The San Diego County Air Pollution Control District
AB 617: Community Air Protection Program
Submittal for San Diego International Border Community

Community Air Monitoring and Emission Reduction Plan

Presented to the California Air Resources Board

September 26, 2019

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MISSION STATEMENT

To Improve Air Quality and Public Health in San Diego Disadvantaged Communities

GUIDING PRINCIPLES

1. Pursue community-involved actions to reduce air pollution that improves public health
2. Form a collaborative process that is diverse and inclusive
3. Be transparent, accessible, accountable, proven, effective, adaptive, and defined
4. Make science-based decisions
5. Leverage resources
6. Share information and lessons learned with other communities
7. Promote accelerated deployment of clean technology
8. Be aligned with other programs, including local climate action plans

The San Diego County Air Pollution Control District (District) is tasked with implementing and leading this community air monitoring program. One of the first orders of business is to identify and prioritize air monitoring for disadvantaged communities within the county. This document describes the methodology used to identify communities, the steps taken to date to determine community concerns, the next steps needed to measure air pollutants and then identify their sources so we can work to improve air quality in those communities. The proposed elements of the Community Air Monitoring Program are listed below in Table 1.

Table 1- PROPOSED ELEMENTS FOR COMMUNITY AIR MONITORING PLANS

#	Element	Activities	Participants
1	Engage community members	Establish a participating structure	Community, District
2	Develop community-specific problem statements	Assess existing monitoring and identify problems community monitoring will address	Community, District
3	Define air monitoring objectives	Describe goals and resulting actions	Community, District
4	Define data quality objectives	Identify precision, accuracy, completeness, and representativeness	Community, District
5	Establish roles and responsibilities	Assign tasks	Community, District
6	Select equipment and methods	Identify appropriateness of equipment for pollutants of concern	Community, District
7	Determine monitoring locations and frequencies	Identify areas, frequency, and duration	Community, District
8	Design quality control procedures	Identify calibration and audit requirements	Community, District
9	Provide work plan for conducting field measurements	Develop timeline and process for coordinating with community	Community, District,
10	Manage and validate data	Discuss path from collection, analysis, storage, and presentation	Community, District
11	Specify process for evaluating effectiveness	Describe process to evaluate data to intended objective and when air monitoring is complete	Community, District
12	Analyze and interpret data	Interpret data, trends	Community, District
13	Communicate Results	Describe final reporting format, frequency, and content to established CARB standards	Community, District

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COMMUNITY OUTREACH and APPROACH

The District will follow CARB's blueprint for community engagement, follow best practices from the experiences with the Portside Community, and best practices from stakeholders across the state. Best practices will include:

- A diverse steering committee consisting of residents, businesses, workers, organizations, agencies, medical experts, and academia (majority of committee members will be residents)
- Develop committee charter approved by committee
- Conducting frequent steering committee meetings starting with a monthly frequency
- Consider the utilization of a professional facilitator
- Ensuring the committee lead the direction of meetings not the District
- Providing Spanish translation at meetings and translating documents into Spanish
- Conducting committee meetings in the evening and in the community
- Bring in experts to present on agenda items
- District or facilitator will prepare agendas, meeting notes, presentations in advance of meetings
- Provide committee with updates and upcoming workshops related to AB 617
- Seek committee approval on items such as what pollutants to measure, where to put monitors, how to spend incentive and implementation funding
- Give updates to committee on District progress with AB 617 tasks
- Maintaining a District website **(already in place)**

Above is District presentation at a San Ysidro Community meeting with breakout sessions where District is getting feedback from San Ysidro residents

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As shown below the District has conducted significant outreach:

