Westlake, Korea Town, Mid-City, Mid-Wilshire

Community Air Monitoring Plan

California Statewide Mobile Monitoring Initiative (SMMI)

aclima

Prepared by Aclima, Inc.
in partnership with **Breathe Southern California**
and the SMMI Project Expert Group

September 2025

CALIFORNIA AIR RESOURCES BOARD

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

The Statewide Mobile Monitoring Initiative is part of California Climate Investments, a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment — particularly in disadvantaged communities.

Summary

This Community Air Monitoring Plan is prepared under the Statewide Mobile Monitoring Initiative (SMMI), a California Air Resources Board project. The SMMI is a statewide effort to use mobile monitoring methods to gather a comprehensive dataset of criteria pollutants, toxic air contaminants, and greenhouse gases. The SMMI is part of California Climate Investments and aims to reduce greenhouse gas emissions and improve public health, particularly in disadvantaged communities. Aclima, Inc., a California Public Benefit Corporation focused on air monitoring technology, was contracted by the California Air Resources Board to develop and implement Community Air Monitoring Plans using mobile monitoring in 62 Consistently Nominated Communities (CNCs), which have been nominated for the community air protection program, but have not been selected for participation. Resources are needed to address air pollution in these communities.

The primary purpose of the SMMI is to provide better understanding of air pollution in 62 CNCs through mobile monitoring following a rigorously developed community air monitoring plan based on effective and inclusive community engagement.

The purpose of this Community Air Monitoring Plan (CAMP) is to outline the mobile air monitoring that will be conducted in response to air quality issues identified by community outreach in Westlake, Korea Town, Mid-city, Mid-Wilshire and inform future plans and community actions. This CAMP will outline monitoring objectives that reflect resident concerns about where and what pollution is most impactful. Community voices directed where mobile air monitoring will take place, the monitoring objectives, and where focused pollution studies are needed. This project also seeks to ensure that data is shared in an accessible way with all interested parties, including community members, to support the planning and implementation of emissions reduction actions. Data will be presented in digital format, in physical printout form, and verbally in public webinars.

Contents

List of Abbreviations Used in the Community Air Monitoring Plan

Abbreviations	Term
AB	Assembly Bill
AMN	Aclima Mobile Node
AMPs	Aclima Mobile Platforms
AQS	Air Quality System
BC	Black Carbon
C2H6	Ethane
CAMP	Community Air Monitoring Plan
CARB	California Air Resources Board
CBOs	Community-Based Organizations
CERP	Community Emissions Reduction Plan
CES	CalEnviroScreen
CH4	Methane
CNC	Consistently Nominated Community
CO	Carbon Monoxide
CO2	Carbon Dioxide
EPA	Environmental Protection Agency
GHGs	Greenhouse Gases
L0	Level 0
L1	Level 1
L2a	Level 2a
L2b	Level 2b
L3	Level 3
L4	Level 4

Abbreviations	Term
NO	Nitric Oxide
NO2	Nitrogen Dioxide
NOx	Total Oxides of Nitrogen
O3	Ozone
PAHs	Polycyclic Aromatic Hydrocarbons
PEG	Project Expert Group
PEL	Permissible Exposure Limit
PI	Principal Investigator
PM2.5	Fine Particulate Matter
PML	Partner Mobile Laboratory
QA	Quality Assurance
QC	Quality Control
REL	Reference Exposure Level
RFP	Request for Proposal
SCAQMD	South Coast Air Quality Management District
SMMI	Statewide Mobile Monitoring Initiative
TVOC	Total Volatile Organic Compounds
UFP	Ultrafine Particulate

What is the reason for conducting air monitoring?

1. Community partnership approach

The Statewide Mobile Monitoring Initiative (SMMI) prioritizes forming strong community partnerships from the outset to guide the development of Community Air Monitoring Plans (CAMPs).

The SMMI Community Engagement Plan (Appendix A) is central to the success of the SMMI, emphasizing that communities must have a leading role in design, engagement, and implementation for the initiative to be successful. Aclima has implemented a co-leadership model with existing community experts and co-ownership with communities. This model is informed by CARB's Community Engagement Model, the People's Blueprint, CARB's Blueprint 2.0, and Facilitating Power's Spectrum of Community Engagement to Ownership. The goals of the community partnership approach include:

1. Develop and implement CAMPs that are responsive to the air quality concerns and needs of community members in pollution-overburdened areas.
2. Define monitoring objectives that reflect resident concerns about where and what pollution is most impactful. Community voices will direct where mobile air monitoring takes place, the monitoring objectives, and where focused pollution studies are needed.
3. Build community capacity to interpret mobile air quality data and help translate data into actions for emissions reduction and public health improvement.
4. Ensure that data is shared in an accessible way with all interested parties, including community members, to support the planning and implementation of emissions reduction actions.

Several groups play integral roles in the implementation and success of the SMMI. The SMMI Project Expert Group (PEG) includes community members, representatives from local air districts, community-based organizations (CBOs), and academia. Over 50 percent of the PEG comprises community members or representatives of CBOs. Engagement Leads, who are trusted community organizations, are subcontracted to lead and facilitate community engagement in the 62 Consistently Nominated Communities (CNCs). These Engagement Leads work closely with Aclima and the PEG to ensure CAMPs are responsive to community needs and that engagement is culturally and linguistically relevant. The California Air Resources Board (CARB) funds and oversees the SMMI. Aclima, as the contracted air monitoring technology company, is responsible for conducting community engagement and mobile monitoring. The project aims for a collaborative process where community members actively contribute to defining air monitoring objectives and the scope of actions.

1.1 Project Team Roles and Responsibilities for Community Partnerships

The core project team is made up of paid staff at a number of different organizations. These are described in Table 1.1. Additional project roles and responsibilities are outlined in Section 5.

Engagement Leads: Aclima has subcontracted with trusted community-based organizations or leaders to lead and co-manage community engagement efforts in the designated communities. These Engagement Leads are responsible for designing and implementing engagement strategies, conducting outreach, and working with Aclima to translate community knowledge (e.g., air pollution concerns) into responsive CAMPs. Some organizations may cover more than one community. Engagement Leads distribute an air pollution concerns survey and lead and conduct outreach for two community meetings, which serve as forums for community members and other interested parties to discuss local air pollution concerns and define where they would like air quality monitoring to occur. The Engagement Lead is also responsible for summarizing these meetings for Aclima, who then integrates community concerns into the CAMP. Engagement Leads serve as a conduit between community members and Aclima and CARB, helping to raise community questions and concerns and communicating project updates to the community.

Project Expert Group (PEG): A cross-sector group of representatives from local air districts, community-based organizations, academia, and residents from overburdened communities that guides community engagement and decision-making for this project. Over 50 percent of the Project Expert Group is composed of community members or representatives of community-based organizations. The PEG serves as a trusted group of experts to help define and steer the initiative and ensure it meets community needs. PEG members are responsible for attending eight meetings during the project period, and completing six assignments that help inform and steer the project. Specifically, PEG members helped shape the content of the Community Engagement Plan, served on the selection committee for Engagement Leads, and shaped the methodology for allocating monitoring miles to each project community. Outside of meetings and assignments, Aclima requests that PEG members support decision-making in areas relevant to their professional and lived experiences.

Aclima's Project Team: Aclima monitors local engagement strategies and supports Engagement Leads by offering technical expertise, data interpretation, outreach materials, and meeting support. Aclima is responsible for organizing and facilitating all PEG meetings and managing PEG assignments.

Table 1.1: Project teams and contact details

Organization/team	Contact details	Type of Support Offered
CARB	smmi@arb.ca.gov	All project questions after the project has completed (May 2026)
Aclima	carb-team@aclima.earth	Monitoring updates and CAMP questions during the project period (through May 2026)
Project Expert Group	carb-team@aclima.earth	Questions about community engagement framework and statewide engagement opportunities during the project period (through May 2026)
Breathe Southern California (Engagement Lead)	jmercado@breathesocal.org	Community engagement questions during the project period (through May 2026)

1.2 SMMI resources

The CARB SMMI website (https://ww2.arb.ca.gov/statewide-mobile-monitoring-initiative) details the objectives of the SMMI; the size and recipient of the contract award and collaborations with research institutions. Additionally, the website outlines community engagement efforts, public participation opportunities, and the development of air monitoring plans. The website provides access to summary documents including the original CARB Request for Proposal (RFP), a project summary one-pager, FAQs, and Aclima's technical proposal.

The Aclima SMMI website (https://aclima.earth/ca-smmi) provides an overview of the SMMI. It explains the community engagement approach, project scope, monitoring technology and approach, and data availability. The website also provides access to the joint Aclima-CARB press release.

1.2.1 Engagement tools

The online and offline tools used to support community engagement as part of CAMP development include:

Online

- Aclima Project Website: For updates, resources, and contact information.
- Air Pollution Concern GeoSurvey: Online survey to gather community input on air quality concerns.
- Broad Area Monitoring Selection tool for community members to select the boundaries for broad area monitoring given allocated driving resources for each community
- Social Media Graphics: Customizable graphics and text for outreach efforts.
- Meeting Summary Report: Document template for documenting meeting content.

Offline

- Physical Flyers: Customizable flyers for distribution at community hubs.
- Community Air Monitoring Plan Development Handout: Infographic detailing the Community Air Monitoring Plan development process.
- Door-to-door outreach (in some communities)
- Phone call/text message outreach (in some communities)
- Radio announcements and/or project interviews (in some communities)

1.3 Statewide community meetings

The Community Engagement Plan includes the following statewide community meetings:

- **Pre-meeting / Introduction to project**: An online meeting introducing the project and answering questions, held at the air district level.
- **Meeting 1 / First Draft Community Air Monitoring Plan Boundary**: A hybrid (in person and online) meeting to identify community air quality concerns, monitoring objectives, monitoring areas, and community roles in the project.
- **Meeting 2 / Affirming Community Air Monitoring Plan**: A hybrid (in person and online) meeting to confirm monitoring areas and review draft Community Air Monitoring Plan(s).

- **Meeting 3 (series) / Project Results**: A series of online meetings, organized geographically by air district (or at a sub-district level if necessary), to explain project results, answer questions, and discuss next steps.

1.4 Engagement during and after monitoring

There will continue to be opportunities for the public to engage with the SMMI throughout monitoring and after completion of monitoring.

During the monitoring period:

- Project website: use the project website to access updates, resources, and contact information
- Webinars and training: participate in online sessions about data literacy, interpretation, emissions reduction success stories, and air management policies/regulations
- Community-specific project pages (via project website): Find updates, contact information, and leave comments/feedback for each Consistently Nominated Community on the project website
- Continued communication: receive email updates on progress towards monitoring completion (if contact information was provided during the engagement process). For example, monthly event notifications summaries (see Section 14.1), broad area monitoring progress, and locations where PMLs have completed monitoring.
- Office hours: Attend online office hours to ask project-related questions of the Aclima team

After the monitoring period:

- Publicly available data hosted by CARB
- StoryMaps: Explore interactive data visualizations for each Consistently Nominated Community
- Project Results meeting: Attend online meetings to learn about project results, ask questions, share experiences, and discuss next steps. These meetings will be held in English with Spanish interpretation and designated Spanish breakout rooms.
- Post-Meeting Survey: Provide anonymous feedback on the project and engagement process after the Project Results Meetings.

2. State the community-specific purpose for air monitoring

The primary purpose of the SMMI is to develop and implement Community Air Monitoring Plans that are responsive to the air quality concerns of community members and other stakeholders in the 62 CNCs. These communities have been consistently nominated by air districts, CBOs, and community members as needing extra attention to address high levels of air pollution.

Community air monitoring generally falls into two types of air pollution concerns:

1. Ambient air quality monitoring - measure the levels of relevant air pollutants to understand which areas of the community are experiencing **disproportionate or unequal impacts** from air pollution as well as evaluate measured concentrations against existing standards and historical information.

2. Stationary source monitoring - measuring air pollutants near **specific stationary emission sources** (e.g. industrial facilities) to better understand and characterize the air within the vicinity of these known or suspected sources.

This air monitoring plan will address these monitoring aims - to identify and characterize areas experiencing disproportionate air pollution impacts and specific air pollutant emission sources - by focusing on specific sources and air pollution concerns identified by the community. Residents' and other interested parties' knowledge was solicited through community meetings and surveys to understand the community's pollution burdens. A specifically designed Air Pollution Concerns Survey was used to help identify priority air pollution concerns in each community and collect detailed information to guide monitoring objectives. The CAMPs will define where mobile air monitoring takes place, what the monitoring objectives are, and where focused pollution studies are needed, all directed by community voices.

2.1 Westlake, Korea Town, Mid-City, Mid-Wilshire Community profile

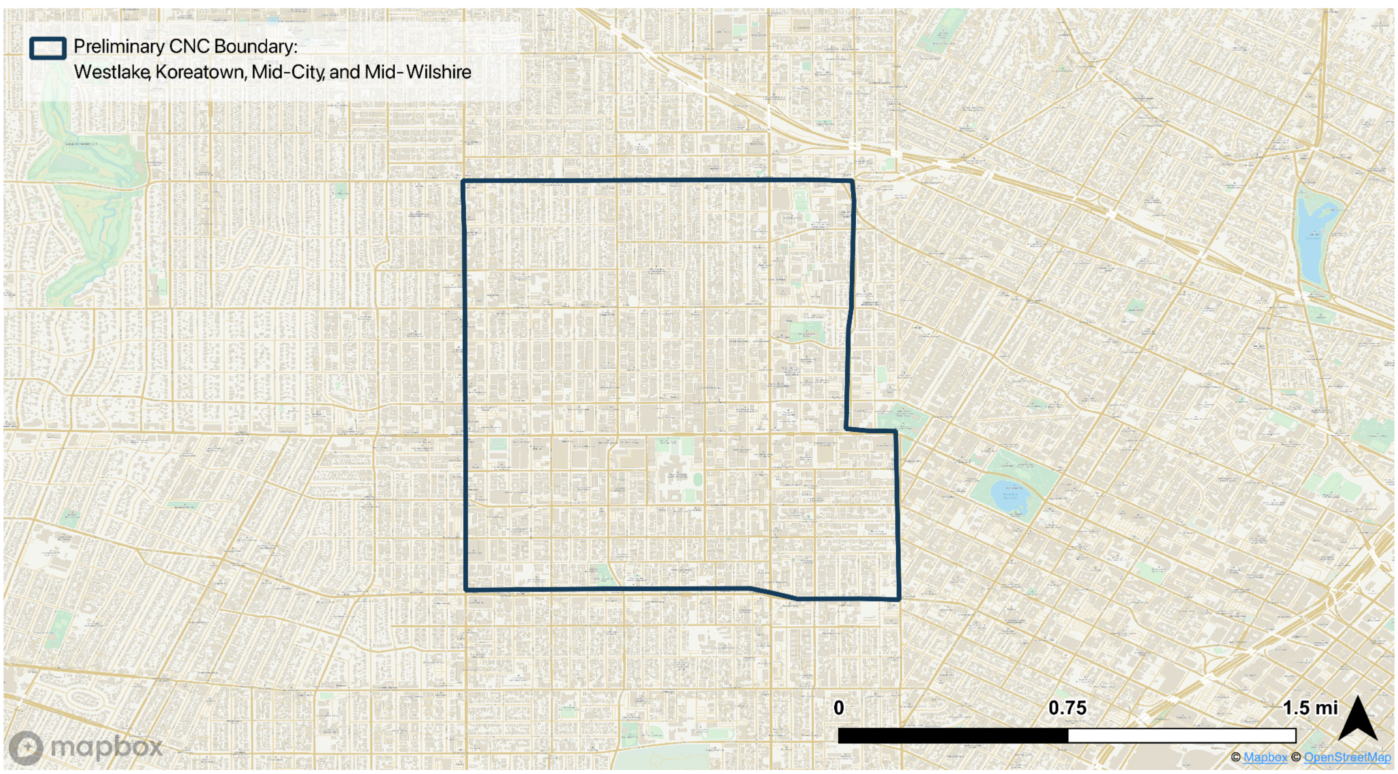

Figure 2.1: Preliminary Westlake, Korea Town, Mid-City, Mid-Wilshire CNC Boundary.

The communities of Westlake, Koreatown, Mid-City, and Mid-Wilshire form a densely populated, urbanized corridor just west of Downtown Los Angeles. Together, they represent a vibrant cross-section of the city, marked by a high concentration of multifamily housing, commercial corridors, and cultural diversity. Westlake is one of the most historic neighborhoods in LA, home to many immigrant and working-class families. Koreatown is then a major cultural and commercial hub with one of the highest population densities in the country, blending historic architecture with high-rise development. To the west, Mid-Wilshire and Mid-City feature a mix of residential zones, museums, and key transit corridors like Wilshire Boulevard and La Brea Avenue. The area lies in a low-lying basin flanked by hills to the north and west, which can contribute to pollutant stagnation, especially during smog events.

Heavy traffic on nearby highways (including the 10, 110, and 101 freeways), aging buildings, and commercial activity all contribute to the region's complex air quality landscape.

Westlake, Koreatown, Mid-City, and Mid-Wilshire have a high proportion of Latino and Asian American residents, with many households speaking Spanish, Korean, or Tagalog as their primary language. CalEnviroScreen (CES) 4.0 indicators for the broader monitoring area place these communities at the 97th percentile statewide for linguistic isolation. Residents here also face significant socioeconomic challenges. Median household incomes are below the county average, and poverty rates are at the 84th percentile statewide. Additionally, the communities are at the 87th percentile for housing burdens. Educational attainment levels are also comparatively low, with a substantial fraction of the population lacking a high school diploma (76th percentile for educational disadvantages). These socioeconomic factors, coupled with limited English proficiency, necessitate culturally and linguistically tailored community engagement strategies to effectively address environmental health concerns.

On account of the significant vehicular traffic in the area, pollution levels are consistently high. The communities are at the 51st percentile for ozone exposure, the 82nd for diesel PM, and the 85th for total PM. Concurrently, health disparities are evident in these neighborhoods, with elevated rates of asthma, cardiovascular disease, and other pollution-related conditions. Children and the elderly are particularly vulnerable, and proximity to major transportation corridors and industrial facilities exacerbates these health issues. Finally, due to the combined socioeconomic and environmental stressors, large swathes of these communities are designated as disadvantaged under SB 535.

2.2 Westlake, Korea Town, Mid-City, Mid-Wilshire community-specific motivations for air monitoring

Community-identified air pollution concerns

To identify the community-specific motivations for air monitoring in Westlake, Korea Town, Mid-City, Mid-Wilshire, Aclima worked with Breathe Southern California to gather air quality and emission source concerns directly from the community. An SMMI Air Pollution Concerns survey was circulated by email, distributed in person community meetings, and made available during other events in the community. In addition, Breathe Southern California collected air pollution concerns voiced during community meetings in support of the SMMI effort.

The dominant source of air pollution in these densely populated neighborhoods is heavy vehicular traffic. Major arteries like the I-10 and I-110 freeways bisect or run near these communities, contributing substantial emissions of fine particulate matter ($PM_{2.5}$) and nitrogen oxides (NOx). These pollutants are directly linked to respiratory and cardiovascular problems, which are observed at elevated rates in the area. Beyond mobile sources, the region also contends with emissions from various stationary sources, including local industrial operations. While specific large industrial facilities within the immediate confines of these residential areas may be limited, cumulative emissions from smaller businesses, auto body shops, and other commercial activities contribute to the pollution burden. Emerging research also points to surprising sources like cooking emissions as significant contributors to volatile organic compounds (VOCs), which play a role in the formation of ground-level ozone, another harmful air pollutant. Historically, areas like Westlake were also impacted by pollution from oil exploitation activities. The close proximity of sensitive populations, such as children and the elderly, to these diverse pollution sources exacerbates health vulnerabilities.

