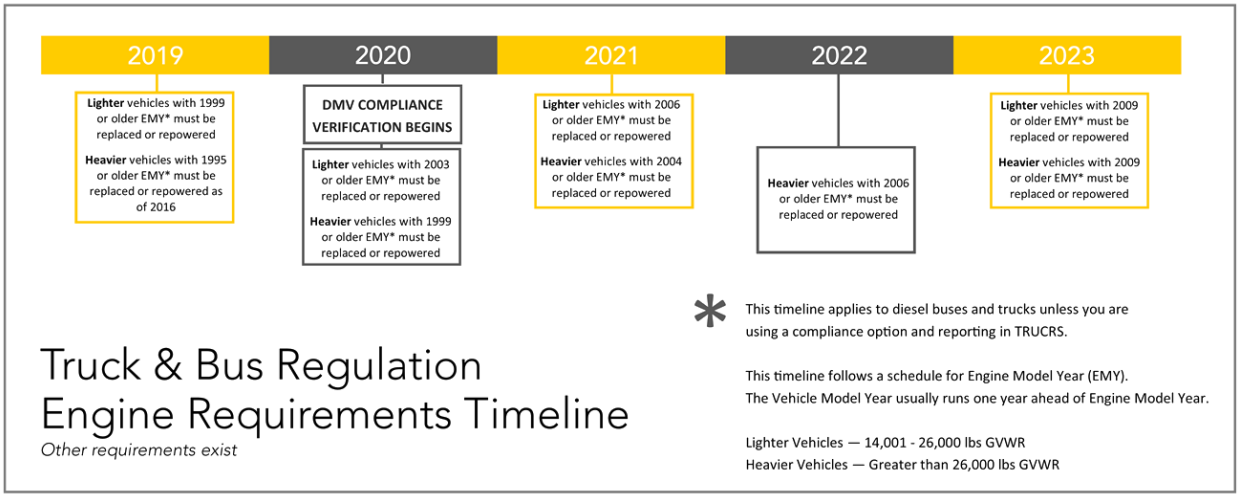


Figure 7-11. Truck and Bus Regulation Engine Requirements Timeline

4. Provide Annual Report of Enforcement Activities.

   CARB's enforcement division will provide an annual report to the Steering Committee to update and summarize CARB's enforcement activities within the community.

5. Coordinate with other agencies.

   CARB will seek opportunities to coordinate with other agencies with enforcement authority in West Oakland like the City and Port of Oakland. One such opportunity could involve CARB staff working with the City of Oakland to provide truck idling signage in areas where community members observe trucks idling.

6. Enhance CARB's Data Management Practices.

   CARB is committed to enhancing the quality of enforcement data for the West Oakland community. Moving forward, CARB will maintain the location of enforcement activity and received complaints to provide the Steering Committee with the most accurate data available. CARB has recently completed a visualization tool that makes CARB enforcement data more transparent and available. The tool can be accessed online by visiting https://webmaps.arb.ca.gov/edvs/.

7. Provide in-person community specific training.

   CARB will develop and implement a new program that will be offered to the West Oakland community. Information will cover topics like the fundamentals of enforcement, how the enforcement process works, instructions on filing a thorough complaint, and what to expect from the enforcement process after filing a complaint. Through this program, community members will be able to better support CARB or air district enforcement processes. CARB may also develop online trainings in the future.

8. Update enforcement measures as applicable.

   CARB staff are committed to updating enforcement strategies as requested by the Steering Committee, if said strategies are enforceable by CARB staff or if CARB can reasonably accommodate the request (e.g., additional enforcement training for idling vehicles). As new CARB regulations included in the Plan are adopted, CARB will enforce these measures and integrate associated activities and data into the West Oakland enforcement measures.

Chapter 8 – Tracking Progress

The Plan goal is to protect and improve community health by eliminating disparities in exposure to local air pollution. Chapter 4 describes the Plan goal and targets. Progress towards the targets will be achieved by implementing the Strategies described in Chapter 6 and the Enforcement Plan described in Chapter 7. This chapter addresses how the Co-leads and the Steering Committee will track progress on individual Strategies and the entire Plan.