Date	***Subject***	***City***	***Attendees***	***Notes***
23-Oct-18	CARB AB617 Workshop	Los Angeles	~35	Listened to CARB/SCAQMD/Non-Profits/Public/C. Garcia
18-Nov-17	APCD Advisory Group Meeting	San Diego	4	Update on AB 617 was an agenda item
28-Nov-17	CARB Freight / AB617 Workshop	National City	~35	Evening CARB community meeting on AB617 and freight
14-Feb-18	APCD Advisory Group Meeting	San Diego	4	Update on AB 617 was an agenda item
28-Feb-18	CA Community Air Protection Summit	Riverside	~150	Attended Workshop on AB617 Implementation
12-Mar-18	CA Community Leadership Summit	Riverside	~150	Attended Workshop- Best Practices for Community Projects
14-Mar-18	APCD Advisory Group Meeting	San Diego	4	Update on AB 617 was an agenda item
23-Mar-18	Stakeholder Kick-Off Meeting	San Diego	~20	Community organizations, academia, utility, industry, EPA
29-Mar-18	San Ysidro Community Meeting	San Ysidro	~25	Residential concerns in San Ysidro/Otay Mesa
April	Door-to-Door Grant Outreach	San Diego		Marketing to companies in Portside communities
11-Apr-18	Portside Community presentation	National City	20	Presentation at Environmental Health Coalition
14-Apr-18	SDAPCD Advisory Board Meeting	San Diego	4	Agenda item was an AB617 update
24-Apr-18	Project Workshop	San Diego	20	ARB presented program details, Q&A
26-Apr-18	Grant Outreach	San Diego		Marketing grants at industry Mexport Conference (
27-Apr-18	Stakeholders Meeting	San Diego	20	Progress on monitoring, incentives grants
May	Door-to-Door Grant Outreach	San Diego		Marketing to companies in Portside communities
17-May-18	Tour of District laboratory	San Diego	3	Tour of lab and monitoring station academia and EHC
29-May-18	Meeting with City of San Diego	San Diego	6	Presentation to City of San Diego Executive Team
31-May-18	Stakeholders Meeting	San Diego	24	Progress on monitoring, incentives
31-May-18	San Ysidro Community Meeting	San Diego	~25	Presentation at Casa Familiar Community Meeting
June	Door-to-Door Grant Outreach	San Diego		Marketing to companies in Portside communities
1, 2-Jun-18	Mobile tour of Port and nearby areas	Several	~25	Workshop and Port tour with CARB, EHC, and Casa Familiar
5-Jun-18	SANDAG presentation	San Diego	**5**	Project update for SANDAG Planning staff
7-Jun-18	SANDAG CBO Working Group	San Diego	12	AB617 update at SANDAG's Community Meeting
7-Jun-18	Grant Outreach	San Diego	~15	Port Tenants Association Environmental Meeting
13-Jun-18	EHC Community Meeting	National City	10	Instructed residents how to report air quality complaints
18-Jun-18	IEA/CARB Workshop	San Diego	32	Update on Emission Inventory Tool
25-Jun-18	IEA/CARB Workshop	San Diego	~20	AB617 update including CARB Blueprint
27-Jun-18	Ongoing Bi-Weekly Calls w/ CARB	Phone	~10-15	Update on AB 617 activities
11-Jul-18	APCD Advisory Group Meeting	San Diego	4	Update on AB 617 was an agenda item
11-Jul-18	EHC Community Meeting	National City	~12	Follow up to 6/13/18 meeting; inspector-led meeting
18-Jul-18	APCD Stakeholder Meeting	San Diego	13	Update on AB 617 was an agenda item
27-Jul-18	Stakeholders Meeting	San Diego	15	Update; Progress on monitoring, feedback
3-Aug-18	SANDAG-CARB Conference Call	Phone	~	Discussion on Incentive Funding
4-Oct-18	Stakeholders Meeting	San Diego	~ 15	Update; Progress on monitoring, feedback
25-Oct-18	Steering Committee Meeting	Portside	~40-50	First of ten monthly steering committee meetings
14-Nov-18	CARB-District Source Apportionment	Phone	Several	Discussed requirements for source apportionment
15-Nov-18	Call with Casa Familiar Monitoring	Phone	Several	Discussed ongoing sensor monitoring; District assistance
29-Nov-18	SDGE-SANDAG-APCD Meeting	San Diego	Several	Discussed collaboration on electric vehicle expansion
17-Dec-18	SANDAG Freight Stakeholder Meeting	San Diego	Several	SANDAG Meeting on future transportation plans
1-Mar-19	Third Party Mobile Monitoring Starts	Dis. Comm.	-----	All 37 census tracts measured for pollutants
21-Mar-19	Steering Committee Meeting	Portside	~40-50	Monthly steering committee meeting
4-Apr-19	AB 617 Consultation Group Meeting		Several	Discussed concerns, best practices in communities
11-Apr-19	Call with Sac Metro AQMD	Phone	Several	Discussed best practices, lessons learned
7-Jun-19	Mobile Monitoring Completed	Dis. Comm.	----	Minimum of 20 passes on all roads completed
10-Jun-19	Commenced with ALPR Imaging	Portside	---	Up to six students filming vehicles

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Going forward, it is felt that the best way to be transparent, hear ideas and concerns, and respond to community concerns is through steering committee meetings. The steering committee meetings will be an effective way to provide in-person updates on community emission monitoring, inspection results and to learn more on the community members' concerns.

Disseminating AB 617 information will be made available on the District website. The District has added a section on the Community Air Monitoring Program to our existing website (www.sdapcd.org). Currently posted is information on AB 617, survey forms, and steering committee nomination forms in English and Spanish. Planned updates will include updates on air monitoring (possibly real-time or near real-time air quality data), updates on incentive funding, inspection results, a place for comments, and a public complaint link. Information will be linked to other community websites so as to facilitate transparency.

SAN DIEGO COUNTY EMISSION INVENTORY ANALYSIS

The emission data shown in Table 3 are from the California Air Resources Board (CARB) website and include pollutants that are ozone precursors or of special health concern. Ozone, oxides of nitrogen (NOx), and fine particulates ($PM_{2.5}$) are shown for several reasons. AB 617 requires air districts that are in non-attainment for a criteria pollutant to apply expedited best available retrofit control technology (BARCT) to specified sources. The District is currently non-attainment for ozone. ROG and NOx emissions are the precursors to ozone and will need to be analyzed for expedited BARCT reasons. $PM_{2.5}$ is included because the San Diego International Border Community scores are in the 95% Percentile for this pollutant. Diesel particulate matter (PM) is included because the Portside Environmental Justice Neighborhoods scores in the 95th Percentile for this toxic air contaminant.