In addition to those summarized above, other specific concerns identified through community engagement are included in Table 2.1 below. These concerns were compiled from community members during community meetings as well as through the SMMI Air Pollution Concerns Survey.

Table 2.1: Specific concerns identified through community engagement. Details about community concerns are direct quotes from the community member concern submissions.

Location and Concern	Details
Freeways	Requests for extra air quality monitoring near the 101 and 110 Freeways. Participants felt these freeways significantly contribute to emissions and pollution spreading in the communities
Mac Arthur Park regions	Concerns about the MacArthur Park region, with community members reporting smoke and emission plumes from various businesses and facilities in the area
Bus transportation routes	Community members described the plumes of smoke that public transportation buses are leaving behind on the routes they operate in.
Refinery (ExxonMobil Refinery, Torrance Refinery)	This oil refinery, one of the largest in the region, is known for releasing pollutants such as sulfur dioxide, nitrogen oxides, and particulate matter
Gas Station	Emissions from vehicles refueling can release volatile organic compounds (VOCs), which contribute to smog and air quality degradation. Concerns also noted for a Shell gas station.
Roadways / Vehicle Emissions	Concerns revolve around air pollution from vehicle emissions (including heavy trucks and diesel vehicles) and traffic congestion (idling, bottlenecks, high volume, rush hours)

Efforts to mitigate air pollution in these areas are multifaceted, involving regulatory actions, technological advancements, and initiatives promoting cleaner transportation. The South Coast Air Quality Management District (South Coast AQMD) is the primary regulatory body responsible for developing and implementing air quality management plans, adopting rules and regulations to control emissions, and issuing permits for stationary sources. These regulations often drive the adoption of cleaner technologies in industrial processes.

Furthermore, broader regional and state-level initiatives aimed at reducing mobile source emissions have a direct impact on these neighborhoods. California's pioneering clean car standards, such as the Advanced Clean Cars II (ACC II) regulations, mandate increasingly stringent tailpipe emissions standards and promote the transition to zero-emission vehicles. These regulations are crucial for reducing the dominant source of pollution in the area.

Investments in alternative transportation infrastructure also contribute to emissions reduction. Projects like the Metro D Line (Purple) subway extension, which serves Koreatown and extends westward, aim to provide residents with viable alternatives to driving, thereby reducing vehicular miles traveled and associated emissions (though associated construction may temporarily exacerbate air pollution if not properly mitigated). Preparations for the 2028 Olympics in Los Angeles have also spurred significant investment in expanding and improving public transit options, including rail extensions and bus fleet enhancements, with a focus on transitioning to zero-emission technologies. While these efforts are regional, they directly benefit residents in the targeted neighborhoods by offering cleaner mobility choices.

Top pollution sources identified via emission inventories

Aclima scientists gathered important sources from available emission inventories, focusing on major polluting facilities and AB2588 Air Toxics Hot Spots. Known pollution sources within Westlake, Koreatown, Mid-City, and Mid-Wilshire are listed in Tables 2.2-2.3. Table 2.2 lists the top ten AB2588 Air Toxics Hot Spots within or near the monitoring area boundary (up to 200 meters outside), ranked by total toxicity-weighted emissions (TWE) across chronic, cancer-causing, and acute categories. Table 2.3 then lists the major polluting facilities within the monitoring area boundary (up to 200 m outside the boundary). These tables detail each facility's name, geographic coordinates (longitude and latitude), a description of its business or service, and the reported pollutants.

These facilities include a diverse range of industrial, utility, commercial, and institutional operations that contribute to the local air toxics burden. For example, HRRP Garland LLC, located in the heart of Westlake, reports emissions of diesel PM, benzene, lead, formaldehyde, and numerous other air toxics often associated with fuel combustion and building operations. Healthcare and professional service buildings, such as Kaiser Foundation Hospital and Ernst & Young, are also registered air toxics emitters, contributing pollutants like 1,3-butadiene, xylene, ammonia, and chromium compounds, possibly from equipment use, on-site generators, or building infrastructure.

Major construction and infrastructure operations are another important source. The Skanska-Traylor-Shea Joint Venture has two sites reporting a wide suite of emissions typical of large-scale tunneling or roadway construction, including diesel PM, metals like cadmium and manganese, VOCs, and combustion byproducts like formaldehyde and acrolein. Facilities such as Equinix LLC (telecommunications), LA DWP (water and solid waste management), and 2900 Wilshire LLC (mixed-use) report similar pollutant profiles, adding to cumulative exposure risks across the region.

Media production facilities such as Paramount Pictures and Television City Productions are also notable sources, emitting dozens of pollutants including solvents, fuel-related VOCs (like MTBE and propylene oxide), metals, and PAHs (polycyclic aromatic hydrocarbons). These emissions likely stem from maintenance operations, painting, equipment fueling, and special effects processes. Together, these sources reflect the complexity of pollution burdens in this highly urbanized corridor, where emissions arise from a mix of essential services, infrastructure, and entertainment industry activities.

Table 2.2: Top 10 AB2588 Air Toxics Hot Spots located within the monitoring area boundary for Westlake, Korea Town, Mid-City, Mid-Wilshire (up to 200 m outside the boundary), as defined by the total toxicity-weighted emissions (TWE) for chronic, cancer causing, and acute categories combined.

Facility Name	Longitude	Latitude	Description	Reported Pollutants
HRRP GARLAND, LLC	-118.2658	34.0514	REAL ESTATE AGENTS/MANAGERS/REAL ESTATE/REAL ESTATE AGENTS, MANAGERS/REAL ESTATE AGENTS AND MANAGRS	Diesel engine exhaust, particulate matter (Diesel PM), 1,3-Butadiene, Cadmium, Naphthalene, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Formaldehyde, Copper, Ethyl benzene, Nickel, Acetaldehyde, Lead, Toluene, Acrolein, Hexane {n-Hexane}, Chromium, hexavalent (& compounds), Manganese, Selenium, Ammonia, Xylenes (mixed), Mercury, Arsenic, Hydrochloric acid, Benzene

Facility Name	Longitude	Latitude	Description	Reported Pollutants
KAISER FOUNDATION HOSP	-118.3752	34.0386	OFFICE/CLINICS OF MDCL DOCTORS/HEALTH SERVICES/OFFICES/CLINICS OF MED. DRS./OFFICES OF PHYSICIANS	Acetaldehyde, Nickel, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Hexane {n-Hexane}, Benzene, Toluene, Chromium, hexavalent (& compounds), Selenium, Ethyl benzene, Cadmium, Acrolein, Formaldehyde, Hydrochloric acid, Xylenes (mixed), Diesel engine exhaust, particulate matter (Diesel PM), Naphthalene, Arsenic, Ammonia, 1,3-Butadiene, Copper, Mercury, Manganese, Lead
ERNST & YOUNG	-118.2611	34.0489	ACCOUNTING/AUDITING/BOOKEEPING/ENGINEERING/MNGMNT SERVICES/ACCOUNTNG, AUDITNG,BOOKKEEPING	Acrolein, Copper, Arsenic, Cadmium, Nickel, Diesel engine exhaust, particulate matter (Diesel PM), 1,3-Butadiene, Naphthalene, Ammonia, Xylenes (mixed), Acetaldehyde, Lead, Ethyl benzene, Chromium, hexavalent (& compounds), Formaldehyde, Hexane {n-Hexane}, Toluene, Benzene, Manganese, Mercury, Hydrochloric acid, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Selenium
STS - SKANSKA - TRAYLOR-SHEA JV	-118.3445	34.0619	BRIDGE/TUNNEL/ELEVATED HIGHWAY/HVY CONSTRUCTION,EXC.BUILDING/HEAVY CONST. EXCEPT HIGHWAY/BRIDGE,TUNNEL,ELEVTD HWAY CNST	Acrolein, Naphthalene, Benzene, Chromium, hexavalent (& compounds), PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Formaldehyde, Toluene, Mercury, Ethyl benzene, Xylenes (mixed), 1,3-Butadiene, Copper, Manganese, Lead, Hydrochloric acid, Hexane {n-Hexane}, Selenium, Nickel, Ammonia, Diesel engine exhaust, particulate matter (Diesel PM), Arsenic, Cadmium, Acetaldehyde
EQUINIX LLC	-118.2601	34.0489	TELEPHONE COMMS, EXC RADIO/COMMUNICATIONS/TELEPHONE COMMUNICATIONS/	Xylenes (mixed), PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Manganese, Arsenic, 1,3-Butadiene, Toluene, Selenium, Cadmium, Chromium, hexavalent (& compounds), Benzene, Lead, Acrolein, Ethyl benzene, Acetaldehyde, Formaldehyde, Mercury, Hexane {n-Hexane}, Naphthalene, Ammonia, Diesel engine exhaust, particulate matter (Diesel PM), Copper, Nickel, Hydrochloric acid
2900 WILSHIRE LLC	-118.2843	34.0608	UNKNOWN/NOT CLASSIFIABLE ESTABLISHMENT/UNKNOWN/UNKNOWN	Xylenes (mixed), Manganese, Nickel, Cadmium, Naphthalene, Toluene, Hydrochloric acid, Lead, Selenium, Diesel engine exhaust, particulate matter (Diesel PM), Acrolein, Acetaldehyde, Benzene, Hexane {n-Hexane}, Ethyl benzene, Mercury,

Facility Name	Longitude	Latitude	Description	Reported Pollutants
				Chromium, hexavalent (& compounds), 1,3-Butadiene, Copper, Arsenic, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Ammonia, Formaldehyde
STS SKANSKA TRAYLOR SHEA JV	-118.3599	34.0625	UNKNOWN/NOT CLASSIFIABLE ESTABLISHMENT/UNKNOWN/UNKNOWN	Ammonia, Diesel engine exhaust, particulate matter (Diesel PM), Acetaldehyde, Ethyl benzene, Hexane {n-Hexane}, Acrolein, Formaldehyde, Lead, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Benzene, Mercury, Chromium, hexavalent (& compounds), 1,3-Butadiene, Selenium, Hydrochloric acid, Copper, Xylenes (mixed), Naphthalene, Arsenic, Nickel, Cadmium, Toluene, Manganese
LA CITY, DWP	-118.2485	34.0592	AIR WATER & SOLID WASTE MANAG/ENVIRONMENTAL QUALITY& HOUSING/ADMIN OF ENVIRO QUAL PROGRAMS/AIR,WATR RESRC,SOLD WAST MGMNT	Chromium, hexavalent (& compounds), Benzene, Toluene, Ethyl benzene, Lead, Xylenes (mixed), Nickel, Hexane {n-Hexane}, Acrolein, Manganese, Naphthalene, Methyl ethyl ketone {2-Butanone}, Ammonia, Selenium, Arsenic, Diesel engine exhaust, particulate matter (Diesel PM), Mercury, Acetaldehyde, 1,3-Butadiene, Cadmium, Hydrochloric acid, Copper, Formaldehyde, Methyl isobutyl ketone {Hexone} {MIBK}, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]
PARAMOUNT PICTURES CORP	-118.3209	34.0838	MOTION PICTURE & VIDEO PRDTN/MOTION PICTURES/MOTION PICTURE PRDCTION/SRVCS/	1,3-Butadiene, Formaldehyde, Toluene, Chlorine, Xylenes (mixed), Nickel, Copper, Ethyl benzene, Manganese, Methyl tert-butyl ether {MTBE}, Benzene, Naphthalene, Acetaldehyde, Chromium, hexavalent (& compounds), Arsenic, Ammonia, Hydrochloric acid, Hexane {n-Hexane}, Lead, PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA], Selenium, o-Xylene, Mercury, Cadmium, Diesel engine exhaust, particulate matter (Diesel PM), Acrolein, Methyl ethyl ketone {2-Butanone}, Propylene oxide, Methanol, m-Xylene, Styrene, Asbestos, 1,2,4-Trimethylbenzene
TELEVISION CITY PRODUCTIONS, LLC	-118.3601	34.0751	TV BROADCASTING STATIONS/COMMUNICATIONS/RADIO/TELEVISION BROADCASTING/TELEVISION BROADCASTING	Selenium, Mercury, Copper, Xylenes (mixed), Cadmium, Naphthalene, Hexane {n-Hexane}, Acrolein, Toluene, Hydrochloric acid, Benzene, Nickel, Ammonia, Diesel engine exhaust, particulate matter (Diesel PM), Chromium, hexavalent (& compounds), PAHs,

Facility Name	Longitude	Latitude	Description	Reported Pollutants
				total, w/o individ. components reported [Treated as B(a)P for HRA], Lead, 1,3-Butadiene, Acetaldehyde, Ethyl benzene, Arsenic, Manganese, Formaldehyde

Table 2.3: Major polluting facilities (from CARB Pollution Mapping Tool v2.6, reporting year 2021) located within the monitoring area boundary (up to 200 m outside the boundary).

Facility Name	Longitude	Latitude	Description	Reported Pollutants
Breitburn Operating LP - Los Angeles Basin Facility	-118.257	34.051	Oil and Gas Production	Diesel PM, 1,3-Butadiene, Formaldehyde, Benzene, CH4, Chromium Hexavalent, PM2.5, Nickel, NOx, PM10, Hydrochloric Acid, SOx, N2O

Past and ongoing air quality measurements and studies

There are no active regulatory ambient air monitoring stations in the CNC itself, but there is one roughly 5 miles to the east at 1630 N Main St, Los Angeles. Established in 1979 and managed by the South Coast Air Quality Management District, this station measures O_3, CO, NO_2, SO_2, CH_4, total non-methane hydrocarbons, $PM_{2.5}$, PM_{10}, total suspended particulates, air toxics, and hexavalent chromium. Additionally, as part of the $PM_{2.5}$ Chemical Speciation Network (CSN), this station also provides speciated PM measurements of elemental carbon, organic carbon, nitrate, sulfate, ammonium, and a wide variety of metals. This station is part of the national regulatory network overseen by the USEPA in support of the federal clean air act. Measurements from the station are intended to represent regional air quality and demonstrate compliance with regional air quality standards.

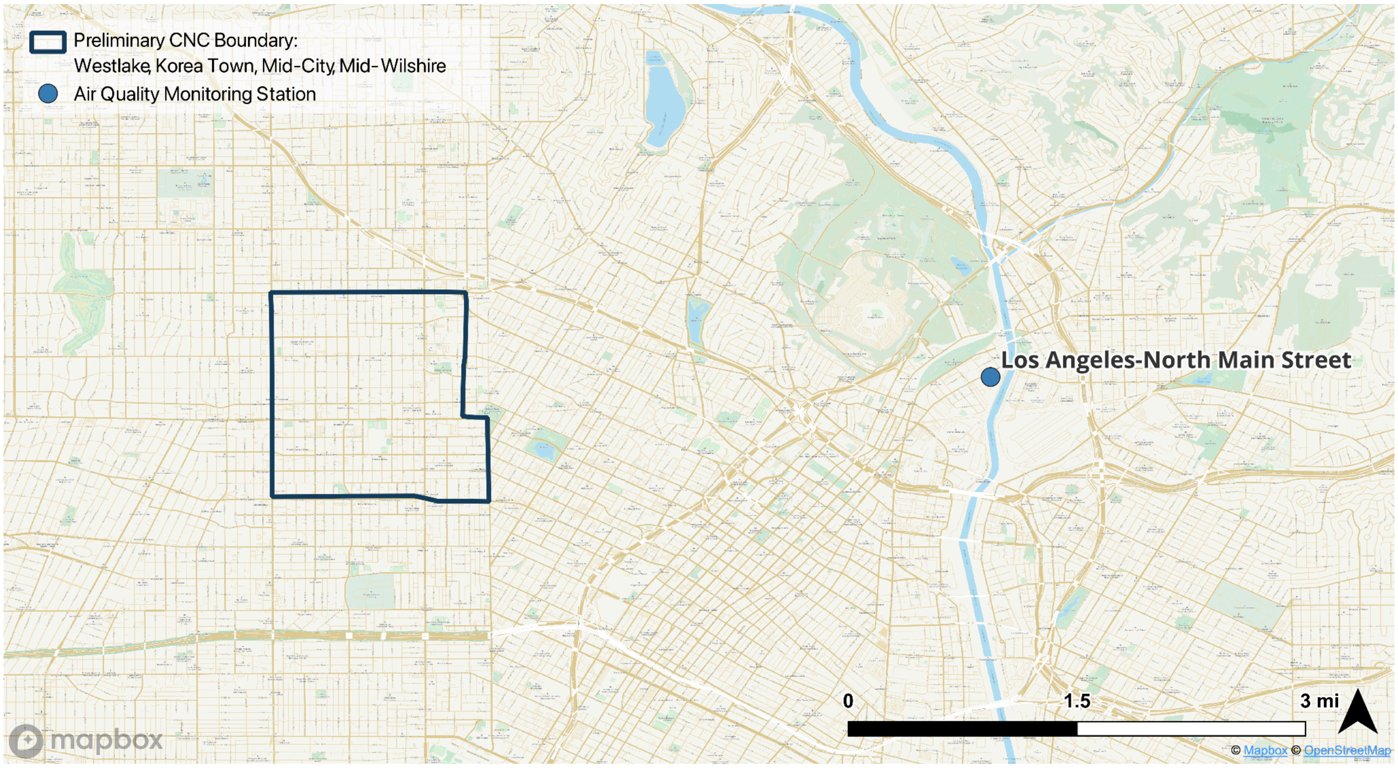

Figure 2.2: Map of the preliminary Westlake, Korea Town, Mid-City, Mid-Wilshire CNC boundary and local regulatory air quality monitoring sites.

Complementing the regulatory monitoring in the area, other initiatives have provided valuable neighborhood-scale insights into air quality challenges in Westlake, Koreatown, Mid-City, and Mid-Wilshire. CARB-supported sensor campaigns conducted between 2013 and 2015 collected high-resolution air pollution data in Koreatown and surrounding communities, revealing sharp spatial variability in traffic-related pollutants at the street level (CARB). Research by the University of Southern California has also developed AI-based models to map fine particulate matter ($PM_{2.5}$) across Los Angeles neighborhoods, using land use and environmental data to highlight exposure disparities in densely developed areas like Koreatown (USC Dornsife). In addition, studies exploring the use of low-cost sensor networks have demonstrated their utility in capturing nitrogen dioxide and ozone at high spatial resolution, filling in data gaps left by fixed-site monitors (Miskell et al., 2019). Also, regulatory planning tools such as HARP and CalEEMod have been employed to assess potential emissions from development projects in Mid-City and Wilshire Corridor, providing project-specific pollution modeling to inform public health and environmental review processes (LA City Planning).In parallel, community-led groups such as the Koreatown Youth and Community Center (KYCC), in partnership with the USC Urban Trees Initiative, have followed the expansion of low-cost air quality sensor networks in the area. For example, the University of California, Berkeley BEACO2N network (whose LA subnetwork is operated by researchers at the University of Southern California) manages several air quality sensor nodes around this community. These sensor packages include instruments that measure CO, CO_2, NO, NO_2, O_3, and $PM_{2.5}$ and aim to deliver hour-resolution observations on the public BEACO2N website. Observations from these BEACO2N nodes have previously been used in studies evaluating large-scale atmospheric trends across the San Francisco Bay Area, such as the sustained reduction in greenhouse gas emissions[1,2,3]. Though this data has not yet been employed in a capacity to inform exposure risks specifically as they pertain to the communities of Westlake, Korea Town, Mid-City, and Mid-Wilshire, the curation of this database aims to support future analyses by providing a continuously expanding body of air quality insights. An additional benefit of the inclusion of CO_2 in these datasets is that it enables the calculation of CO:CO_2 and NO_x:CO_2 emission ratios, which are known to vary by source type (e.g. traffic-related, off-road vehicles, residential combustion, wildfires etc.) and can therefore support source apportionment analyses. This community-generated data empowers residents to advocate for targeted interventions and to hold regulatory agencies and polluters accountable.