ANNUAL PROGRESS REPORT

The Co-leads will work with the Steering Committee to track progress on Plan implementation, and will develop an annual progress report on the Plan that will include:

- A status update on individual Strategies in the Plan and completed Plan elements;
- A qualitative progress assessment, including a description of Plan implementation and community engagement;
- Updates on the metrics used for tracking progress;
- Updates to the community profile;
- Plan or programmatic changes based on progress to date;
- Updates on interim milestones identified by CARB; and
- Recommendations on new or modified Strategies to further reduce emissions and exposure.

Annual Progress Reports will be electronically available on the project website www.baaqmd.gov/ab617woak.

TRACKING PLAN PROGRESS AND STRATEGY IMPLEMENTATION

The Co-leads will, on a regular and ongoing basis, track Plan progress and Strategy implementation using a suite of qualitative and quantitative metrics. A summary of the tracking metrics will be shared with the Steering Committee at quarterly implementation meetings and be made available on the project website. During Plan implementation, tracking metrics will be reviewed and updated as needed by the Co-leads and the Steering Committee.

Plan targets discussed in Chapter 4 are framed in terms of local concentrations of $PM_{2.5}$, diesel PM, and cancer risk in seven impact zones. We will use a combination of modeling and measurements to track progress towards these targets. The Air District's fixed-site monitoring station located at 1100 21st St. will continue to measure air quality in West Oakland.[48] The Air District has also contracted with Aclima to measure particulate matter, ozone, nitrogen oxides, carbon monoxide, and carbon dioxide on every street throughout the Bay Area. Aclima is anticipated to complete its measurements for the updated annual baseline by 2021. Measured levels of air pollutants reflect year to year changes in meteorology and sources outside of the Plan boundary, as much as changes in local emissions. Therefore, it may not

[48] Detailed information about the Air District's monitoring station in West Oakland, including what pollutants are measured, are found in the Air District's annual Air Monitoring Network Plans. These Plans are located at http://www.baaqmd.gov/about-air-quality/air-quality-measurement/ambient-air-monitoring-network

be possible to reliably connect changes in measured air quality to the implementation of specific strategies or to show progress towards the Plan's targets. Therefore, the Air District commits to modeling air quality from pollution sources five years after the Plan's implementation. This timeframe is expected to provide a more granular look at progress being made from each of the quantifiable strategies identified in this Plan.

To the extent feasible, we will track emissions reductions resulting from implemented Strategies. Emissions reductions can be readily quantified for Strategies such as Air District and CARB regulations and Air District grants and incentives. As much as possible, we will strive to quantify emission reductions from other measures such as relocation of truck-related businesses, truck route changes, or vegetative buffers. Reductions that cannot be readily quantified will be described qualitatively.

Tracking of Strategy implementation will include metrics describing the status of rules and regulations adopted or implemented, incentives awarded, reduction measures implemented, inter-agency coordination, public outreach, and additional enforcement activities undertaken.

Examples of potential tracking metrics are provided below. These and other metrics will be considered by the Co-leads and Steering Committee at initiation of the implementation phase.

Table 8-1: Example Tracking Metrics

	Example Metrics	Frequency
Plan Goal	Reduction in local concentrations of $PM_{2.5}$, diesel PM, and cancer risk in seven impact zones	Model 5 years after Plan adoption
Plan Targets	Annual tons/year emissions reduced resulting from implementation of specific Strategies	Annual
Strategy Implementation	Number of emission reduction Strategies	Annual/Ongoing
	• Rule development: Workshops held for stakeholder engagement; staff reports released; draft regulatory language released; board hearings to consider proposed rule adoption or amendments.	
	• Technology: Number of trucks/vehicles/equipment replaced/upgraded with cleaner technology; (i.e., # of ocean-going vessels plugging in at Port of Oakland).	
	• Incentives: Number of incentive dollars invested to achieve specified diesel PM, $PM_{2.5}$ or TACs reductions from trucks and equipment.	

	• Public outreach: Workshops/community meetings held for stakeholder engagement; number of events/attendees.	
	• Exposure reduction: number of vegetative buffers and trees planted; number of schools or sensitive receptor facilities funded for air filtration systems.	
	• Inter-agency coordination: number of meetings or discussions; agency actions.	Annual
Enforcement	Numbers and types of: inspections, complaints received, citations and/or Notice of Violations, referrals to other agencies, public meetings, trainings or workshops held.	