Finally, in addition to these initiatives, basin-wide studies such as the Multiple Air Toxics Exposure Study (MATES) III-V, conducted by the SCAQMD, mapped concentrations of pollutants such as PM, benzene, formaldehyde, 1,3-butadiene, and hexavalent chromium. These analyses, though not specifically focused on Westlake, Korea Town, Mid-City, and Mid-Wilshire, helped establish air quality trends in the region and are therefore useful for contextualizing the pollution burdens of the community.

2.3 Gaps in air quality information that SMMI will address

The regulatory air quality monitoring stations neighboring the Westlake, Korea Town, Mid-City, and Mid-Wilshire communities provide valuable regional data on criteria pollutants and some toxic air contaminants with its somewhat unique in its capabilities of measuring speciated PM and some VOCs (which provide important insights into broader source-apportionment analyses). However, these stations are designed primarily to assess broad regional air quality trends and regulatory compliance rather than capture the fine-scale spatial variability of pollution experienced at the neighborhood or community level. As a result, locations of persistently elevated concentrations influenced by proximity to major roadways, industrial facilities, and other emission sources are often underrepresented.

Other work conducted in the community, such as the Miskell et al. study and the expansion of the BEACO2N network, has shown the potential of increasing the spatial resolution of air quality measurements. However, even this resolution (with sites typically situated approximately 2 km apart) is still insufficient to resolve trends on a street-by-street basis. Moreover, the pollutants reported by low-cost sensors do not include measurements critical for the area, such as concentrations of BC relevant for assessing diesel PM and VOCs related to industrial operations. These data gaps hinder the development of robust, evidence-based emissions reduction strategies and delay the equitable allocation of resources. To support environmental justice goals and improve public health outcomes, sustained investment in comprehensive, high-resolution air monitoring in these communities is needed.

Finally, previous work such as the regional MATES studies have provided useful insights into major air toxics such as diesel PM, benzene, acrolein, and arsenic. However, these studies generally produced area-wide averages that were useful in establishing broad trends but did not offer intra-neighborhood insights. Though the MATES studies supplemented observations from representative locations with atmospheric models to infer exposure risks in

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[1] Turner A. J. et al., Observed Impacts of COVID-19 on Urban CO_2 Emissions. Geophysical Research Letters 2020, 47 (22), e2020GL090037. https://doi.org/10.1029/2020GL090037.

[2] Asimow, N. G. et al., Sustained Reductions of Bay Area CO2 Emissions 2018–2022. *Environ. Sci. Technol.* 2024, *58* (15), 6586–6594. https://doi.org/10.1021/acs.est.3c09642.

[3] Asimow, N. G. et al., Differences in Regional Home Heating Behavior in Three U.S. Cities Revealed by Ground-Based Sensor Network. March 12, 2025. https://doi.org/10.22541/essoar.174180753.30586978/v1.

between the points of measurement, continuing to corroborate model outputs with high-resolution observations remains an important objective.

Westlake, Koreatown, Mid-City, and Mid-Wilshire, densely populated and punctuated by numerous industrial sources and transportation hubs, has long suffered from poor air quality. Additionally, a sizable fraction of this community is designated as disadvantaged by SB 535, compounding concerns about health and environmental equity. A summary of the air pollution concerns and sources identified by the community, supported by information about major polluting facilities and air toxics hot spots, include:

- Freeways, bus corridors, and arterial roadway emissions
- Industrial and commercial locations of persistently elevated concentrations near MacArthur Park
- Gasoline service stations
- Regional impacts from large sources such as the Torrance refinery

To provide the type of data necessary to characterize the areas of concern identified by the community and prioritize locations for further plans and community action, the following data gaps were identified:

- Lack of localized, community-scale air monitoring data that offers intra-neighborhood, street level insights, especially near sources
- Lack of high-density observations of greenhouse gases
- Lack of information on air quality near sensitive receptor locations such as schools, day care facilities, senior residences, etc.

This plan proposes to use mobile air pollution monitoring to provide highly spatially resolved pollutant concentration data for the community. The detailed spatial information from mobile monitoring can help identify specific, localized sources of pollution and show how pollutant levels change across and between different neighborhoods. The Aclima Mobile Platform includes an expanded suite of pollutants that support improved characterization of sources including the use of black carbon to diesel particulate matter and TVOCs to indicate areas where toxic air contaminants may be located. Furthermore, the use of the expanded suite of equipment in the Partner Mobile Laboratories enables communities to be monitored for specific toxic air contaminants. The information gathered through mobile monitoring supports the development of pollution reduction plans that can be different for various parts of a community, allowing for solutions that are specifically suited to local needs.

3. Scope of actions

Data gathered by mobile air monitoring can support a wide range of actions by communities and governments to reduce emissions and/or exposure. Examples of possible actions include, but are not limited to:

- Regulatory investigation: where these data identify locations of persistently elevated concentrations, local and state agencies may decide to do further investigative work that can lead to compliance and enforcement actions (e.g. fines, new emissions control requirements)
- Traffic management strategies: by identifying locations of persistently elevated concentrations caused by vehicular emissions, these data can inform local and state vehicular emissions control strategies, including initiatives like anti-idling enforcements or vehicle emissions inspection programs
- Urban planning: governments can use an understanding of how air quality varies over time and space to direct investment in green spaces or update zoning regulations to restrict certain land uses

- Corporate action: individual companies may be able to use these data to adjust their transportation routes and schedules, or facility operations, to reduce emissions and health impacts
- Modeling and forecasting: mobile air monitoring data can support improved modeling of historical air quality that allows better prediction of future patterns and impacts across a community
- Health risk assessments: where these data identify disproportionate impacts of pollution across the geography of a community, these insights can be used in conjunction with other datasets to assess potential health impacts for communities or identify locations where formal health risk assessments should be performed
- Community action: data provided by mobile air monitoring may be useful to community-based organizations in advocacy work to reduce emissions and/or exposure, including the development of Local Community Emissions Reduction Plans (LCERPs)

When monitoring has concluded, CARB, Air Districts, community groups, regulatory agencies, researchers, and other parties are encouraged to leverage the data to address specific air pollution concerns.

4. Air monitoring objectives

4.1 Define objectives

The air monitoring aims described in Section 2 can be expanded into two primary **air monitoring objectives**:

1. **Identification and characterization air pollutant emission sources**
   This objective seeks to better understand and characterize the air within the vicinity of known, suspected, or unknown sources, which can include the following goals:
    - Understand what locations in communities are impacted by pollution near sources
    - Understand how concentrations can vary directly downwind of a given source
    - Understand how concentrations near a given source may vary by time of day

2. **Identification disproportionate air pollution impacts**
   Mobile air monitoring can also be used to investigate various objectives focused on understanding the unequal distribution of air pollution within a community:
    - Identify the key pollutants that impact ambient air in a community
    - Understand the typical concentrations of pollutants in ambient air in the community
    - Understand how pollution is distributed across a community
    - Understand how pollution varies in time across a community

These two objectives support investigation of the majority of concerns identified by the community by either characterizing individual sources (such as oil refineries and gas stations) and broader source types (such as mobile emissions from highways, bus transportation routes, and other heavily trafficked roadways), or the impact of these sources across the community.

4.2 Define mobile monitoring methods to support objectives

Given the gaps identified in Section 2.3 and the community specific air quality concerns, the types of data needed include high spatial resolution observations in a wide variety of locations across the community of Westlake, Korea Town, Mid-City and Mid-Wilshire, in particular for black carbon (as a proxy for diesel PM), VOCs, and specific air toxics related to fuel processing and combustion such as benzene and toluene. The mobile monitoring approach enables the collection of data at high spatial resolution throughout the community over the entire mapping period. This approach results in measurements of a snapshot of the concentration of air pollutants near to many if not most of the areas of concern identified by the community during the project. The data resulting from mobile monitoring support targeting a wide range of source types within the monitoring area, allowing for flexibility of source analysis without predetermined source selection.

The CAMP will use two mobile monitoring approaches to support project air monitoring objectives - broad area monitoring and targeted area monitoring. Broad area monitoring supports the air monitoring objectives throughout the entire CAMP monitoring areas over the entire monitoring time period while targeted area monitoring will focus on a subset of specific air pollution concerns with focused driving around those concerns for shorter periods of time.

Broad area monitoring: monitoring vehicles collect data within the entire CAMP monitoring area over an extended time period using the Aclima Mobile Platform. Vehicles monitor on publicly accessible roads, gathering repeat measurements at different times of day, days of the week, and seasons. Broad area monitoring tells us about the typical concentrations of pollutants and locations of persistently high pollutant concentrations throughout the CAMP area over the whole period of monitoring. As an example, Figure 4.1 shows results of a broad area monitoring approach in San Francisco, displaying typical NO2 concentrations observed over a 1-year time period. Broad area monitoring will occur over a 9-month time period between June 2025 and March 2026.

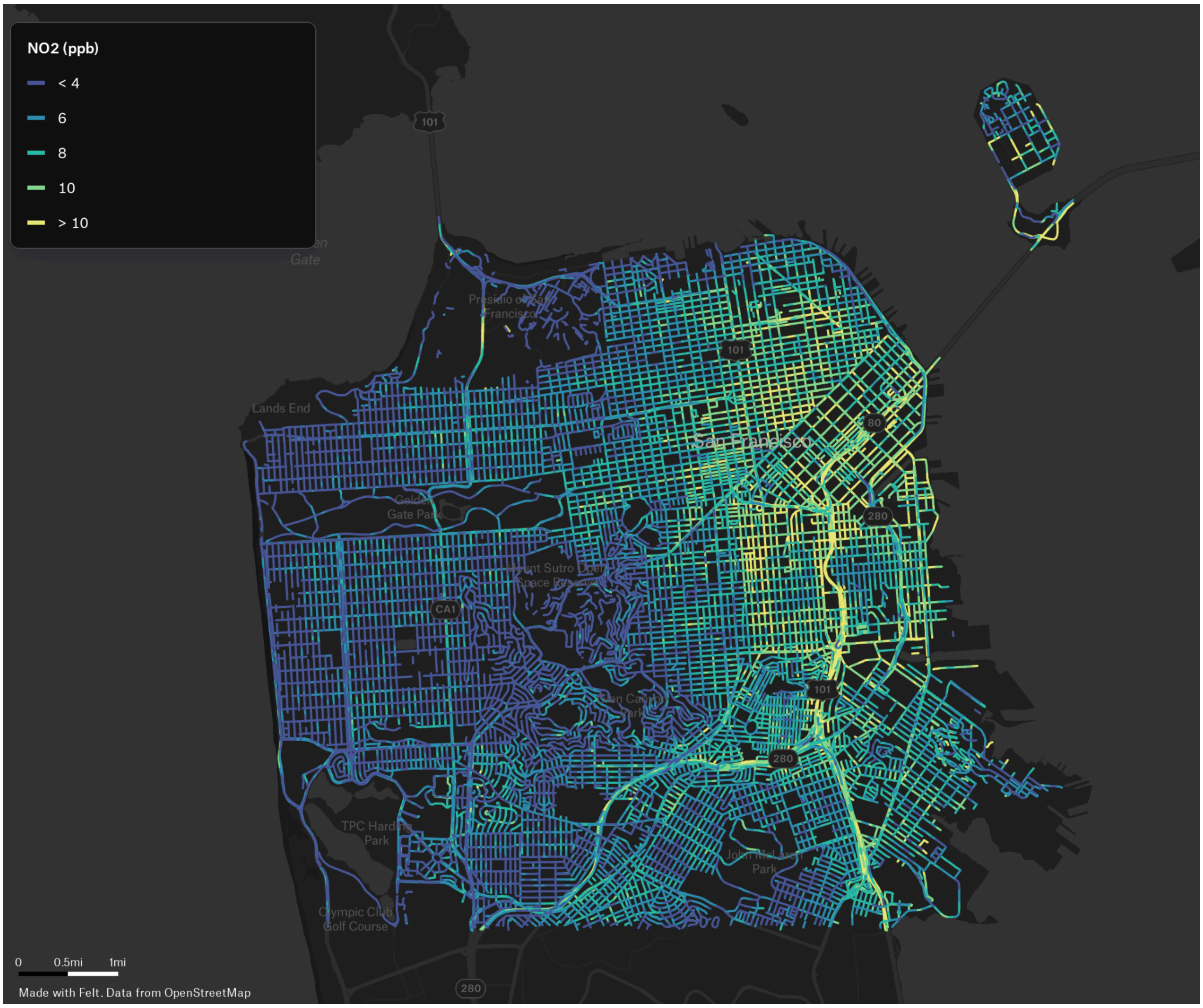

Figure 4.1: Example of plotted ambient concentration estimates for NO_2 in the San Francisco Bay Area, CA, showing typical concentrations observed over a 1-year monitoring period. This example shows how high NO_2 concentrations (as illustrated by the brighter green colors) are disproportionately impacting the eastern parts of the city. This plot uses data generated by the broad area monitoring method.

The suite of pollutants measured by the AMP supports the exploration of many source types identified by the community. Black carbon measured in combination with NO_2 and other combustion related pollutants help identify areas impacted by diesel particulate matter pollution. TVOC data help identify areas where organic toxic air contaminants may be located, such as near oil refineries or gasoline service stations. Methane and ethane data combined with other pollutants then help identify natural gas leaks, combustion-related methane emissions, or sources of biogenic methane such as landfills and water and solid waste management plants.

Targeted area monitoring: a subset of monitoring vehicles focuses on specific air pollution concerns (sources or impacted areas) at smaller spatial scales and shorter time periods. This measurement strategy involves monitoring over a relatively small area over a shorter time period with more intensive driving (i.e. more samples in a specific area on any single day). There is an inherent limitation in the targeted area studies in that they will typically occur over a short time period, and the results are likely to not be representative over longer time periods (different facility operating patterns and/or meteorological conditions). While broad area monitoring may provide more temporally representative results, targeted area monitoring is a complimentary approach that can tell us more detail about a specific concern, such as the exact makeup of chemicals being emitted from a particular facility, what areas of a community are most impacted in the immediate vicinity of pollution sources, or what times of day these areas are most impacted. Targeted area monitoring vehicles will either be drawn from the broad area monitoring fleet (Aclima Mobile Platforms) or from a special mobile laboratory fleet (a small number of vehicles with higher accuracy/precision sensors detecting a wider range of pollutants including toxic air contaminants), depending on the specific source of concern. In contrast to the broad area monitoring approach, the number of concerns that can be addressed is much more limited, but the depth at which the data about the concerns can be collected and analyzed is potentially greater.

Targeted area monitoring vehicles can be deployed in different ways to meet different objectives.

- *Fenceline* driving (Figure 4.2) gathers data systematically on predetermined routes around the perimeter of a known or suspected source facility/site. Fenceline driving can help determine the chemical makeup of emissions from a known source.
- *Transect* driving (Figure 4.2) follows a path designed to go upwind, through, and downwind of a potential plume of pollution from a known or potential source. Transect driving can help us better understand the chemical makeup of emissions in a plume, and where the plume is impacting in the local community.
- *Pseudo-stationary* driving approximates a more traditional stationary monitoring approach by temporarily stopping a monitoring vehicle within a potential plume of pollution from a known or potential source. Pseudo-stationary driving can help us better understand how pollution from a source varies in time. It can also allow for measurements of certain pollutants where measurement methods require longer sampling times (minutes up to an hour).
- *General Survey driving* is repeated monitoring along a predetermined route or on all roads within a predetermined area, attempting to collect air pollutant data evenly across time.

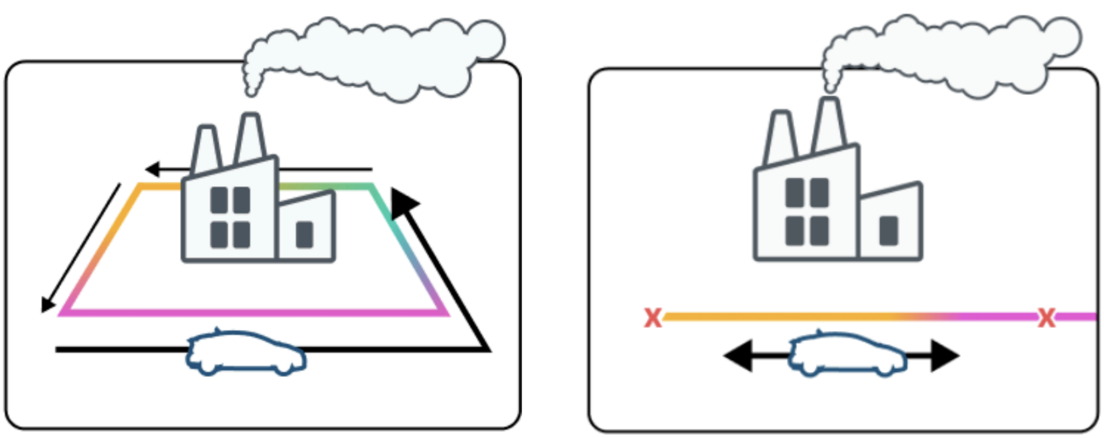

Figure 4.2: Example measurement technique for targeted area monitoring using (left) fenceline driving systematically surveys around the perimeter of a known or suspected source facility/site and (right) transect driving following a path designed to sample upwind, in, and downwind of a potential plume of pollution from a known or potential source.

Targeted area monitoring for Westlake, Korea Town, Mid-City and Mid-Wilshire will be conducted by UC Riverside, and additional information about the targeted area monitoring can be found in Section 8.3. The suite of pollutants for monitoring by UC Riverside includes benzene, toluene, PAHs, 1,3-butadiene, ethylene oxide, total PM, and SO_2, which are relevant to the mixture of air pollutants expected from the concerns and sources identified in Section 2. Moreover, the Riverside mobile laboratory can measure a wide variety of organic gas-phase and particle-phase species, allowing for characterization of the composition of pollution coming from refineries or petroleum facilities, as well as a number of other sources in the community.

4.3 Community-defined concerns, objectives, and analysis plans

The community engagement process has defined a range of air pollution concerns. These concerns were translated into specific high-level monitoring objectives and sub-objectives, which in turn allowed the selection of appropriate mobile monitoring methods and data analysis plans to collect the type of data needed to address gaps in prior monitoring efforts and to address specific community concerns. Not all concerns and identified pollution sources are assigned specific monitoring objectives. In some cases, it is because the measurement methods for monitoring the sources are not available to address the specific pollution sources. One of the identified concerns of the Torrance refinery is addressed in a different CAMP for SMMI. More generally, however, it is because resources for targeted area monitoring are limited across the entire SMMI project (62 different communities) and not all concerns can be directly addressed through the targeted area monitoring approach. While the concerns listed below will be the primary focus of the monitoring in Westlake, Korea Town, Mid-City and Mid-Wilshire, the final collected data set can be further analyzed beyond the scope of SMMI to address a much wider set of concerns and sources.

Note that the selection of specific concerns to be included as monitoring objectives for targeted area studies does not imply that these are the most impactful sources or the most impacted areas in the community. The results of these studies will not be able to provide a comprehensive view into all possible sources in the community and the monitoring objectives listed here should not be interpreted that way.

Table 4.1 below provides an outline of the community specific concerns, objectives/sub-objectives, mobile monitoring methods, and data analysis approaches that may support actions to reduce emissions or exposure in a community. More details on the monitoring methods and presentation approaches can be found in Section 8 and Section 13, respectively.

Table 4.1: Community-defined concerns, objectives, and analysis plans

Community Concern	Primary Monitoring Objective	Monitoring Sub-objective	Mobile Monitoring Methods	Analysis Approach
MacArthur Park neighborhood	Identify disproportionate impacts	Spatial Distribution Which source types most responsible Key pollutants	Targeted Area: General survey Conducted by UC Riverside	Ambient concentration map of key pollutants Area-wide statistics on pollutant levels

Community Concern	Primary Monitoring Objective	Monitoring Sub-objective	Mobile Monitoring Methods	Analysis Approach
				Clusters of enhancement detections on a map
Freeways & other major roadways	Identify disproportionate impacts	Locations impacted Pollutant levels	Broad Area Monitoring	Clusters of enhancement detections on a map
Bus transportation routes	Identify disproportionate impacts	Key pollutants Pollutant levels Locations impacted	Broad Area Monitoring	Clusters of enhancement detections on a map
Gas Stations	Characterizing Sources	Locations impacted Pollutant levels	Broad Area Monitoring	Clusters of enhancement detections on a map

5. Project roles and responsibilities

The SMMI defines the roles and responsibilities of various stakeholders in the community monitoring. The Community Engagement Plan details these roles and responsibilities and outlines how different groups will work together for community engagement. This section outlines the organizational structure for the SMMI partners (Figure 5.1), a list of community organizations that are Engagement Leads, and a list of the PEG members (Figure 5.2). Information on the SMMI project, including links to Engagement Leads, PEG members, and PEG meetings is also available at https://aclima.earth/ca-smmi. Responsibilities for Engagement Leads and PEG members are laid out in Section 1.1 in detail.

CARB's Monitoring and Laboratory Division is responsible for funding, managing and overseeing the project and ensuring it meets all contractual requirements. Aclima is the primary contractor for the project and is responsible for designing and implementing a plan for statewide community engagement, developing CAMPs for all project area communities, deploying mobile platforms to collect data, managing and analyzing data, and developing public reports. CARB and Aclima meet weekly to discuss project updates and ensure the project is progressing.

Based on the project's Community Engagement Plan, Breathe Southern California, the Engagement Lead for Westlake, Korea Town, Mid-City, Mid-Wilshire, plans and implements community outreach and engagement for the project, with the goal of understanding specific community concerns around air pollution. In addition to the distribution of an air pollution survey, Breathe Southern California holds and conducts outreach for two community meetings focused on local air pollution concerns that are tailored to the specific linguistic, cultural, and accessibility needs of the community. Breathe Southern California then summarizes community air pollution concerns for Aclima to translate into the CAMP. Community members play a crucial role in providing their knowledge and experiences with air pollution both through participating in the community meetings and through completing the air pollution concerns survey. The Project Expert Group guides community engagement and decision-making throughout the project, meeting eight times over the project period in meetings facilitated by Aclima.

SMMI Partners

Figure 5.1: SMMI Project Organizational Chart

Community Organizations

Engagement Leads lead and co-manage community engagement efforts in the designated communities

- Acterra
- Breathe SoCal
- Californians for Pesticide Reform
- Canal Alliance
- CCEJN
- Center for Community Action and Environmental Justice (CCAEJ)
- Center on Race, Poverty, and the Environment
- Citizen Air Monitoring Network
- Clean Water Fund
- Climate Action Campaign
- Community Agency for Resources, Advocacy and Services (CARAS)
- Cool OC
- Day One
- El Concilio
- Girl Plus Environment
- Greenbelt Alliance
- HARC, Inc.
- Healthy Fresno Air
- HOPE Collaborative
- Just Cities
- Leadership Counsel
- Los Amigos de la Comunidad
- Madera Coalition for Community Justice
- One Treasure Island
- Our Children's Earth Foundation (for Rodeo Citizens Association)
- Pacoima Beautiful
- Rise South City
- Sacramento EJC
- San Leandro 2050
- SOMCAN
- Sustainable Contra Costa
- Sustainable Solano
- The Niles Foundation
- Tri-Valley Air Quality Climate Alliance
- UNIDOS Network
- United for Justice
- Valley Improvement Projects
- Valley Onward
- Valley Vision

Project Expert Group

A cross-sector group of representatives from local air districts, community-based organizations, academia, and residents from overburdened communities that guides community engagement and decision-making for this project.

- Nader Afzalan
- Stephanie L. Mora Garcia
- Brent Bucknum
- Mikela Topey
- Agustin Angel Bernabe
- Amelia Stonkus
- Anna Lisa Vargas
- Gustavo Aguirre Jr
- Jamallah Green
- Jonathan Mercado
- Ken Szutu
- Lillian Garcia
- Moses Huerta
- Ms. Margaret Gordon
- Brad Dawson
- Kate Hoag
- Lily Wu-Moore
- Payam Pakbin

Figure 5.2: List of Engagement Lead organizations and PEG members for SMMI

How will monitoring be conducted?

6. Data quality objectives

Data quality objectives are a series of goals set to make sure that the data collected, the analyses performed, and the visualizations produced are of good enough quality to address the stated monitoring objectives. These goals can be related directly to the quality of the measurement method, for example the accuracy or the precision of a sensor. They can also be more qualitative goals that determine how the measurement data is analyzed and visualized to accurately address community air quality concerns without being misleading. Data quality indicators are sometimes included as part of a data quality objective and are specific metrics that can be used to tell how good a measurement is. Some commonly used data quality indicators are data completeness, precision, bias, or limit of detection. Additional information on these and other data quality indicators can be found in Appendices C, D, E, F and G.

Mobile air quality monitoring enables a variety of high-resolution spatial analyses that support different air monitoring objectives. One output uses time-resolved data from multiple individual drives of the same location to identify areas where pollution concentrations vary substantially and persistently from local background levels, indicating a probable local emissions source. This supports the air monitoring objective of attempting to identify and characterize pollution sources. Another output is the creation of maps of typical air pollution concentrations at block-by-block resolution that show areas of persistently high or low levels of individual pollutants, supporting the air monitoring objective of identifying areas of disproportionate impact.

Different monitoring objectives have different data quality objectives. The two primary monitoring objectives for SMMI and their associated data quality objectives are:

1. **Identify and characterize air pollutant emission sources**

   Typical pollutants of interest: CH_4, C_2H_6, BC, $PM_{2.5}$, NO, CO, TVOC, and toxic air contaminants such as benzene, toluene, formaldehyde, and PAHs

   Data quality objectives:

   a. Find and map spots where pollution is likely coming from by detecting noticeable spikes in measurement readings that are clearly above normal background levels. More specifically, this means that the spike measurement must have a signal to noise ratio of at least 3.
   b. Ensure high confidence in the locations where pollution emissions sources are detected and minimize the presence of “false positives” in the resulting data. This is done by ensuring that multiple detections of emissions sources occur in the same location before identifying it as a likely source of pollution. This can be quantified as the number of detections per visit to a particular location.
   c. Aclima will monitor and track the performance of each underlying measurement using the following key data quality indicators: gain drift and limit of detection. Additional information is in Appendix C.

2. **Identify disproportionate air pollution impacts**

   Typical pollutants of interest: O_3, NO_2, $PM_{2.5}$, BC

Data quality objectives:

a. Produce an ambient concentration estimate of pollution for the monitoring area by collecting measurements at different times of day, day of week, and across seasons to account for natural variability of pollution levels.
b. Ensure data are spatially distributed throughout the entire user-defined area.
c. Produce concentration estimates at desired and practical spatial aggregation scales (e.g. hexbins, road segments).
d. Include a measure of confidence (i.e. a confidence interval) with each ambient pollution concentration estimate, so users can understand the reliability of the values and whether pollution levels are truly different between locations.
e. Monitor and track the performance of each pollutant measurement using the key data quality indicators of bias, drift, precision

These data quality objectives are largely qualitative goals that provide the foundation for the types of insights that mobile monitoring is designed to support. A critical aspect of quality assurance underlying these objectives is characterizing and maximizing the measurement quality of the air pollution measurements, particularly for the sensors. However, confidence in these data products will depend on a number of additional factors such as mobile monitoring strategy, the number of samples collected for features of interest (i.e. road segment or other spatial length scale), magnitude and variability in pollution concentrations, and meteorology over the contract period. Different sensors in Aclima's Mobile Platform have varying levels of data quality and limitations to consider, which are outlined in Appendix C.

Data completion is an important quantitative data quality indicator in air quality monitoring as incomplete data can lead to biased conclusions from the data collected. Traditionally, data completeness is quantified across the time dimension, for example, number of data points collected per total time elapsed. With mobile monitoring, in some cases, it is more important to quantify data completion in the spatial dimension, for example, total number of data points collected in a specific location compared to an expected number of data points in that location. Aclima's completeness metric for monitoring is discussed in Section 12. For the customized targeted area monitoring, metrics for completion are discussed in Section 8.3. Achieving completion for the monitoring plan relies on individual sensors having high temporal data completeness rates and uptime. Completeness rates of 80% or higher generally allow for efficiently achieving the spatial completeness objectives. If completeness is below 80%, additional driving will be done to compensate in order to meet the monitoring completeness metrics. If this is not possible for specific monitoring objectives, the impact will be detailed in the final report.

The comprehensive quality assurance approach incorporates processes and metrics to minimize uncertainty. Achieving data quality objectives relies on more than just individual indicators, as real-world challenges (e.g., driver absences) and external events (e.g., wildfires) can affect data quality despite a robust QA plan. The primary aim of these objectives is to generate high-quality data with well-defined performance parameters, enabling effective aggregation and analysis of mobile data for informed decision-making and pollution reduction initiatives across various applications. Section 12 details the evaluation of the effectiveness in meeting these data quality objectives. Section 12.2 details the QA/QC information that will be included in the final report.

7. Monitoring methods and equipment

Aclima will deploy two distinct but complementary monitoring methods enabled by the use of a mixed fleet of AMPs and PMLs:

- **Broad area monitoring** collected by AMPs, with mobile monitoring guided by dynamic algorithm in monitoring areas defined by the community as areas of high pollution concern during community meetings and through survey submissions
- **Targeted area monitoring** for investigations of specific sources and areas of concern, collected by the UC Riverside PML, with mobile monitoring guided by community-defined air quality concerns and monitoring objectives

7.1 Monitoring equipment

Broad area monitoring as part of this CAMP will be conducted using a fleet of Aclima Mobile Platforms (AMPs, Figure 7.1).

Figure 7.1: An Aclima Mobile Platform.

All AMPs have a standardized measurement suite that covers a core range of priority pollutants and greenhouse gases (GHGs) shown in Table 7.1, operating at a collection frequency of every second (with the exception of ozone which is measured every 2 seconds). The Aclima fleet will conduct broad area monitoring measurements during different times of day and different days of the week.

Table 7.1: Air pollution and greenhouse gas species measured by the AMP.

Pollutant	Measurement Frequency
Carbon Monoxide (CO)	1 sec
Carbon Dioxide (CO2)	1 sec
Nitric Oxide (NO)	1 sec
Nitrogen Dioxide (NO2)	1 sec
Ozone (O3)	2 sec
Methane (CH4)	1 sec
Ethane (C2H6)	1 sec
Total Volatile Organic Compounds (TVOC)	1 sec
Fine Particulate Matter	1 sec
Black Carbon	1 sec

Experienced scientists from academia and industry will be deploying 3 Partner Mobile Laboratories (PML) that are equipped with instruments that measure a wide set of speciated air toxics. The PMLs are research groups from UC Berkeley, Aerodyne Research, and a consortium including researchers from UC Riverside, Baylor University, and University of Houston. Each vehicle is custom-built with different specifications and instrumentation. All 3 vehicles sample in real time with sample time ranging from 1 second up to 30 minutes, depending on the instrument. A full list of PML instrumentation and pollutants measured is available in Appendix I.

For Westlake, Korea Town, Mid-City, Mid-Wilshire, the Riverside/Houston/Baylor Mobile Air Quality Lab #3 (MAQL3) will be conducting the targeted area monitoring. The MAQL3 is a 24' box truck with a crew cab to carry a driver and up to four scientists. The MAQL3 has a flexible payload system which will carry a variety of instruments to measure gases, aerosols, volatile organic compounds, meteorological, and other state parameters (latitude, longitude, altitude, speed, etc). Trace gas measurements include ozone (2B Technology Model 205; modified Thermo 42c), carbon monoxide (Los Gatos 913-0024), carbon dioxide (Licor LI-7000), nitric oxide (Thermo 42c-TL or custom Air Quality Design 2-channel), nitrogen dioxide (modified Thermo 42c-TL or custom Air Quality Design 2-channel), total reactive nitrogen (modified Thermo 42c), sulfur dioxide (Thermo 43i-TLE), and reactive alkenes (Hills Scientific Reactive Alkene Detector). An Airmar 220WX reports temperature, humidity, pressure, wind speed and direction, latitude, longitude, altitude, and vehicle speed. Boundary layer heights are derived from a Vaisala CL-31 using BL-View software. The downwelling photolysis rate of nitrogen dioxide is measured with a 2-pi field of view filter radiometer (MetCon). Volatile organic compounds analysis includes a Proton Transfer Reaction Mass Spectrometer (PTR-MS; Ionicon Analytic), AROMA-VOC Mobile Trace Chemical Analyzer (Entanglement Technologies), and a Picarro G2307 gas concentration analyzer to measure formaldehyde (HCHO) and methane (CH_4). Aerosol analysis includes an aerosol light scattering (TSI 3563 nephelometer) and light absorption with a three-wavelength tricolor absorption photometer (TAP; Model 2901, Brechtel Inc). Aerosol size distributions will be measured with a home-built scanning mobility particle sizer, a Handix Portable Optical Particle Spectrometer, and a TSI Aerodynamic Particle Sizer (3321).

Aerosol composition will be measured with a high-resolution time-of-flight mass spectrometer (HR-ToF-MS; Aerodyne Research Inc, Aerosol Mass Spectrometer). Particle size distributions will be measured using a Scanning Mobility Particle Sizer (SMPS; custom, UCR), a Portable Optical Particle Spectrometer (POPS; Handix Scientific, Inc.), and an Aerodynamic Particle Sizer (APS; Model 3321, TSI, Inc.). Total particle number concentration will be measured with a condensation particle counter (CPC; Model MAGIC, Aerosol Dynamics, Inc.).

7.2 Monitoring methods - broad area monitoring

In broad area monitoring, Aclima's fleet of Mobile Platforms will collect data within the community defined monitoring area boundary. AMPs will measure on publicly accessible roads within this boundary, gathering repeat measurements at different times of day, days of the week, and seasons.

Aclima will conduct monitoring within the defined boundary such that the fleet will complete an average of 20 repeat measurements distributed across all residential and major roads in all census block groups to provide adequate coverage throughout the monitoring area. However, rather than specify the number of samples on any specific length of road within each census block group, Aclima uses a dynamic mobile sampling algorithm that is updated daily with the specific goal of collecting data that will maximize improvement in the characterization of a location's air quality. This approach ensures that sufficient measurements are collected in areas where greater pollutant variability requires additional sampling to achieve representativeness, or measurements that are representative of the conditions across the specific monitoring period. The system uses observed data in combination with predictive models to prioritize data collection in locations based on these factors:

- Number of visits to-date relative to expected visits, given the time elapsed over the 9-month monitoring period
- Time elapsed since the last visit
- Variability in observed pollutant concentrations over repeat visits, i.e. a mismatch between observed concentration and the predicted concentration based on prior observations

At the beginning of the monitoring period, the number of visits is more heavily weighted than the other factors and once a suitable number of observations have been made to make reliable predictions, the variability of observed pollutant concentrations becomes more heavily weighted. In the end, locations where pollutant variability is higher, will be prioritized for more repeat visits in order to more adequately characterize the average pollutant concentrations in these locations.

Aclima ensures continuous mobile monitoring throughout the day by staffing driving shifts throughout the day and staggering start times to avoid operational gaps when drivers are ending and starting shifts. The drive planning algorithm operates across large areas, not individual communities of varying sizes, and aims for spatially diverse data collection daily across all CNCs, regardless of the amount of road miles contained in those communities. To mitigate time-of-day bias, specific road locations are randomly assigned to 6-hour windows on a daily basis to mitigate against overly biased collection in certain locations to certain times of day. The sampling algorithm also prioritizes maintaining an equal revisit rate across the monitoring area, aiming for the 20-visit average over a nine-month period rather than quickly completing specific locations. Locations that receive 20 visits early on in the nine-month period will continue to be visited over time.

The mobile sampling algorithm ensures sufficient data collection to support the calculation of spatially resolved ambient concentration estimates. In addition, the method supports source identification and assessment of disproportionate impacts by directing more sampling in regions where there is larger variation in pollution concentrations. For a detailed discussion of the broad area mobile monitoring and the dynamic mobile monitoring algorithm, see Aclima's QA documentation in the Appendices C, D, and E.

The broad area monitoring boundary for Westlake, Korea Town, Mid-city, Mid-Wilshire is shown in Section 8: Monitoring Areas.

7.3 Monitoring methods - targeted area monitoring

UC Riverside will conduct targeted area monitoring that focuses on specific air pollution concerns at smaller spatial scales. This involves monitoring over a relatively small area over a shorter duration in time (approximately 1 to 2 weeks) and is designed to complement the broad area monitoring coverage by providing more in-depth information about a specific area of concern. This can provide both enhanced characterization of pollution sources as well as an assessment of the locations of concern and sensitive receptors in the community that are impacted by source emissions. Targeted area monitoring is designed to perform detailed chemical, temporal, and/or spatial characterization at a select number of locations of concern identified by communities. The characterization can include aspects such as denser temporal information about pollutants by time of day, detailed chemical speciation around sources of concern in a particular area, or spatial information about the location of an emission source and extent of the areas and people impacted by the source.

The mobile monitoring method for targeted area monitoring is different from that used for broad area monitoring. By the nature of targeted area monitoring, a more customized driving method is necessary to support air monitoring objectives and concerns specific to individual communities. As with the broad area monitoring, representativeness is achieved by conducting repeat measurements to sufficiently characterize pollutant concentrations; however, the repeat measurements will typically (though not exclusively) occur over a more condensed time period in these targeted investigations.

Section 8 (Monitoring Areas) details the targeted area monitoring study that will be conducted in Westlake, Korea Town, Mid-city, Mid-Wilshire.

7.4 Strengths and limitations of mobile monitoring

Because of the nature of mobile monitoring and how it differs from stationary monitoring, there are inherent strengths and limitations to the approach.

- Mobile monitoring can cover more area at a higher spatial resolution than stationary networks (i.e. fewer spatial gaps in coverage). However, because mobile monitoring vehicles can only spend a limited period of time at a given location, there may be gaps in time for that location where monitoring data is not available.
- Mobile monitoring sensors and instruments can gather valid data on a wide variety of important pollutants for informing community action, but to achieve high spatial resolution, gather data on fewer pollutants and at lower precision and accuracy than is possible in stationary networks. As a result, mobile monitoring sensors are not certified by the U.S. EPA for gathering data that can be compared against national ambient air quality standards (NAAQS) and used in regulatory actions under the Clean Air Act. For certain regulatory actions, a follow-up study using U.S. EPA-approved monitoring methods may be necessary.
- While mobile monitoring can provide a significant amount of information across a given geographic area, monitoring vehicles may be present in that area for a limited period of time. This may mean rare events or seasonal patterns are not captured in the dataset.