TRACKING HEALTH CONDITIONS

As noted above, the goal of the Plan is to protect and improve community health by eliminating disparities in exposure to local air pollution. As such, we will continue to investigate and track long-term health outcomes in the community. We will seek to answer a basic question: *Have health outcomes improved?*

To answer this question, health conditions in West Oakland will be compiled and reported on a periodic basis during implementation of the Plan. This is for two primary reasons. First, it will take years to implement the Plan and to see evidence of changes in health outcomes in rates of asthma, cancer, heart disease, and strokes. Second, many factors besides air quality influence community health, such as access to health care, quality of housing, allergies and genetics, and more. While we hope to see health improvements during the 5-year implementation timeline, it will not be possible to reliably connect these health improvements to implementation of specific strategies or the Plan. While there is a vast body of research that connects exposure to emissions with higher rates of asthma, cancer, heart disease, and stroke deaths, *air pollution is not the sole risk factor contributing to these health outcomes*. Air pollution is *one* critical factor affecting health in West Oakland, and thus tracking long-term trends in health conditions will be an important indicator of the overall effectiveness of this Plan.

To track health outcomes, data on asthma emergency visits, asthma hospitalization, and cancer, heart disease, and stroke death rates are needed. The Co-leads will work closely with the Alameda County Public Health Department to collect, analyze and report these data. To the extent feasible, we will strive to estimate economic benefits of improved health conditions. The Co-leads will work with local schools and health services providers to explore potential connections between absenteeism and respiratory illness.

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Glossary

AB 617 – Assembly Bill (AB) 617 (C. Garcia, Chapter 136, Statutes of 2017) directs the state and local air districts to identify communities in California that are exposed to high levels of air pollution and established the Community Air Protection Program. Air districts with input from residents and stakeholders are to develop community focused action plans and community air monitoring plans to address localized air pollution and reduce exposure to particulate matter and toxic air contaminants.

abatement device – Devices designed to capture, remove and/or reduce pollutants that would otherwise be emitted into the air. Examples are baghouses, scrubbers, dust collectors, direct flame afterburners, vapor recovery units, and water sprayers.

area sources – Sources of air pollutants that individually emit relatively small quantities of air pollutants, but that may emit considerable quantities of emissions when aggregated over a large area. Examples include water heaters, lawn maintenance equipment, and consumer products.

average (or "expected") concentrations – This is the amount of air pollution concentrations expected over a period of time. Many estimates of health impacts are driven by calculations involving an annual average, and important air quality standards are also set based on annual averages.

back-up diesel generator (BUG) – BUGs include stationary generators and portable generators. Stationary generators are often sources of emergency power for commercial, industrial, and residential buildings. Portable generators are used as temporary power when and where an electrical grid is not available, at construction sites, outdoor gatherings such as concerts and festivals, and disaster recovery sites. See also diesel engine.

Bay Area Air Quality Management District (Air District or BAAQMD)—A regional air pollution control agency with jurisdiction over the nine counties that surround the Bay (except northeastern Solano and northern Sonoma counties); the Air District oversees policies and adopts regulations for the control of air pollution from stationary sources.

best available control technology (BACT) – These are the most stringent requirements for new or modified sources. An emissions limitation based on using the most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions.

best available retrofit control technology (BARCT) – An emissions limitation based on the maximum degree of reduction achievable for existing sources considering environmental, energy, and economic impacts.

best practices to reduce emissions – Measures that reduce emissions, and therefore reduce health risks from air pollution. Examples include retrofitting diesel generators to low or zero emitting technology, electrifying loading docks, limiting truck idling times, requiring low or zero emitting truck engines, and adding abatement devices to stationary sources.

best practices to reduce exposure – Measures that do not reduce actual emissions but reduce people's *exposure* to pollutants and reduce health risks. Examples include HVAC (heating ventilation, air conditioning) air filters, planting vegetation between a source of pollution and residential units and prohibiting trucks on residential streets.

black carbon – Black carbon is the sooty black material emitted from gasoline and diesel engines, coal-fired power plants, and other sources that burn fossil fuel. It comprises a significant portion of particulate matter. Inhalation of black carbon is associated with health problems including respiratory and cardiovascular disease, cancer, and birth defects.

boiler – A water heater for generating steam.

bulk cargo – Cargo which is loaded into a ship's hold without being boxed, bagged, or hand stowed, or is transported in a large tank space.

bus rapid transit (BRT) – High quality bus-based transit system that delivers fast and efficient service that may include dedicated lanes, busways, traffic signal priority, off-board fare collection, elevated platforms and enhanced stations.