8. Monitoring Areas

8.1 Community Mileage Allocation

A requirement for SMMI is that at least 50% of the population in the areas monitored are living in areas designated as Disadvantaged Communities (DAC), as defined by the top 25% of CalEnviroScreen scores under SB535. Across all CNCs designated for monitoring as part of SMMI, the total population is approximately 7.9M people, of which 2.9M people live in DACs (approximately one quarter of the California-wide DAC population). Aclima's monitoring resourcing scales with the length of roads contained within the selected monitoring area; in other words, more vehicles and drivers are required to monitor areas with a higher total length of roads. For all CNCs combined the total contained road length is approximately 18,000 miles[4]. The DAC census tracts combine to about 6700 miles. Aclima determined that allocating resources for SMMI such that approximately 12,000 miles of roads could be covered would allow for covering the DAC communities while also keeping the total % of DAC population at 50% or above, whereas adding additional resources would reduce the percentage of DAC population receiving monitoring resources. The implication of this is that because not all communities will receive monitoring resources to cover the entire community, an equitable process for allocating monitoring resources per community would need to be developed that would ensure that communities with higher proportions of DAC population will receive more monitoring resources. In consultation with the Project Expert Group (PEG), Aclima developed a method for allocating monitoring resources for broad area monitoring across the 62 CNCs that are part of the SMMI. The approach involved 3 steps:

1. The total number of available road miles was distributed across air districts according to the proportion of population contained within the CNCs in each of the 5 air districts containing the 62 CNCs (Imperial County, South Coast, San Joaquin Valley, Sacramento Metro, and Bay Area)[5]. This resulted in 100% of the road miles for CNCs in Sacramento, San Joaquin, and Imperial County Air Districts being allocated, because the proportion of these air districts' population is higher than their proportion of the CNC road miles compared to that over all CNCs. For the Bay Area and South Coast CNCs, there were more miles present within the CNCs than there were miles available, and therefore a method was required for allocating the remaining miles among individual CNCs.
2. A customized prioritization metric for each census tract across all CNCs was defined to rank CNCs according to various socioeconomic and environmental indicators. This prioritization method was defined in consultation with the PEG. A description of how this prioritization metric was defined is given below.
3. Individual census tracts within CNCs were successively selected based on this customized ranking until the total road miles available for monitoring in each air district was exhausted. The road mile length of the census tracts selected is added up for each CNC, and that total is the number of miles available for monitoring for that CNC. The total number of miles assigned to each community by this method is presented in Appendix B.

The prioritization metric was created as an alternative to the CalEnviroScreen (CES4.0) score, addressing concerns raised by the PEG about the relevance of many of the metrics used in CalEnviroScreen as applied to the SMMI. Note that because the DAC communities are defined based on CES (under SB535), the PEG's prioritization metric will

[4] Only major and residential road types are considered in estimates of monitoring area road miles for resourcing purposes; however, all accessible road types, which includes major, residential and highways/freeways, will be driven.
[5] The populations used for each Air District in this calculation are: Bay Area - 2838232; Imperial - 15330; Sacramento Metro - 138633; San Joaquin Valley Unified - 687473; South Coast - 4573865.

result in some non-DAC communities being prioritized over DAC communities. The methodology Aclima used, in coordination with the PEG, is outlined below.

- Aclima proposed a customized weighting of individual environmental and socioeconomic indicators relevant to the SMMI monitoring methodologies (including some in CalEnviroScreen plus others). The weighting was determined by a survey of PEG members, who collectively assigned weights to each available indicator.
- Survey Score Normalization: The Max/Min method was used to normalize the survey responses from PEG members to a scale of 0 to 1. This ensured that individual respondents' tendencies to give consistently higher or lower ratings did not skew the overall results.
- Indicator Weighting and Scoring: The normalized raw survey results were used to create weighting factors for each indicator. These weighting factors are shown in Appendix B. For each census tract, a mileage allocation score is derived by converting each indicator value into a percentile rank across all census tracts contained in the CNCs. This rank is multiplied by its corresponding weight, summing across all indicators, and normalizing to a value between 1-100. The indicators were taken from CES 4.0 and two additional non-CES indicators were added: the density of AB2588 Air Toxics Hot Spots and the density of large permitted sources, both measured as the number of sources per unit road length in census tracts. Some of the sources in the inventory had no emissions reported; these sources were first removed before calculating the density of sources.
- Final Score Calculation: The weighted scores for each indicator were summed for each census tract. This summed result was then normalized to a scale of 1-100 to create a PEG mileage allocation score for every census tract contained within the 62 CNCs. The final indicators and scores are available in Appendix B.

While this approach resulted in census tracts with the highest prioritization scores being prioritized within CNCs for the purposes of mileage allocation, the Community Engagement Plan (Appendix A) outlined a process for the Engagement Leads to work with communities directly to use the road mileage budgeted to select monitoring boundaries according to the priorities indicated by the communities. While this process empowers the local communities to make the decisions about where to direct monitoring, it should be acknowledged that the final monitoring area boundaries may not necessarily include the most disadvantaged communities as defined by established metrics such as CalEnviroScreen or by the PEG-developed metric.

For Westlake, Korea Town, Mid-City, andMid-Wilshire, the total road length (for residential and major roads only) within the community is 289 miles, and the allocated mileage is 244 miles, as determined through the process above.

8.2 Broad Area Monitoring Coverage

Aclima's vehicles will gather detailed location-based and time-based pollution measurements throughout the community. This will happen over a nine-month period as the vehicles drive on roads that are open to the public. The specific neighborhoods where this mobile monitoring will take place were decided by the community members themselves during meetings led by Breathe Southern California. Broad area monitoring will occur consistently across a 9-month period from June to March, with repeat frequency in all locations (at the census block group level) on average approximately once every 2 weeks.

The maps below identify the region selected by the community for broad area monitoring along with location characteristics about known air pollution sources and community-identified concerns. Meteorological data (wind speed and direction) will be collected on the mobile platform and will be an additional location-based characteristic for incorporating into analysis and interpretation of data.

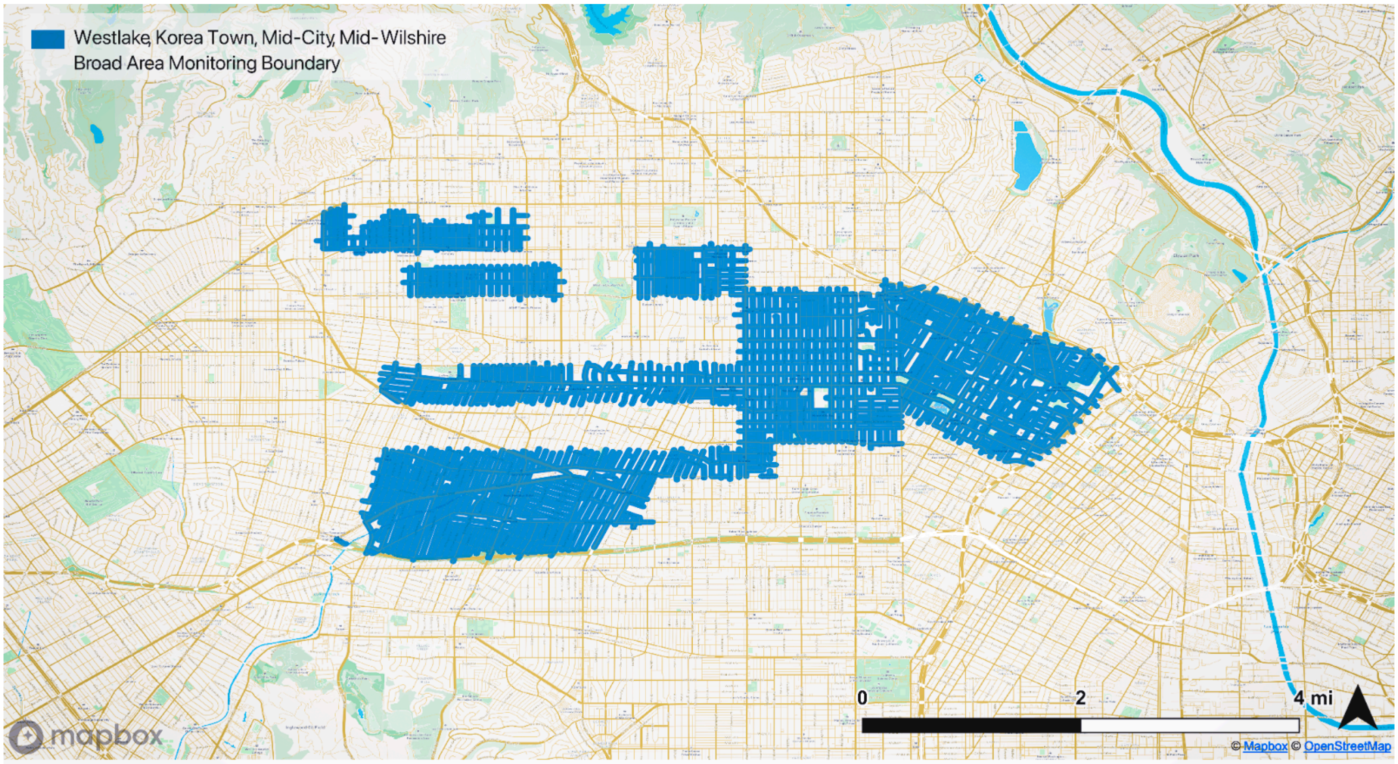

Figure 8.1: Map of the broad area monitoring boundary selected by Westlake, Korea Town, Mid-City, and Mid-Wilshire community members.

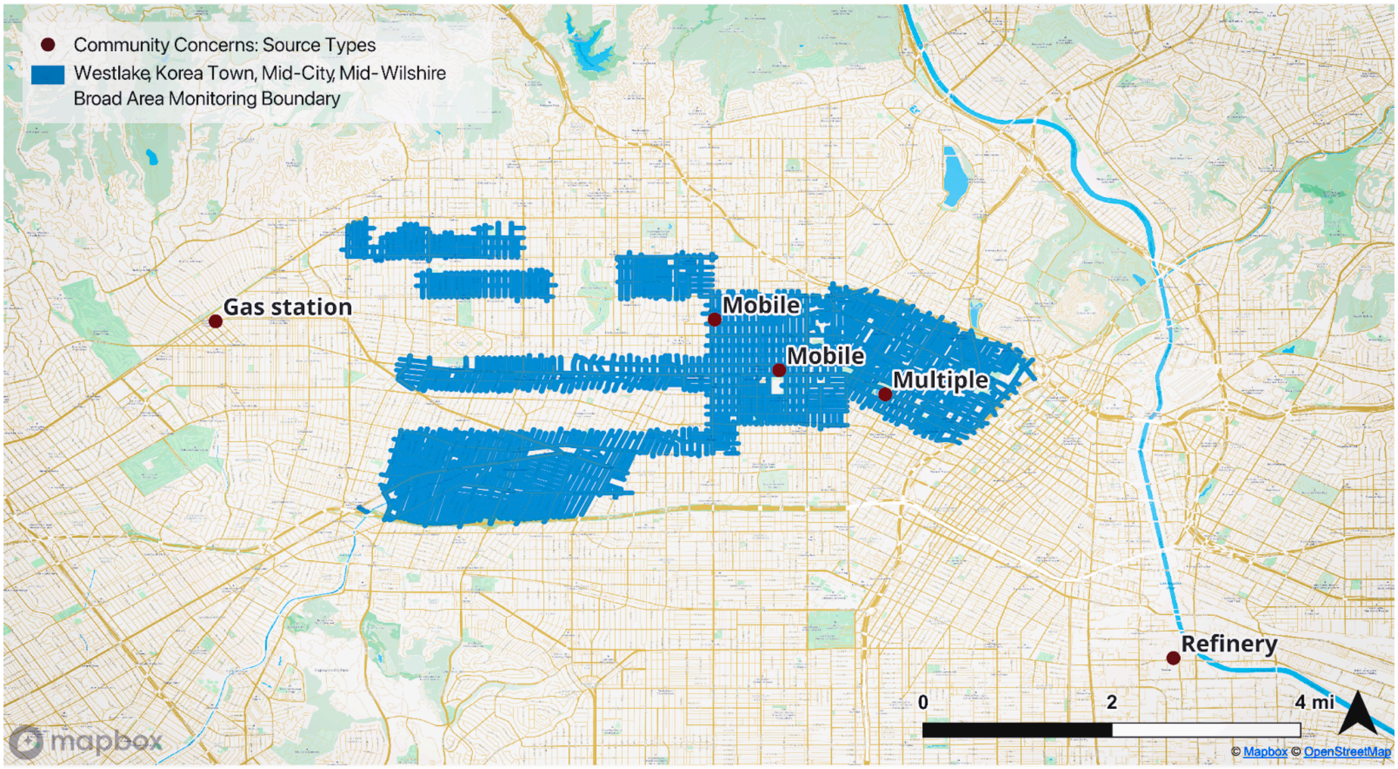

Figure 8.2: Map of the Westlake, Korea Town, Mid-City, and Mid-Wilshire broad area monitoring boundary and local air quality community concerns. Concerns noted by Westlake, Korea Town, Mid-City, and Mid-Wilshire community members include several heavily trafficked roadways and bus transportation routes, as well as gasoline service stations.

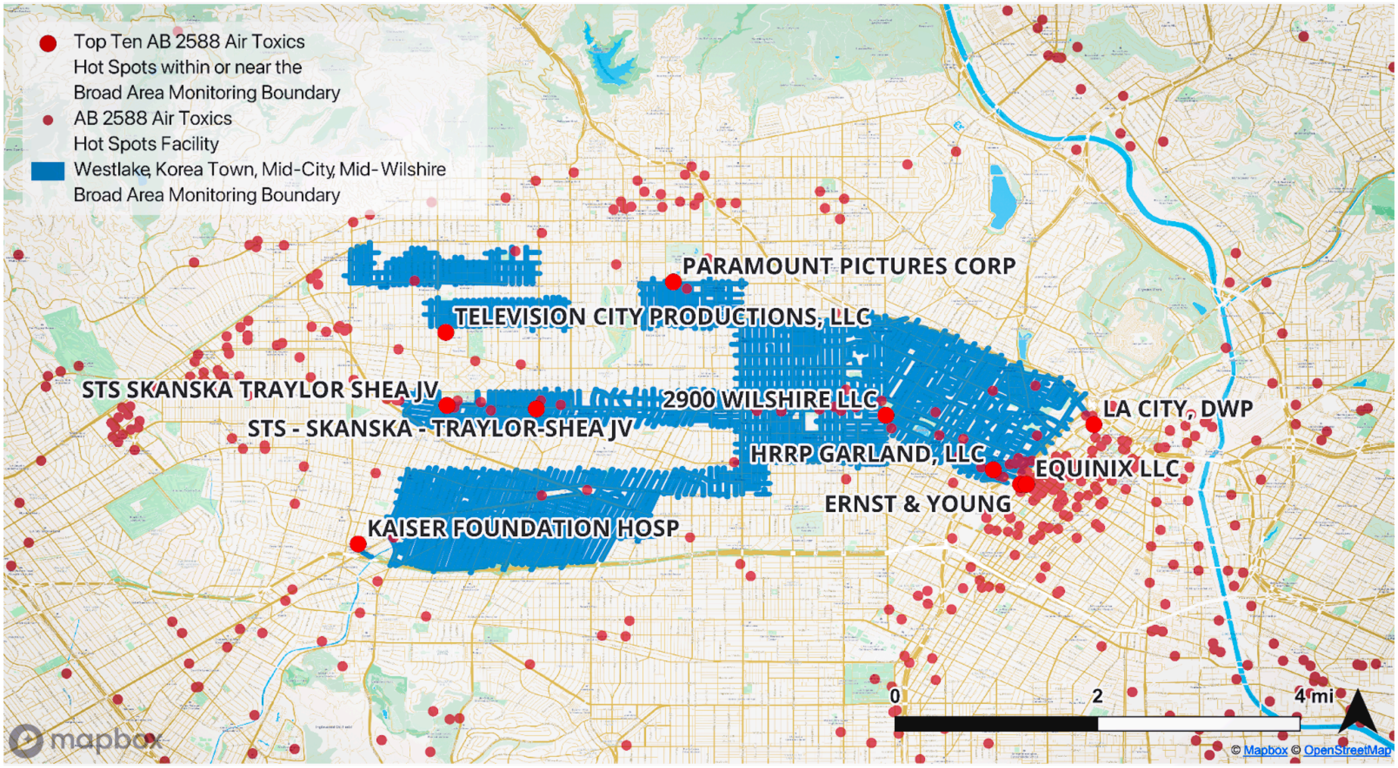

Figure 8.3: Map of AB 2588 Air Toxics Hot Spots within and near the Westlake, Korea Town, Mid-City, Mid-Wilshire broad area monitoring boundary. The top 10 hot spots, based on total toxicity-weighted emissions (TWE), are emphasized. These sources include a diverse range of industrial and commercial operations including companies specializing in: construction, infrastructure, telecommunications, entertainment, and waste management.

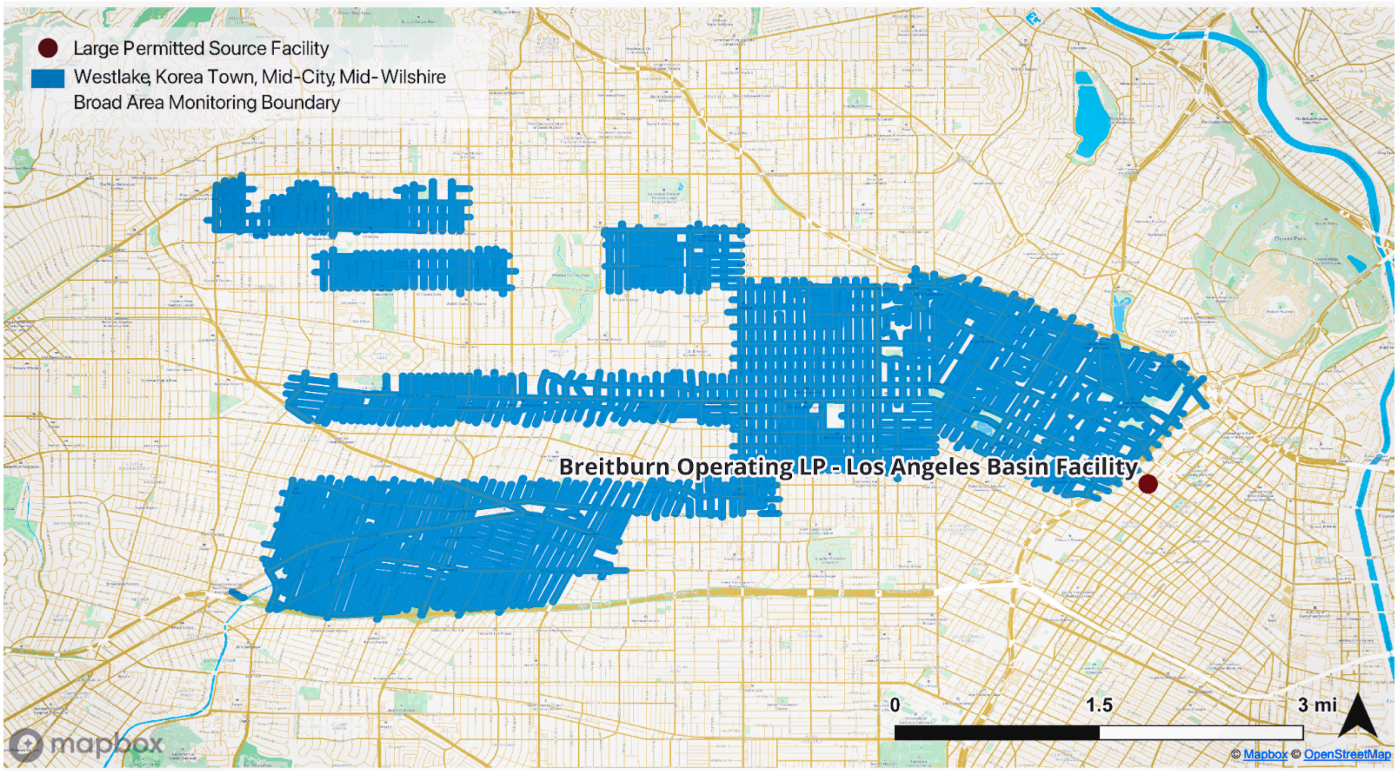

Figure 8.4 Map of large permitted facilities within and near the Westlake, Korea Town, Mid-City, and Mid-Wilshire broad area monitoring boundary. Facility activities include oil and gas operations.