California Air Resources Board (CARB) – The State of California agency responsible for air pollution control. Responsibilities include: establishing State ambient air quality standards, setting allowable emission levels for motor vehicles in California and oversight of local air quality management districts.

California Environmental Quality Act (CEQA) – Legislation requiring state and local agencies to disclose the significant environmental impacts of a project through the preparation of an Initial Study, Negative Declaration or Environmental Impact Report, including actions to mitigate any significant environmental project impacts.

cancer risk – The likelihood that a person will develop cancer during their lifetime.

cargo handling equipment (CHE) – Equipment used to move containers within a marine terminal. Cargo-handling equipment includes rubber-tired gantry (RTG) cranes, yard tractors, side-picks, and top-picks. The large ship-to-shore cranes that move containers from the vessel to the container yard and vice-versa are not included in the definition of CHE.

chrome plating – A process that involves the electroplating of a thin veneer of chromium onto an underlying metal.

commercial land use – Use of land for commercial purpose, including building offices, shops, resorts and restaurants as opposed to residential development.

community-scale modeling – Air quality modeling to characterize the ambient air toxic concentrations within communities and potential exposures to certain susceptible populations.

complete streets – Streets designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities should be able to safely move along and across a complete street.

concentrations – Pollution in the air is typically expressed as a *concentration*. A concentration is the amount that could be extracted from a given volume of air (like a cubic meter). For example, we express the intensity of particulate matter concentrations in terms of "micrograms per cubic meter ($\mu g/m^3$)." This is a measure of the amount of particulate matter collected if you were to draw a cubic meter of air through a clean filter, and then weigh the filter on a scale that can measure millionths of a gram. Today we would expect, on average, to be able to collect about 10 µg of $PM_{2.5}$ from a cubic meter of ambient air in West Oakland.

container cranes – A container crane is a type of large dockside crane found at container terminals for loading and unloading intermodal containers from container ships.

criteria air pollutants – As required by the Clean Air Act, the U.S. Environmental Protection Agency (EPA) identifies and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxide. The term "criteria pollutants" derives from the requirement that the U.S. EPA must describe the characteristics and potential health and welfare effects of these pollutants. U.S. EPA periodically reviews new scientific data and may propose revisions to the standards as a result.

cumulative air quality impact – The impact on the environment and the public which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

diesel engine – An internal combustion engine in which ignition of the fuel, which is injected into the combustion chamber, is caused by the elevated temperature of the air in the cylinder due to mechanical compression.

diesel particulate filter (DPF) – An emission control technology that reduces particulate matter emissions by trapping the particles in a flow filter until the particles are either physically removed or oxidized (burned off) in a process called regeneration.

diesel particulate matter (DPM) – The particles found in the exhaust of diesel-fueled compression ignition engines. Diesel PM may combine and adsorb other species to form structures of complex physical and chemical properties.

dozer – A tractor with a large, shovel like blade on the front, for pushing or moving earth debris, tree stumps and rocks.

drayage trucks – A truck used to haul containers to and from the container terminals. It consists of the tractor unit and a semitrailer consisting of the container on a chassis (wheeled base).

emissions – A gas or liquid stream containing one or more air contaminants discharging or emitting into the atmosphere.