8.3 Targeted Area Monitoring

Targeted area monitoring studies are designed to flexibly address specific air quality concerns raised by communities. The monitoring method, data analysis approach, and visualization approach will be customized to collect, visualize, and interpret the data in a way that is most effective for providing results that can ultimately be used to take action to address the air pollution concern. Aclima and UC Riverside, with guidance from the PEG, have developed a method that draws from a modular set of predetermined monitoring, analysis, and visualization approaches that can be combined in unique ways to address a number of different concern types and monitoring objectives.

The air quality survey, community meetings conducted by ELs, and other outreach conducted with community members and air district representatives identified and prioritized the community air quality concerns (detailed in Section 2.3).

From the concern and monitoring objectives, a monitoring, analysis, and visualization approach is selected that is most appropriate for providing actionable results to help address the community air quality concerns.

The targeted area study for Westlake, Korea Town, Mid-City, and Mid-Wilshire will be conducted by the UC Riverside mobile lab and will address the community identified concern about Mac Arthur Park being a generally impacted area with multiple different pollution sources of concern. The primary monitoring objective for this targeted area study is to identify locations of disproportionate impact from the various sources in this area (e.g. from traffic-related sources, gas stations, and other manufacturing industries). Some of the key pollutants that will be of focus include air toxics, including benzene, toluene, and formaldehyde, methane/ethane, black carbon, PM2.5, CO, and NO2. This targeted area study will be conducted using the following monitoring approach:

- **General Survey** Repeated monitoring along a predetermined route or on all roads within a predetermined area, attempting to collect air pollutant data evenly across time.
- **Stationary Sampling** If the source type is a VOC or particulate matter source, stationary measurements at the downwind fenceline will be made (if suitable parking is available) in order to allow for full chemical characterization of the plume. Stationary data allows the slower-timescale instruments to collect more meaningful data.

The Riverside Mobile Lab will monitor Westlake, Korea Town, Mid-City, and Mid-Wilshire by performing a general survey of areas immediately around MacArthur Park. Because the Riverside Mobile Lab is too large to drive many of the smaller residential and commercial blocks within the community, the monitoring will be constrained to transects of major roads (e.g. Wilshire Blvd.) near MacArthur Park. Additional transects of major roads throughout the entire community will also be performed, targeting additional community concerns as well as AB2588 Air Toxics Hot Spots. Monitoring in the MacArthur Park area will occur on approximately 50% of days spent in this community. Additionally, certain high priority sources listed in the top 10 Air Toxics Hot Spots will be targeted, up to two point sources per day. Daily wind conditions and downwind road access will dictate which day(s) a source or concern is visited. Clusters of sources with favorable sampling conditions can often be visited together, maximizing our sampling time. Three to five repeat visits (over multiple days) to these sources will be attempted. Initial scouting of this community determined that stationary sampling may be challenging, given the high congestion and density of roads, but where possible, parked monitoring will be conducted if desired to better characterize emissions plumes.

Riverside will spend approximately 1 week (either contiguous or spread across a wider time window while alternating visits across multiple SMMI communities) monitoring in Westlake, Korea Town, Mid-City, and Mid-Wilshire. This plan will address high emitting source concerns as well as producing multiple background measurements for the area. Aclima and the Riverside team will be in touch with the Westlake, Korea Town, Mid-City, and Mid-Wilshire engagement leads when plans are finalized in order to alert the community. Community specific information about the local concerns and sources as well as the accessibility of certain roads can be discussed at this point in order to inform the mapping routes.

The map below shows the focus area for this targeted area study.

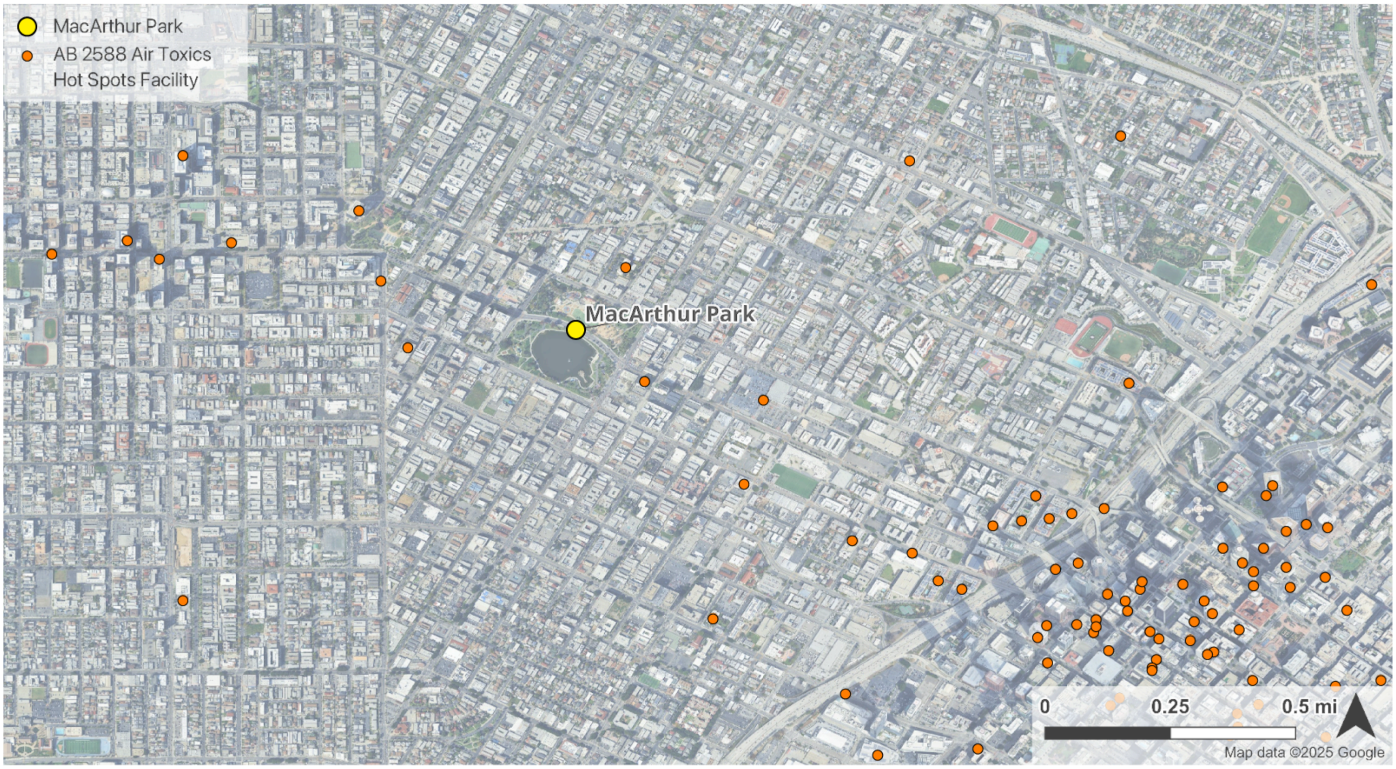

Figure 8.5: Map showing general area around MacArthur Park, which is the focus area of targeted area monitoring. The Riverside Mobile Lab will be constrained primarily to the major boulevards in this area, for example Wilshire Blvd. See text for additional details on the monitoring plan.

9. Quality control procedures

Quality control procedures are an important part of all air monitoring plans because they outline the work that will be done before, during, and after the measurement period to make sure that the data collected meet Aclima's data quality objectives.

9.1 Aclima's Quality Assurance and Quality Control Procedures

Aclima has a comprehensive set of quality control (QC) procedures in place throughout the entire monitoring process, from the moment the sensors are installed into vehicles up until the final data is analyzed. These procedures help us track and minimize uncertainty, ensuring that the data collected is appropriate for the intended monitoring objectives. The following is a brief overview of these procedures. A full description of these procedures is included as accompanying documents in Appendices C, D, and E, including the frequency of QC checks conducted.

Ensuring Sensors Measure Accurately: Calibration

Calibration is a critical part of Aclima's quality control process. Aclima compares its sensors against trusted reference instruments and standards to make sure they are reporting the correct pollutant levels. Aclima does this at several stages:

- **Before Deployment (Pre-deployment Calibration):** Before mobile monitoring vehicles start collecting data in the community, each sensor undergoes a thorough calibration process.
- **During and After Deployment (Calibration Check):** During and after a mobile monitoring period, the sensors are brought back to Aclima's calibration facilities and recalibrated using the same methods as before deployment. This helps the team see if the sensors have drifted or changed their readings during the monitoring period. Calibration checks will occur approximately once every 6-8 weeks over the 9-month monitoring period.
- **Addressing Calibration Drift:** If Aclima finds that a sensor's calibration has shifted between any two calibration events, the team carefully reviews the data and may apply adjustments to ensure the accuracy of the measurements taken during the monitoring period. The way Aclima corrects for drift depends on the pollutant and the type of data product (e.g., long-term averages vs. short-term spikes).

Ongoing Checks During Monitoring:

There are several ongoing checks that occur while mobile monitoring vehicles are in the field:

- **Driver Checks:** Aclima's trained drivers perform daily visual inspections of the monitoring system, including checking sample lines and performing **PM zero checks** to ensure the system is operating correctly. They also monitor data connectivity and clean the black carbon sensor inlet.
- **Automated System Checks:** Aclima's mobile platform continuously monitors various **system status indicators**, such as temperature, pressure, humidity, and flow rates within the sensors. If these indicators fall outside of acceptable ranges, the data is automatically flagged for review. This helps us identify potential issues early on.
- **Manual Data Review:** Aclima's technical staff remotely monitor the incoming data and system diagnostics on a weekly basis to look for trends, unusual patterns, or potential sensor issues that automated checks might miss. Aclima may compare its data to that from nearby regulatory air monitoring stations to provide context for how pollutants are generally behaving over time in the region.

Addressing and Correcting Issues:

If any issues are detected during quality control checks, Aclima has the following procedures in place to address them:

- **Troubleshooting and Repairs:** For minor issues, drivers may be able to perform simple repairs in the field. For more complex problems, sensors or even the entire Aclima Mobile Node (AMN) may be returned to the calibration facilities for repair, recalibration, or replacement.
- **Data Flagging and Exclusion:** If Aclima identifies data that is likely inaccurate due to a sensor malfunction or other issue, Aclima flags this data in the system. Severely compromised data is excluded from further

analysis to prevent it from affecting the final data products. Data that may have slightly higher uncertainty is noted and may be handled with more caution. Both the severity and the reason for flagging will be indicated

- **Data Adjustments:** If a calibration check reveals a consistent drift in a sensor's readings since the previous calibration, Aclima may apply adjustments to the data collected during the deployment to improve its accuracy over that time period. All data modifications are carefully tracked in Aclima's database. During calibration checks, the sensors also undergo recalibrations to derive the next set of calibration parameters for the next phase of data collection.

Table 9.1: Summary of Aclima QC Procedures and Frequency

Quality Control Activity	Frequency
Driver system checks (PM zeros, data connectivity, tubi ng and cable checks)	Daily
Manual data review	Weekly
Calibration checks (and subsequent recalibration)	Every 6-8 weeks
Routine Maintenance (internal filter or other consumables swaps, leak checks)	Every 6-8 weeks at calibration checks
Installation and Uninstall Checks (Flow checks, sample line cleaning, sample line filter swaps, etc)	Every 6-8 weeks at calibration checks
On-demand maintenance	As needed

Collocation of Aclima AMN at Regulatory Sites

Aclima AMNs will be installed at 2 regulatory monitoring sites operated by CARB or local air districts across California for long term intercomparisons in order to directly compare Aclima's measurements to regulatory measurements in different regions of the state. There are two motivations for this inter-comparison:

1. Provide transparency about how Aclima's measurements compare to FEM/FRM measurements of the key criteria pollutants (NO2, O3, CO, and PM2.5).
2. Identify any region-specific biases in the comparison of the AMN PM2.5 measurement with FEM methods. Aclima will consult with CARB to determine whether any systematic adjustment to Aclima's PM2.5 data should be performed based on the results of this intercomparison (see Appendices C and D for more details on the treatment of systematic bias).

These intercomparisons will be evaluated and quantified using various Data Quality Indicators (DQIs) (e.g. bias, precision, mean bias error, R2, etc). As of the publication of this CAMP, an AMN has been installed at a regulatory site in Sacramento (Downtown Sacramento – T Street, 1309 T Street, Sacramento, CA) and in Fresno (Fresno – Garland, 3727 N. 1st Street, Ste. 104, Fresno, CA). These sites were selected based on availability of space as well as the desire to collect AMN data in the Central Valley for characterizing regional differences in PM2.5. This data will be included in the data set released to the public at the conclusion of SMMI and the results of the intercomparison will be summarized in the final report.

Documentation and Oversight:

Aclima maintains detailed records of all quality control activities. This includes calibration records, maintenance logs, data review notes, and any data adjustments made. The Quality Assurance Manager is responsible for overseeing Aclima's quality assurance system, ensuring that company procedures are followed and that Aclima's data meets high quality standards. Results from calibration records will be summarized in the project final report.

9.2 Partner Mobile Laboratories Quality Assurance and Quality Control Procedures

The quality assurance and quality control (QA/QC) procedures for the Riverside/Baylor/Houston Mobile Air Quality Lab #3 (MAQL3) involves various checks for both gas and aerosol instruments. For trace gas measurements (O3, NO, NOx, NOy, CO, SO2, Reactive Alkenes), zero and span checks are performed prior to sampling drives, with multipoint calibrations done weekly or after instrument repair. Hourly zero checks are also conducted for some chemiluminescent instruments.

Aerosol and volatile organic compound (VOC) instruments are continuously monitored. VOC instruments undergo calibration curve assessments every 1-3 days, including five concentration points and a zero air point. The HR-ToF-AMS and Condensation Particle Counter (CPC) are calibrated weekly (or as needed) with HEPA filter zeros. The nephelometer is calibrated approximately every 15 days using CO2, and the tricolor absorption photometer (TAP) is calibrated with each new filter, typically every 3-7 days. Table 9.2 shows the QA activities and their frequency. Additionally, the data undergoes a thorough review process. This includes visual inspection by trained personnel, alongside the application of screening tools such as calculating ratios (e.g., NOx:NOy) and evaluating instrument responses to known events like O3 response to NO plumes, to ensure data quality and identify any suspect or erroneous measurements.

A full description of these procedures is included in an accompanying document in Appendix G.

An Aclima AMN will be installed in the PML for intercomparisons of PML measurements with Aclima measurements. Additionally, inter-comparison exercises are planned between different PML teams participating in SMMI, which are expected to include cross-comparisons of reference gases and parked collocations.

Table 9.2: Summary of Riverside/Baylor/Houston QA Procedures and Frequency

Measurement	Zeros (nominal minimum frequency)	Span (nominal minimum frequency)	Multipoint (nominal minimum frequency)
O3	With spans, multipoint, and hourly (chemiluminescent only)	Prior to sampling drives	Weekly or after instrument repair
NO	With spans, multipoint, and hourly	Prior to sampling drives	Weekly or after instrument repair

Measurement	Zeros (nominal minimum frequency)	Span (nominal minimum frequency)	Multipoint (nominal minimum frequency)
NOx	With spans, multipoint, and hourly (chemiluminescent only)	Prior to sampling drives	Weekly or after instrument repair
NOy	With spans, multipoint, and hourly (chemiluminescent only)	Prior to sampling drives	Weekly or after instrument repair
CO	With spans and multipoint	Prior to sampling drives	Weekly or after instrument repair
SO2	With spans and multipoint	Prior to sampling drives	Weekly or after instrument repair
Reactive Alkenes	With spans and multipoint	Prior to sampling drives	Weekly or after instrument repair
PTRMS	Prior to sampling drives	Minimum of every three days	Weekly or after instrument repair
TAP	Prior to sampling drives and with white filter check	White filter check at filter change	
Neph	Prior to sampling drives	Every 15 days or after instrument repair	Every 15 days or after instrument repair (single point)
AROMA	Prior to sampling drives	Minimum of every three days	Weekly or after instrument repair
AMS	Prior to sampling drives	Minimum of every three days	Weekly or after instrument repair
Picarro	Prior to sampling drives	Minimum of every three days	Weekly or after instrument repair

10. Data management

The section briefly outlines how Aclima's system manages data from Aclima Mobile Nodes (AMNs) and Partner Mobile Laboratories (PMLs) throughout the SMMI campaign, fulfilling specific Scope of Work elements related to data management procedures and transfer mechanisms. A detailed description of Data Management can be found in Appendix F.

10.1 Data categories and levels

Data collected as part of this CAMP will range from 1-second measurements used for analysis, combinations or summaries of data collected throughout the observation period, and more rapid notifications of the detection of high concentrations. Aclima organizes these data further into levels reflecting the degree of processing, from the lowest level (Level 0, or L0) at sensor readout to high level (Level 4, or L4) modeled analyses which synthesize individual data points into actionable insights and data summaries for dissemination through visualization and reporting.

Table 10.1: Aclima's Data Processing Levels. Asterisks (*) indicate data levels provided to CARB or in support of non-scientific communication and community visualization.

Data Level	Name	Definition	Example
0	Raw Signal	Original signal produced by the sensor.	Voltage, digital number, raw mass spectra data
1	Intermediate geophysical quantities	Derived from Level 0 data using basic physical principles or calibration equations.	Concentration in ppb or ug/m3
2a*	Standard geophysical quantities	Estimate using sensor plus associated physical measurements directly related to measurement principle.	NO2 derived from O3 and Ox (O3+NO2) Temperature and humidity correction to sensor estimates. Methane and speciated air toxics peaks derived from time series data.
2b	Standard geophysical quantities, extended	Level 2a but using external data sources for artifact correction & directly related to measurement principle.	Not planned for use in the SMMI effort.
3*	Advanced geophysical quantities	Aggregated geospatial products using standard statistical methods.	Basic average concentration maps. Maps of enhancement events.
4*	Spatially continuous geophysical quantities, modeled spatio-temporal phenomenology	Aggregated geospatial products using advanced statistical models and potentially external data	Statistically reconstructed concentration maps with confidence intervals. Locations of persistently elevated concentrations maps

10.2 Data management pipeline

The Data Management Pipeline includes five stages that manage data from collection to analysis. First, 1-Hz sensor data and accompanying metadata are **published** to remote (cloud) systems. Next, the sensor data and metadata are **ingested** into Aclima cloud storage. This Level 0 data is archived to ensure it is never altered. PML data is processed separately but in compatible formats. The raw, Level 0 data is **transformed** into calibrated physical quantities (Level 1) and further refined standard measurements (Level 2a), applying necessary corrections, time-shifting adjustments for sensor lag, and performing both automated and manual data quality flagging. Next, the **models** are used to aggregate L1/L2a information into higher-level geospatial data products (Level 3 using standard statistical methods and Level 4 employing advanced modeling techniques) to identify emission sources and disproportionately affected areas. Lastly, the data in all levels are labeled and **stored** using scalable cloud data storage. The original collected data is always preserved, and snapshots are taken at critical states. CARB will have access for a three-month period post-contract.

10.3 Data review and quality assurance

The data management system incorporates support for data review checks, defined as the manual or automated flagging of automated signals from sensor time series. Scientific details of data review can be found in the Appendices C, D, E, and F. Different data review and QA activities take place at different stages.

During the active deployment of a monitoring device and as data is streaming to the cloud, the monitoring team periodically checks (through a combination of manual and automated processes) the data being ingested to flag any sensor or data quality issues as they arise. Wherever possible, issues are resolved quickly in the field. Data that must be omitted from use for any reason (e.g. leaks, sensor failure, flow blockage, etc) is flagged.

After the deployment of a monitoring device is over (once the device returns to its home base), the monitoring team conducts a full review of all sensor data collected during that device's deployment, to ensure any issues that may have slipped through the cracks during the deployment period are detected before data is finally verified. Once again, any well-characterized data issues are flagged and any omissions from use are marked.

Once the deployment of all monitoring devices in the fleet is over (once all devices return to home base and the monitoring period is over), all collected data is re-processed to take account of flags and omissions and to prepare data for handing over to CARB and the community.

The original data coming from the sensors is always preserved, as well as all annotations from the various review and QA steps, so that the inclusion or omission of specific data can be properly traced.

10.4 Data transfer

Finalized L2a data from Aclima and the PMLs will be transferred to CARB via secure cloud storage, following a defined schema compatible with EPA's AQS where applicable. The delivery cadence of finalized data to CARB will be monthly beginning 4 months after data collection. File formatting and other details are specified in Appendix F.

10.5 Data visualization

Data will be used to create datasets and visualizations (e.g., Esri StoryMaps) focused on identifying pollution sources and areas of disproportionate impact, with templates and specific data layers described. Aclima will develop these, but CARB will own and host the final StoryMaps.

11. Work plan for conducting field measurements

The plan must describe field procedures that will be followed by those conducting measurements and provide the timeline for community air monitoring. Field procedures spell out individual tasks with enough detail so that staff with the necessary training can complete the tasks. Examples of specific field procedures include documenting actions in logbooks, completing chain of custody forms, and conducting specific quality control procedures. The timeline needs to establish the duration of field measurements and denote milestones for completing key tasks. The plan will also describe communication and coordination steps to ensure field personnel know whom to contact for questions and how work products are delivered. Relevant safety considerations should also be documented.

The work plan for field measurements is distinguished by the monitoring approach.

11.1 Broad area monitoring

11.1.1 Field materials and procedures

Broad area monitoring principally involves the Aclima fleet (Aclima Mobile Platforms, or AMPs). Each vehicle is operated by an Aclima driver, who begins their shift at a local hub powering up instruments, a safety check, and troubleshooting. Their driving day is managed by a mobile application in their vehicle and includes mandated breaks. The day ends back at the local hub and with an instrument shutdown routine. During the day, each AMP is active on a route, constantly collecting data at 1 second intervals.

11.1.2 Communication and coordination

The operations team uses a range of software applications for communication, fleet management, safety, and navigation:

- Information for each operator starting their shift is communicated via a messaging application.
- Each operator can access online resources (written and video instructions) that describe specific standard operating procedures and provide resources for a range of encountered situations.
- Any photos or notes that the operator takes during the day are captured via a dedicated fleet management application.
- A sensor/instrument interface gives basic information to the operator on data reporting status.
- A dashboard mapping application loads the monitoring plan for the day and provides guidance on the route the operator must follow
- For general communication, a dispatch phone line is maintained.
- Operators can also file tickets for issues that cannot be immediately resolved.
- Safety training and issues are handled via a dedicated platform.

11.1.3 Timeline: duration, frequency, milestones, and deadlines

Broad area monitoring will be conducted by Aclima mobile platforms (AMPs) from June 2025 through the end of February 2026, for a total of approximately nine months of monitoring.

11.2 Targeted area monitoring

In addition to the Broad Area Monitoring, the following section details the work plan for Targeted area monitoring that will be conducted in Westlake, Korea Town, Mid-city, Mid-Wilshire.

11.2.1 Field materials and procedures

The UC-Riverside/Baylor University/University of Houston Partner Mobile Lab (Riverside PML) is operated by a team of faculty, staff, and students who begin their shift at a local hub, typically the University of California at Riverside campus. Each day the team will conduct and review instrument performance and safety checks. If issues are identified troubleshooting will occur and if the issue is not quickly resolved a decision will be made whether to cancel the drive and further address the issue, or if the impacted measurement is not key to the day's objective the drive may continue as planned and the issue addressed at a later date. The driving day is managed by the university lead's and driver in the vehicle and includes mandated breaks as required by California and/or Federal commercial driving regulations. The day typically ends back at the UC-Riverside campus and power is transferred back to shore power connections.

The Riverside PML instrumentation typically generates data at 1-second intervals, although some instrumentation reports values more slowly. All data is collected at the fastest reasonable rate and is a balance between spatial/temporal resolution and sensitivity.

11.2.2 Field communication and coordination

The Riverside PML team uses a range of software applications for communication, fleet management, safety, and navigation:

- Driving routes are determined through consultation with the university leads, driver, staff, and Aclima team and evaluated for suitability for the PML (i.e. height, weight, or truck restricted areas).
- Each operator can access online resources (written and video instructions) that describe specific standard operating procedures and provide resources for a range of encountered situations.
- Photos are automatically collected every second from 5 cameras to document the surroundings. Written notes are recorded in text files by each instrument operator and included in the data backup.
- The faculty, staff, and students aboard the PML discuss their instrument responses in real time and relay this information and proposed route to the driver. Coordination outside of the PML may be desirable in some situations and will be managed by non-drivers.
- Three workstations, one in the front seat and two in the back seat, provide connections to the various data systems and instruments. The faculty, staff, and students aboard the PML monitor the instrument measurements and performance indicators.
- All operations are conducted in compliance with the appropriate state, federal, and respective university guidelines.

- Prior to conducting monitoring, the Riverside PML team will meet with project representatives from Breathe Southern California in order to gain a proper understanding of the local context around the air quality concerns specified in the CAMP for targeted area monitoring. Communication channels may also be established during this meeting in order to provide real-time updates from community members about current air quality conditions or expected events that may impact air quality during the monitoring period.

11.2.3 Timeline: duration, frequency, milestones, and deadlines

Targeted area monitoring will be conducted in Westlake, Korea Town, Mid-city, Mid-Wilshire for a duration of approximately 1 week over a time period to be determined between September - November 2025. See Section 8.3 for details on the duration and frequency of monitoring.

How will data be used to take action?

12. Evaluating effectiveness

The monitoring work plan and data will be evaluated across all stages of the monitoring phase of SMMI to ensure that air monitoring objectives are being met. These evaluations include on-going processes during monitoring, data review while collection is ongoing, and at data verification at the end of the monitoring period after all data has been collected. For additional details on these processes, see Aclima's detailed QA documentation in Appendices C, D, E, and G. Additional details about the public data release can be found in Section 14.2 and Section 10 of Appendix F.

12.1 Evaluating effectiveness during the monitoring period:

Effectiveness will be continuously evaluated during the active data collection phase to ensure the monitoring is progressing as planned and that potential issues are identified and addressed promptly. This ongoing evaluation will involve several key components:

- **Manual Data Review:** Aclima staff will conduct weekly assessments of vehicle and sensor performance, as well as overall data quality. These reviews consist of visual review of time series data from all sensors on each deployed vehicle, responding to automated alerts for specific known patterns of device issues (e.g. sample line leaks) and addressing through corrective actions as needed, and a review of other associated diagnostic data. The UC Riverside team conducts manual data review using an approach outlined in Appendix G.

- **Automated Data Quality Checks:** The data processing pipeline includes automatic status indicator flags that signal when measurements fall outside predefined environmental or physical specifications for the sensors. These flags serve as immediate alerts for potential sensor malfunctions, data anomalies (e.g., negative values or concentrations outside the sensor's range), or issues with supporting systems like flow rates. These checks occur as data streams through the data processing pipeline, in near real-time.

- **Contextual Data Review:** Where available, data from regulatory monitoring sites within the mapping area will be used to provide context for large-scale air quality trends over time. This allows for a comparison of Aclima's sensor data with established networks, helping to identify whether observed patterns are consistent with broader trends or potentially indicative of issues with Aclima's measurements. Factors such as distance between mobile and stationary measurements, road type, site type, and temporal aggregation will be considered during these comparisons. These evaluations occur on a weekly basis as part of the manual review process.

- **Measurement Quality Objectives:** Acceptable quantitative criteria for data quality indicators at the individual sensors (e.g., precision and bias) will serve as benchmarks for evaluating effectiveness. These are referred to as calibration acceptance criteria in Aclima's detailed Quality Assurance document (Appendix C) In addition to calibration prior to the start of monitoring, all AMNs will receive calibration checks (and subsequent recalibrations) on a 6-8 week basis over the 9-month monitoring period, including at the end of monitoring. The UC Riverside team will evaluate their QA checks according to acceptance criteria detailed in Appendix G.

- **Data Verification:** A thorough data verification process will be conducted on an ongoing basis throughout the monitoring period in order to produce finalized data in monthly increments, with the first delivery occurring four months after monitoring begins. The data verification process consists of 1) a manual data review process, 2) a review of calibration results, 3) the application (where necessary) of adjusted calibration parameters and data quality flags for data reprocessing, and 4) a final review of the reprocessed data with applied calibration adjustments and data quality flags. During this process, all of the above data quality checks described above are re-evaluated just prior to and immediately after any reprocessing of data occurs. The UC Riverside team conducts a similar data verification process as Aclima and on the same delivery cadence; specifics are outlined in Appendix G.

- **Evaluating Broad Area Monitoring Completeness:** Aclima mobile monitoring campaigns are designed to repeatedly drive roads in a monitoring area such that the roads are visited 20 times on average. An automated drive planning system evaluates the amount of driving coverage throughout a region on a daily basis and directs drivers to prioritize visiting roads in relatively underdriven regions. Additionally, Aclima analysts continuously monitor temporal and spatial driving coverage in the event that manual drive routing is needed to prevent regions with unexpectedly low numbers of visits. This is tracked by measuring the average number of measurements on each road by census block group.

- **Evaluating Targeted Area Monitoring Completeness:** The UC Riverside team will evaluate the completeness and representativeness in a way that is appropriate and responsive to the targeted area study conducted. In Westlake, Korea Town, Mid-City, Mid-Wilshire, the approach is a general survey of areas in the vicinity of community concerns and known sources. The number of repeat passes will be analysed along with pass-to-pass variability by scientists in charge of the data collection to evaluate the completeness of monitoring.

12.2 Evaluating effectiveness at the end of the Monitoring Period:

A comprehensive evaluation of the overall effectiveness of the community air monitoring initiative will be conducted at the conclusion of the data collection and verification phases. This final evaluation will be documented in the SMMI final report and will provide an overall assessment of the uncertainty associated with the collected data and derived data products. This will encompass various sources of error, including intra-network variability (uncertainty between different monitoring platforms), inter-network comparability (comparison with other monitoring networks, such as regulatory sites), sensor specific measurement errors, and modeling and sampling errors.

- **Comparison with External Data:** The report will include comparisons between Aclima's measurements and data from regulatory stationary monitoring sites. These comparisons will evaluate the accuracy and precision of Aclima's mobile measurements against established reference methods over various timescales. Metrics such as Mean Bias Error (MBE), Mean Absolute Error (MAE), and R^2 will be used to quantify the agreement between the datasets. Additionally, comparisons of the modeled ambient concentration estimates with annual averages from nearby regulatory monitors will be included to assess the overall performance of the data products.

- **Aclima and PML Calibration Results:** Results from the calibration events conducted on Aclima's Mobile Nodes (AMNs) and the PML team, both before, during, and after their deployment. These results will help characterize the typical measurement error at the device level by comparing sensor readings to reference instruments and amongst themselves.

- **Stationary Comparison with Regulatory data:** This evaluation will compare data from Aclima's stationary AMNs, collocated at regulatory monitoring sites, with the measurements from those regulatory monitors. This comparison will help determine the measurement error and how Aclima's data aligns with the established regulatory network's data.

- **Mobile Comparison with Regulatory data:** This analysis will involve comparing in situ measurements collected by Aclima's mobile monitoring fleet near regulatory sites with the concurrent data from those stationary sites. This will provide insight into the agreement between mobile and stationary measurements, considering both measurement errors and the natural spatial and temporal variability of pollutants. This is only relevant for Aclima's data, not the PML data.

- **Ambient Concentration Comparison with Regulatory data:** The hyperlocal ambient concentration estimates will be compared with long term average concentrations from regulatory stationary monitors. This will help assess the overall uncertainty in Aclima's estimates, including factors like modeling and the temporal sparseness of mobile measurements. This is only relevant for Aclima's data, not the PML data.

- **Analysis of completeness and representativeness:** Analysis will be performed to show how well distributed data collection is across times of day, days of week, and season. Additionally, the number of passes in each location will be reported. Similar analyses will be conducted in similar ways for both the targeted and broad area monitoring approaches.

12.3 End of monitoring

Monitoring ends when deployments for all vehicles (AMPs and PMLs) are complete. Given the fixed time constraints for the SMMI final report to be completed by May of 2026, the broad area monitoring period will end after 9 months of data collection. In order to determine successful completion at the end of 9 months the monitoring team will evaluate whether:

- Monitoring coverage has exceeded the required minimum percentage coverage requirement for priority communities within the SMMI-wide monitoring areas (i.e. across all CNCs, not just Westlake, Korea Town, Mid-City, Mid-Wilshire)
- Data gathered is sufficiently representative of the seasonal, time of day, and day of week variation across the monitored area (i.e. not biased by data collection at one specific time), such that they can support the objectives, sub-objectives and presentation plans as uniquely defined in this monitoring plan
- Data gathered is sufficiently representative of the spatial variation in air quality across the monitored area, such that they can support the objectives, sub-objectives and presentation plans as uniquely defined in this monitoring plan

The results of all quantitative evaluations of effectiveness listed above will be included in a Quality Assurance report to accompany the final project report. Details on the above activities will be included for both Aclima and the PML teams.

13. Data analysis and interpretation

13.1 Preparation of finalized datasets

As described in Section 10 on data management (and in detail in the Data Management documentation in Appendix F), 1-second "finalized" data collected by all sensors and instruments will go through several data verification and validation protocols, and transformation steps before they are described as finalized and made available to CARB.

"Finalized" data is defined as sensor signals transformed to geophysical quantities of measurement (Level 2a), calculated using the sensor signal plus associated physical measurements directly related to the measurement principle such as temperature and relative humidity measurements. Data flagged for artifacts will also be included.

13.2 Aclima analysis, interpretation, and visualization of data

Mobile monitoring data gathered under this CAMP are intended to facilitate focused actions by communities and CARB, including any future work to identify and prioritize locations for more comprehensive community-scale air monitoring, or develop Community Emissions Reduction Programs (CERPs).

To support this potential future work, the monitoring team will generate a series of additional datasets that can help communities better understand and interpret the data in the context of the concerns detailed in this CAMP. These datasets will be in addition to the finalized 1-second data provided directly to CARB and require further processing as described in Section 10 in this monitoring plan. Appendix E Section 2.3 discusses the additional data that will be reported including the quantitative metrics that will be associated with enhancements). These datasets can support identifying and characterizing sources or identifying disproportionate spatial and temporal impacts within a community.

The following is a brief description of the different possible analysis and visualization approaches used by SMMI. In some cases, the analysis approaches are matched with specific monitoring approaches, but there can be various combinations of monitoring and analysis approaches that could be selected to appropriately achieve the desired monitoring objectives.

- **Clusters of enhancement detections on a map** - Identifying locations of pollutant enhancements (high concentrations above background levels) on a map. Clustering or grouping of pollutant enhancements refers to identifying locations where multiple enhancements of the same pollutants are detected at multiple different times over the course of monitoring.
- **Statistics on enhancement detections** - Statistical values that describe how often enhancements were detected in a specific location. Examples include number of detections, the number of detections per visit, or the number of distinct days of detections.
- **Chemical speciation bar graph or pie chart** - A bar chart or pie graph that indicates the relative concentration of different key pollutants of interest in a specific location. This can represent the pollutants within an enhancement detection, averaged across an enhancement cluster (i.e. multiple enhancements in the same location), or in ambient concentrations of background air.
- **Diurnal plot of enhancement detection events** - This analysis shows the frequency of enhancement detections in a particular location by hour of day. This analysis requires balanced sampling across different times of day in the same location.
- **Ambient concentration gradients over plume transects** - Displaying ambient concentrations as they vary in space in the downwind region of an air pollution plume. This type of analysis is generally paired with the plume transect monitoring approach, but a general survey approach may also be appropriate in certain situations.
- **Ambient concentration map of key pollutants -** Displaying a map of ambient concentrations that are generally representative over the time period that monitoring takes place. Typically, the general survey monitoring method or broad area monitoring is required for this type of analysis.
- **Area-wide chemical breakdown bar graph or pie chart -** A bar graph or pie chart showing the relative proportion of different pollutant concentrations detected on overage over a particular area of covered. Typically, the general survey monitoring method is most useful for this type of analysis

These example visualizations can help address the community specific concerns in Westlake, Korea Town, Mid-City, and Mid-Wilshire for the concerns assigned monitoring objectives in Table 4.1. The map of ambient concentration estimates shown in Figure 13.1, below, is directly responsive to the monitoring objective of identifying disproportionate impacts (e.g. emissions from heavily trafficked roadways in impacted neighborhoods). The heat map of locations of persistently elevated concentrations of TVOCs (Figure 13.2) is responsive to the monitoring objectives of characterizing sources (e.g. gas stations, refineries, and a wide array of manufacturing/industrial sites). Note that broad area monitoring may result in visualizations that provide information (for example clusters of enhancements) about additional concerns not specifically assigned monitoring objectives or unknown sources not listed specifically as community concerns here.

Some example forms of final data visualizations are shown below.