Environmental Protection Agency (EPA) – The United States federal agency responsible for control of air and water pollution, toxic substances, solid waste, and cleanup of contaminated sites.

excavators – A large machine used for removing soil from the ground, especially on a building site.

exposure – Time duration to assess cancer exposure based on OEHHA recommendations. The key dimensions of *exposure* are *intensity* (or concentration) and *time* — for example, an exposure to 1 $\mu g/m^3$ of benzene for 30 years. Today we would expect, on average, to be able to collect about 10 µg of $PM_{2.5}$ from a cubic meter of ambient air in West Oakland. For perspective, most people breathe an average of 10 cubic meters per day, so a West Oakland resident might expect to inhale about 10 x 10 = 100 µg daily. That would weigh about as much as a few human eyelashes. Implicit in the idea of exposure is that a person (or group of persons) be exposed. The average *concentration* of a pollutant may be high at a given location, but if no people are breathing it, then the (inhalation) *exposure* is zero. (If the population will change — if people will move in — then it may become nonzero.) The other key dimensions of exposure are *intensity* and *time*: for example, an exposure of 100 people to 0.1 $\mu g/m^3$ of diesel PM for 1 year.

fine particulate matter ($PM_{2.5}$) – Particulate matter (PM) is a mixture of solid particles and liquid droplets suspended in the air. Of these particles, those less than 2.5 micrometers in diameter, called fine PM or $PM_{2.5}$, pose the greatest risk to health. See particulate matter.

gasoline dispensing facilities (GDF) – Retail service station or private facility that stores and/or dispenses gasoline into fuel tanks.

greenhouse gases (GHG) – Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), halogenated fluorocarbons (HCFCs), ozone (O3), perfluorocarbons (PFCs), sulfur hexafluoride (SF6) and hydrofluorocarbons (HFCs).

health risk assessment (HRA) – A detailed comprehensive analysis to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations, and to assess and quantify both the individual and population wide health risks associated with those levels of exposure.

high efficiency particulate air filters (HEPA filters) – A high efficiency particulate air filter capable of filtering 0.3 micron particles with 99.97 percent efficiency.

hot spot – An area where large number of diesel-powered transit vehicles (diesel buses, diesel commuter rail locomotives, or diesel ferryboats) will congregate.

indirect sources – Land uses and facilities that attract or generate motor vehicle trips and thus result in air pollutant emissions; for example, shopping centers, office buildings, warehouses, and airports.

industrial land use – Land used for industry. These are typically businesses that manufacture products sold to commercial businesses. Also includes storage facilities, factories, warehouses and shipping operations.

intensity – When modeling or measuring air pollution, we are concerned with the *intensity* of pollution. This can be expressed in more than one way. See concentrations.

magnet sources – Magnet sources include, parking lots, port docking facilities, warehouses, cargo staging and handling areas, fuel sales, truck and other mobile equipment maintenance facilities, weigh stations, and even food service for drivers and other logistics workers. Magnet sources attract trucks, trains, and ships, creating mobile source traffic and contributing to air pollution in communities.

Minimum efficiency reporting value (MERV) – Developed by the American Society of Heating, Refrigerating and Air Conditioning Engineers, MERV rates the effectiveness of air filters. The higher the number, the finer the filtration.

mixed-use land use – A range of land uses including residential, commercial, and industrial to be co-located in an integrated way that supports sustainable forms of transportation.

mobile sources of air pollution – Any motor vehicle that produces air pollution, e.g., cars, trucks, motorcycles (on-road mobile sources) or airplanes, trains and construction equipment (off-road mobile sources).

National Ambient Air Quality Standards (NAAQS) – The Clean Air Act requires U.S. EPA to set National Ambient Air Quality Standards (NAAQS) at a levels determined to be protective of public health within an adequate margin of safety for six pollutants referred to as criteria pollutants. Standards are set based on scientific research and policy assessments reviewed by the Clean Air Scientific Advisory Committee.

new source review (NSR) – A pre-construction permitting review requirement that ensures that when a new source of air pollution is built, or when an existing source is modified, the source will implement effective emission control technology and will comply with related regulatory requirements pertaining to air emissions.

off-road vehicles – An off-road vehicle is any type of vehicle which can drive on and off paved or gravel surfaces. They are generally characterized by having large tires, open treads, a flexible suspension or caterpillar tracks. Other vehicles that do not travel public streets or highways are called off-highway vehicles and include tractors, forklifts, cranes, backhoes, bulldozers and golf carts.

on-road vehicles – A vehicle designed to legally carry people or cargo on public roads and highways such as buses, cars, trucks, vans, motor homes, and motorcycles.