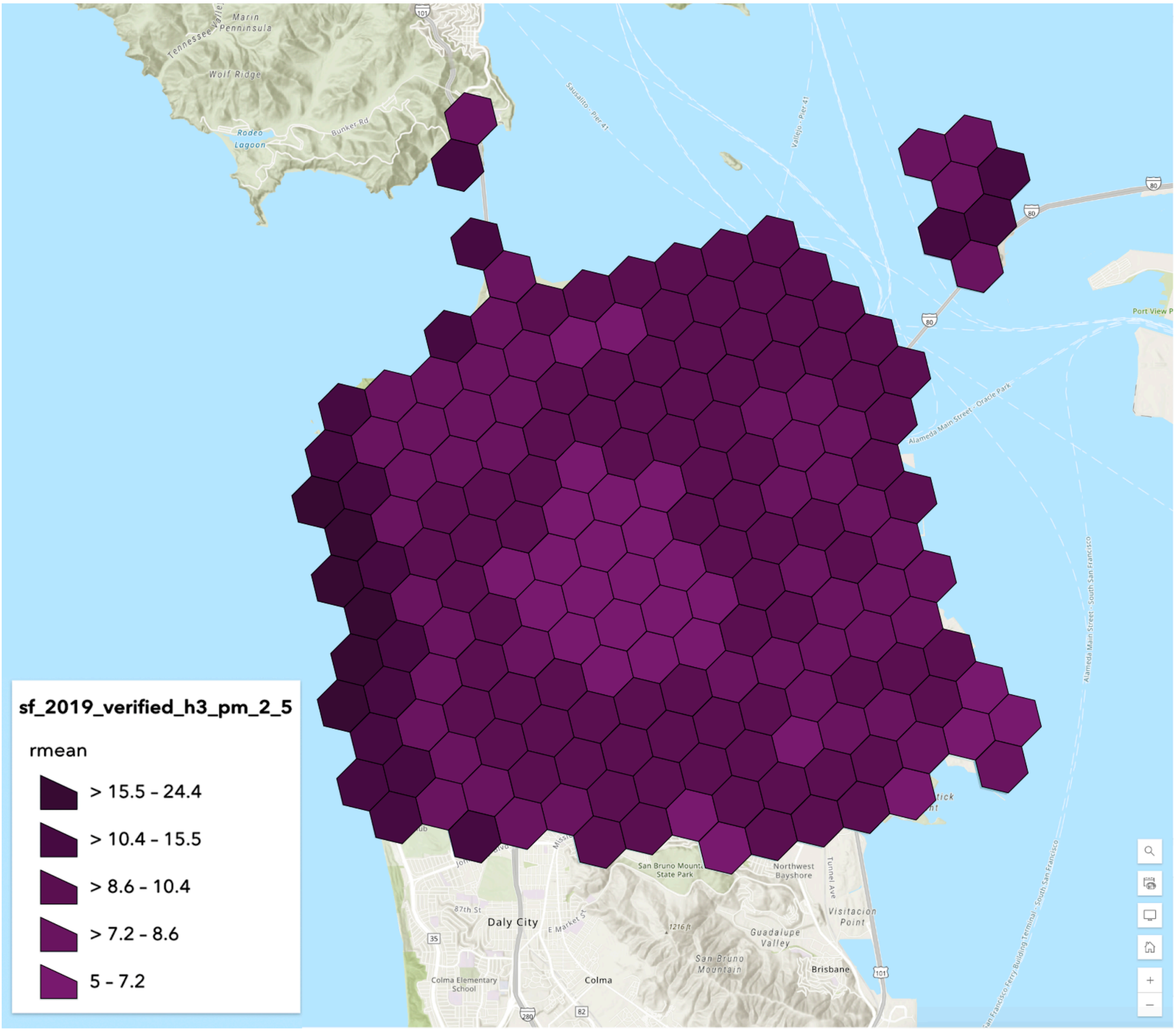

Figure 13.1: Example of a map of ambient concentration of $PM_{2.5}$ over a specific area plotted using hexbins. In this type of map, the color indicates pollutant concentration. In this example, colors indicate $PM_{2.5}$ concentrations for data collected over a 1-year time period in San Francisco, CA. Map data © Mapbox, © OpenStreetMap.

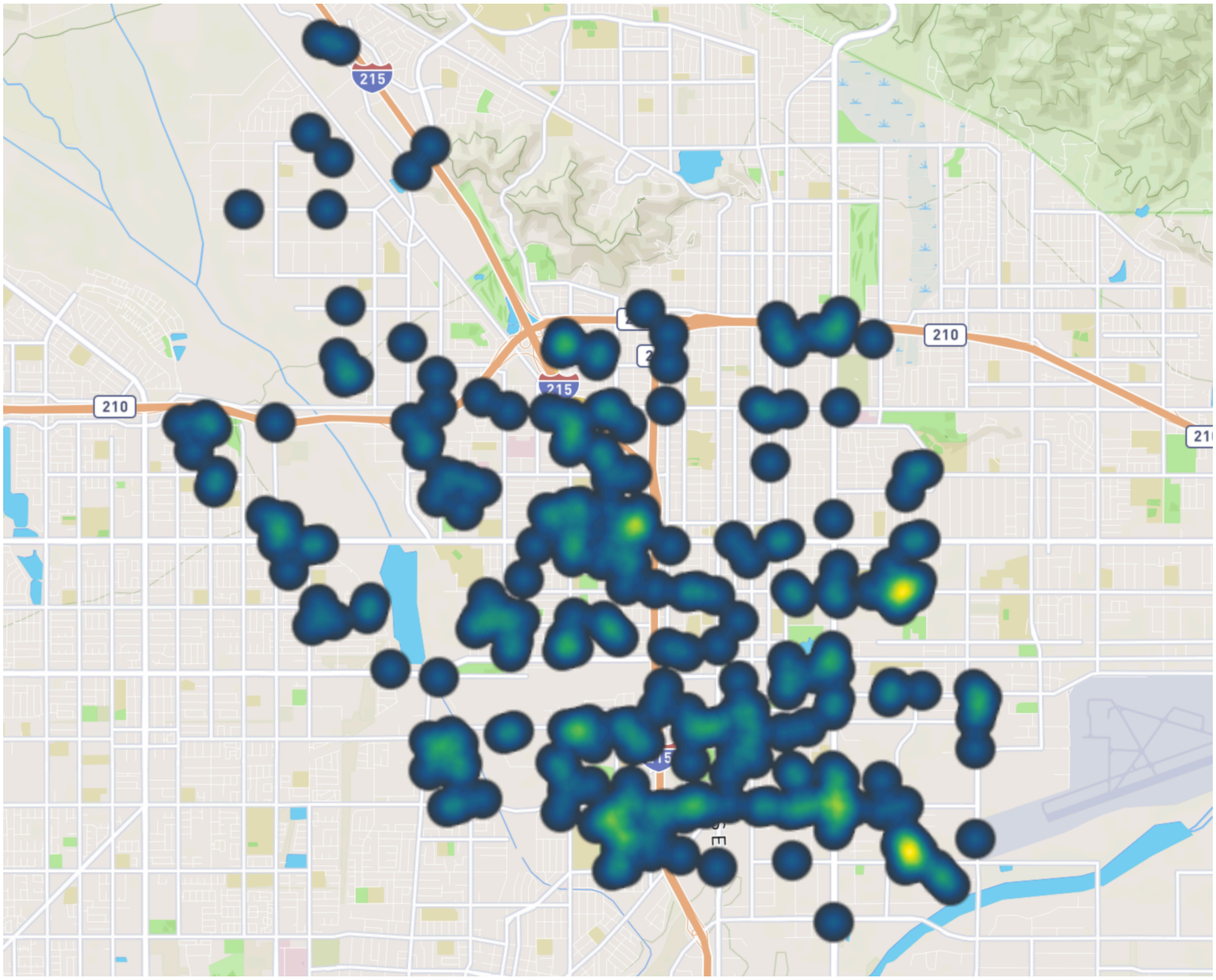

Figure 13.2: Example of plotting an enhancement-based dataset (TVOCs) as a heatmap. In this type of map, the density of individual enhancement events is shown, where the brighter colors indicate a higher density of detected enhancements. In this example, data collected over a 3 month period in San Bernardino, CA are shown. Map data © Mapbox, © OpenStreetMap.

For the concerns assigned specific monitoring objectives in this monitoring plan, the analysis approaches are specified in Table 4.1, in Section 4.3. Appendices D and E provide more detailed descriptions of how different analyses are performed and the different implementations of the approaches that are possible. These appendices also list important limitations that will be taken into account at the analysis stage and will be communicated in the public presentation of results. The specific implementation of these approaches will be determined after the data is collected and evaluated. Data from both Aclima platforms and the UC Riverside PML will be analyzed according to the general approaches outlined above.

14. Communication of results to support action

The mobile monitoring data collected in this community will be analyzed and presented to support focused action to reduce emissions or exposure. This requires an accessible visualization, of which Aclima has many. CARB has selected ESRI StoryMaps as their visualization platform.

The project offers Engagement Leads supplemental budgets for capacity building and relationship building to foster the partnerships necessary for translating data into emissions reduction actions.

14.1 Reporting of high concentrations prior to the end of the contract

The primary intent of the SMMI is not for real-time notification. However, during data collection, there may be instances where pollutant concentrations significantly exceed expected levels. To address these situations, a response protocol has been established to ensure that such anomalies are promptly reviewed and assessed in coordination with relevant agencies and shared with community stakeholders. If concentrations exceed the thresholds (defined below), and the detection is deemed viable after analysis and assessment by Aclima or a Partner Mobile Lab, Aclima will inform the local Air Districts or other relevant local authorities. Not every detection will trigger a report. Only after in-depth investigation by scientists in the field or remotely via data analysis will a detected event be deemed viable for reporting. Table 14.1 provides the overall framework of the assessment process and reporting structure.

The purpose of reporting observed high concentrations is to protect public health and safety, and while no regulatory action will occur as a direct result of data collected by SMMI, local regulators may decide to conduct additional monitoring or other types of investigations based on these reports. Additionally, while the numerical value of health-based thresholds are used in the notification framework, it should be emphasized that notifications are triggered by any detections above this numerical value and do not indicate an exceedance of the health-based threshold, which must account for the averaging period of the health-based threshold.

Table 14.1: Overall framework of the assessment process and reporting structure

Pollutant	Initial Assessment Protocol	Data Reporting and Communication to Local Air Districts or Other Relevant Local Authorities by Aclima	Community Updates
Methane/Ethane Relevant threshold: 100 ppm methane[a]	Aclima: ● Initial Detection ○ Detection above threshold ● Investigation ○ See Section 14.1 text for description	Aclima: ● If detection qualifies – Prepare and Submit Report: ○ Location/Time of Event ○ Historical detections in the area ○ Classification of methane source (thermogenic or biogenic) ○ Description of the local environment (land use, sources, notable features) ○ Placeholder for Summary of findings and next steps ● Notify local utility company (or air district as appropriate based on source) within 2-3 business days of verification ● Email the completed report to designated CARB contacts within 2-3 business days of verification	CARB: ● Monthly Summary Reports will be posted to the CARB website and will include: ○ A summary of reports generated ○ Locations and timestamps of detections ○ Results of preliminary analysis ○ Actions taken or recommended follow-up steps Aclima: ● A comprehensive summary will be included in the End-of-Campaign Report, covering: ○ All events detected over the course of the campaign ○ Historical patterns and trends ○ Overall progress and response efforts
Toxic Air Contaminants (see table 14.2 for additional details)	PMLs: Initial detection ● Detection above California OEHHA acute RELs at least twice in the same location Investigation:	PMLs: If detection is deemed viable event after analysis and repeated monitoring: ● Air district will be notified by Aclima immediately upon verification of the event	CARB: ● Monthly Summary Reports will be posted to the CARB website and will include: ○ A summary of reports generated

Pollutant	Initial Assessment Protocol	Data Reporting and Communication to Local Air Districts or Other Relevant Local Authorities by Aclima	Community Updates
	• See Section 14.1 text for description	• PMLs will prepare and submit report within 3 days of verification: ○ Location/Time of Event ○ Pollutant and concentration ○ Historical detections in the area ○ Description of the local environment (land use, sources, notable features) Note: Reporting timelines may vary based on the instrumentation used, QA/QC protocols, and time required to validate findings.	○ Locations and timestamps of detections ○ Results of preliminary analysis ○ Actions taken Aclima: • A comprehensive summary will be included in the End-of-Campaign Report, covering: ○ All events detected over the course of the campaign ○ Historical patterns and trends ○ Overall progress and response efforts

a) Threshold for methane is not based on a specific health-based action limit, but is based on historical data collected by Aclima, indicating values typically associated with large significant natural gas leaks.
b) Air toxics contaminants are those that may be measured PMLs and monitored in real time by scientists aboard the mobile platform.

The following provides additional details on the investigation process that will occur after an initial detection above the indicated threshold concentrations. For methane, Aclima analysts initiate this investigation remotely typically within 24 hours of the initial detection. Follow up monitoring, if needed, may take days to weeks to complete. For air toxics (or methane detected on the PMLs), the PML teams have technical staff on-board to follow up in real time in most cases. Otherwise, the follow up monitoring will occur as soon as possible. The purpose of this process is to identify anomalously high pollution events and sources and Aclima reserves the right to revise the listed thresholds based on data collected over the course of monitoring (in collaboration with CARB) in cases where exceedances are frequent and follow up monitoring significantly detracts from the planned targeted area monitoring or the reporting of frequent exceedances as individual events become infeasible.

Methane

Detection of methane at the 100 ppm threshold or above typically (but not always) indicates a natural gas leak from residential distribution systems. The following process will be followed to investigate each triggering methane detection:

1. Measurement diagnostics check
2. Evaluate source type using ethane/methane ratio and presence of CO

a. For Thermogenic (i.e. fossil in origin) source type (ethane/methane ratio between 1-10% and no concurrent CO enhancement)
    i. Check historical data and count the number of distinct days with enhancements > 5 ppm
    ii. Report locations where number of days is 3 or higher
    iii. Track locations with less than 3 days and follow up weekly
    iv. Check contextual information about location to determine whether there are obvious sources otherwise assume coming from underground natural gas distribution lines
    v. Report to local utility if gas distribution system suspected, otherwise to the air district
b. For Biogenic source type (ethane/methane ratio <1% or no concurrent ethane detected):
    i. Check whether there is any correlation between ethane/methane to determine whether the source is a biomethane or renewable natural gas blend (biogenic methane blended with traditional natural gas), which typically has an ethane/methane ratio less than 1%. Follow instructions for natural gas source types above.
    ii. Check historical data and count distinct days with enhancements > 5 ppm
    iii. Check contextual information about location to determine whether there are obvious sources
    iv. Use scientific judgement and contextual information to determine whether to report to local air district
c. For mobile source type (strong concurrent CO enhancement):
    i. No further action

Air Toxics

Detection of individual air toxics above the notification threshold (as indicated in Table 14.2) will trigger a follow up investigation according to the following process:

1. Measurement diagnostics check
2. On-board technical operations team determines whether the likely source is transient (e.g. a passing vehicle) or a possibly persistent stationary source or unknown source.
    a. Likely persistent stationary source or unknown source:
        i. Vehicle operator returns to location of initial detection as soon as possible to do follow-on measurements. The vehicle operator will consider whether immediate follow-up measurements would adversely impact the ability to measure a priority source and will schedule a follow-up accordingly.
        ii. If the threshold is exceeded at least twice in the same location, a 1 hour average measurement will be collected in the vicinity of the initial detections. The measurement may be collected while parked or in motion to better characterize the plume extent, at the discretion of the on-board technical team.
        iii. The local air district is notified if 1 hour average concentrations of any pollutant measured reaches or exceeds an acute reference exposure level (CA OEHHA Acute REL), listed in Table 14.2. *Note that for benzene, toluene, and acrolein the uncertainty of these measurements in real-time (prior to post-processing and final QA/QC) may be as high as a factor of 2. Exceedance determinations for all species will also include uncertainties due to calibrations and ambient conditions (humidity, temperature, pressure), and judgement from the scientific team will be used to determine whether borderline cases should be reported or not.*

b. Mobile or other transient source (for example, an exceedance detected while refueling the vehicle at a gas station):
   i. No further action is required

Table 14.2: Thresholds used for air toxics event notification

Pollutant	Action Threshold[a,b]
formaldehyde	45 ppb
benzene	8.5 ppb
toluene	1.3 ppm
acrolein	1.1 ppb
carbon monoxide	20 ppm

a) The thresholds are based on health action limits (California OEHHA Acute REL), however, it should be noted that these are limits only used as a benchmark to trigger follow up investigation and do not indicate that these health action limits have actually been exceeded. The event will only be reported if the scientists deem the detection to be a viable event based on their investigation. Additionally, the species detected by this method will be uncalibrated signals that may have high uncertainties (up to a factor of 2 in some cases)
b) Aclima reserves the right to update the action thresholds over the course of monitoring based on data collected over the course of monitoring, for example, if it is found that the number of threshold exceedances are higher than anticipated.

14.2 Public Data Access

Upon completion of the contract, CARB will make the finalized monitoring data available for public access through the CARB AQview website. Data for each region and pollutant will be provided in standardized, comma-separated values (CSV) format to ensure broad compatibility with commonly used data analysis tools and software. This approach supports transparency, encourages independent analysis, and facilitates community and academic engagement with the air monitoring results.

14.3 Community Story Maps

Aclima will deploy the finalized raw data and appropriately selected data analyses (described in Sections 13.2 and 13.3) in accessible online, public, interactive and free-to-use visualizations built on the Esri platform. These visualizations will be in the format of a customized platform built with Esri StoryMaps and hosted by CARB. A range of analyses are available to identify potential sources and to identify locations of disproportionate impact, drawing on data collected through both targeted area monitoring conducted by UC Riverside and broad area monitoring conducted by Aclima. Only finalized quality assured data will be incorporated into public facing visualizations.

14.4 Final Report

A final report will be delivered to CARB at the end of the contract, May 19, 2026. This report will provide a comprehensive analysis of the data collected by Aclima and the Partner Mobile Laboratories during the SMMI and will include the following sections:

Executive Summary: The report will include an executive summary to highlight the key takeaways, recommendations, or limitations of the report.

Summary and Timeline of Air Monitoring: The report will provide a summary of the air monitoring activities conducted and a timeline of when these activities took place. This will offer context and background on the project.

Discussion of Data Collection, Validation, and Analysis: The report will detail how the air quality data were collected using Aclima's mobile monitoring platforms and partner mobile laboratories. It will also explain the quality assurance and quality control (QA/QC) procedures implemented to ensure the data's integrity, including how the data were validated. Furthermore, the report will describe the methods used to analyze the collected data, potentially including analyses for identifying pollution sources and areas of disproportionate impact like diesel indications, locations of persistently elevated toxic air contaminants, and natural gas leaks.

Summary of Significant Findings and Conclusions: The report will present a summary of the key findings from the air monitoring campaign. This will include ambient concentrations and any identified pollution enhancements. These findings will be presented in a manner understandable to a non-scientific audience.

Recommendations and Next Steps: Based on the findings, the report will offer recommendations for potential next steps. This may include suggestions for tracking progress or verifying results achieved by community emissions reduction programs, or for future, more comprehensive monitoring efforts.

Dissemination Plan: The report will outline how the data and the findings will be disseminated and discussed with appropriate decision-makers so that the information can lead to the intended actions for emissions reduction and public health improvement. This will include the use of publicly accessible data visualizations such as ESRI StoryMaps. The report will also mention the virtual public meeting organized to explain project results and discuss possible next steps.

Public Meeting: To better help community members understand the content of the final report in an accessible manner, Aclima and California Air Resources Board staff will organize online meetings by air district (or sub-group within air district if necessary) to explain project results, answer questions, have community members share their experiences engaging with the project, and discuss possible next steps. Breathe Southern California will play a major role in outreach and promoting community attendance at this meeting. This meeting will be conducted in English with Spanish interpretation and designated Spanish breakout rooms. To ensure further accessibility to results, Aclima will provide one-page result summaries for each community in both English and Spanish that Breathe Southern California can distribute physically or via WhatsApp or text.

Input from Stakeholders: The final technical report will incorporate input from stakeholders across the initiative, including the Project Expert Group, community representatives, air quality officers, and environmental justice leaders.

Accessibility: Aclima will consider accessibility needs for the print document, such as alt text and color design.

The report will be provided to CARB in both PDF and the original electronic format.

Appendices

Full appendices are available here: https://aclima.earth/smmi-camp-appendices

- Appendix A: SMMI Community Engagement Plan (CEP)
- Appendix B: SMMI Community Mileage Allocation
- Appendix C: Aclima Quality Assurance System
- Appendix D: Aclima Hyperlocal Ambient Concentration Estimate Validation and Quality Assurance System
- Appendix E: Aclima Hyperlocal Enhancement-based Data Products Quality Assurance System
- Appendix F: Aclima Data Management Plan
- Appendix G: Partner Mobile Laboratory Quality Assurance Project Plan (QAPPs) and Data Management Plans
- Appendix H: Approach for Assigning Targeted Area Studies
- Appendix I: Complete Table of Pollutants and Instrumentation
- Appendix J: Public Comment and Response Documentation
- Appendix K: Community Meeting Evaluations