particulate matter (PM) – PM includes a wide range of disparate particles that vary greatly in terms of their size and mass, physical state (solid or liquid), chemical composition, toxicity, and how they behave and transform in the atmosphere. PM is commonly characterized based on particle size. Ultrafine PM includes the very smallest particles less than 0.1 micron in diameter (one micron equals one-millionth of a meter). Fine PM or $PM_{2.5}$ consists of particles 2.5 microns or less in diameter (includes ultrafine PM). Coarse PM refers to particles between 2.5 microns and 10 microns in diameter. The term “coarse” particles may be misleading; it should be emphasized that even “coarse” particles

are still very tiny, many times smaller than the diameter of a human hair. PM_{10} consists of particles 10 microns or less in diameter (includes ultrafine, fine and coarse PM).

ppb (parts per billion) – A weight-to-weight ratio used to describe concentrations. Parts per billion (ppb) is the number of units of mass of a contaminant in the air per 1000 million units of total mass.

ppm (parts per million) – A weight-to-weight ratio used to describe concentrations. Parts per million (ppm) is the number of units of mass of a contaminant in the air per million units of total mass.

PZEV or **partial zero emission vehicle** – PZEV is an automobile that has zero *evaporative* emissions from its fuel system and meets Super Ultra Low Emissions Vehicle (SULEV) tailpipe-emission standards. Evaporative emissions are the gasoline fumes that escape during refueling or from the fuel tank and supply lines. See also ZEV.

regional-scale modeling – Air quality modeling at a regional level, to determine air pollution emissions within the region. See also community-scale modeling.

residential impact – An approximation of the average intensity of pollution to which the members of a residential population are exposed. Calculated as the weighted average ambient concentration, using residential population data for weighting. This does not consider any differences between outdoor and indoor air, nor any other variation in the air that people are exposed to as they go about their day. (See also *exposure* and *concentration*.)

residential land use – Land designated by the local governing body for dwelling units. Can include single-family and/or multi-family housing, often specifies the number of dwelling units allowed per lot or acre; for example, R-1 means the parcel is zoned for a single-family residence.

Safe Routes to School (SRTS) – A program to increase the number of students that walk and bicycle to school by making conditions for walking and bicycling safer.

sensitive land uses – Places where sensitive populations are most likely to spend their time, such as schools, playgrounds, daycare centers, nursing homes, medical facilities, and residential communities.

sensitive populations or **sensitive receptors** – Members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses.

solvent cleaning operations – A process using solvents or solvent vapor to remove water-insoluble contaminants such as grease, oils, waxes, carbon deposits, fluxes, and tars from metal, plastic, glass, and other surfaces.

stationary sources of air pollution – A fixed, non-mobile producer of pollution, usually found at industrial or commercial facilities.

toxic air contaminants (TACs) – TACs are air pollutants, identified by CARB, which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential health hazard. Health effects may occur at extremely low levels of TACs.

tractor-trailer – The combination of a tractor unit and one or more semi-trailers to carry freight. A semi-trailer attaches to the tractor with a fifth wheel hitch, and much of its weight is borne by the tractor.

transit-oriented development (TOD) – A type of development that links land use and transit facilities to support the transit system and help reduce sprawl, traffic congestion and air pollution. TOD generally places residential uses in close proximity to retail, office, schools, government services, with access to local and regional transit systems.

transloading – Process of transferring a shipment from one mode of transportation to another. It is most commonly done when one mode cannot be used for the entire trip, such as when goods must be shipped internationally from one inland point to another.

transport refrigeration unit (TRU) – Refrigeration systems powered by integral internal combustion engines designed to control the environment of temperature sensitive products that are transported in trucks and refrigerated trailers. TRUs may be capable of both cooling and heating.

vehicle miles traveled (**VMT)** – One vehicle (whether a car carrying one passenger or a bus carrying 30 people) traveling one mile constitutes a vehicle mile. VMT is one measure of the use of Bay Area freeways and roads.

yard tractor – Tractor unit designed specifically for use in a container yard; also referred to as a yard truck, utility tractor rig, yard goat, yard hostler, or prime mover.

yard truck – A yard truck is a vehicle designed for moving trailers in or around commercial freight yards**.**

zero-emission vehicle (ZEV) – Vehicles which produce no emissions from the on-board source of power (for example, a fully electric vehicle).