Table 3- Regional Summary of emissions by type

EMISSION SOURCE (TONS/DAY)	ROG	NOx	$PM_{2.5}$	TOTAL FOR (ROG, NOx, $PM_{2.5}$)	DIESEL PM (%) OF TOTAL
MOBILE SOURCE	52.2	89.7	5.1	147	91
AREAWIDE	33.9	1.7	12.2	47.8	6
STATIONARY SOURCE	29.2	4	2.7	35.9	3
TOTAL	115.3	95.4	20	230.7	100

As has been discussed in this application, the District must do its part to help communities and we are committed to this effort. As shown above, mobile source emission reductions are key to success. With the majority of emissions being mobile source related, their emission reductions are critically needed. For example, per preliminary modeling completed in 2017, a reduction of 22.8 tons/day of NOx emissions in order to reach attainment for the 2015 national ozone standard (70 ppb). A 26% reduction in NOx mobile source emissions would achieve this, while a 26% reduction in stationary source NOx emissions would yield reductions of approximately only one ton, more than 21 tons short of the needed amount. Even If all the stationary sources in the county shut down, we would still be short over 18 tons of the needed emission reductions. Detailed emissions by category are shown below in Table 4.

Using risk factors from CalEnviroScreen 3.0, the District devised a ranking system to determine priority communities. The priority ranking system was as follows:

Priorities (high to low):

1. High Pollution Burden Score (high air pollution exposure), High Population Characteristic Score
2. Lower Pollution Burden Score (high air pollution exposure), High Population Characteristic Score
3. High Pollution Burden Score (lower air pollution exposure), High Population Characteristic Score
3. High Pollution Burden Score (high air pollution exposure), Lower Population Characteristic Score
4. Lower Pollution Burden Score (high air pollution exposure), Lower Population Characteristic Score
5. Lower Pollution Burden Score (lower air pollution exposure), Lower Population Characteristic Score

Tie

Note: The separation point between high and lower score is the 75 Percentile because CalEPA designates the highest scoring 25% of census tracts from Cal EnviroScreen 3.0 as disadvantaged communities.

Special consideration will be given to:

- Disadvantaged communities where historical regional and/or community air pollution data is lacking
- Situations where disadvantaged communities are impacted by factors outside of local control

ONGOING TECHNICAL ASSESSMENT OF POLLUTANTS IN EACH COMMUNITY:

1. Utilize all CalEnviroScreen 3.0 factors
2. SB 535 Disadvantaged Community List
3. Environmental Justice Screening Tool Score
4. California Healthy Place Index
5. Utilize historical air quality data (emission inventory)
6. Utilize health risk modeling programs to identify acute, chronic, cancer health risks
7. Feedback from community
8. Identify mobile, area, and stationary source emission sources
9. Develop a community-level emission inventory database
10. Conduct modeling as required
11. Mobile Monitoring Data
12. Amount and types of vehicles in community
13. Enhanced meteorology measurements
14. Source attribution
    a. Enhanced monitoring for specific compounds, elements, ions

Additional details and ranking information for the San Diego International Border Community. The District will form a steering committee per the CARB Blueprint to help identify issues/concerns and to seek workable strategies/solutions. The Steering Committee nomination forms and bylaws are found in Appendices 1.

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RELATIONSHIP WITH STAKEHOLDERS:

The District has a good working relationship with all parties, some have been established for years and others are becoming more established. We will be transparent, engaging, open to ideas, and inclusive. We plan to meet with community residents at a neighborhood level to better understand concerns; meet with companies individually to develop emission reduction ideas; meet with other agencies/companies who can assist with community goals; and meet as a group at steering committee meetings to provide updates, hear ideas, concerns, and get additional public input. We expect the process to be dynamic and flexible as lessons are learned and new issues arise.

Partnerships between District inspectors and community residents will be formed. Meetings will occur where bilingual District inspectors will give presentations in Spanish. Staff will provide instructions on how to report complaints and explain District authority (what we can and cannot do). Staff will seek out detail on problematic sources which will help with community-level inspections.

IDENTIFIED COMMUNITIES:

First Year (Selected for Community Monitoring)

Portside Community of Environmentally Disadvantaged Neighborhoods

Second Year Identified Community

1. San Diego International Border Community (Monitoring and Emission Reductions) (Census Tracts 6073010009, 6073010013, 6073010111, 6073010005, 6073010012, 6073010109, 6073010015)

2. Portside Community of Environmentally Disadvantaged Portside Neighborhoods (Emission Reductions)

Subsequent Years for Community Monitoring and Emission Reductions

1. National City (Census Tracts 6073011700, 6073011601, 6073011801, 6073022000)
2. Chula Vista (Census Tracts 6073012502, 6073013205, 607312501, 6073012600)
3. El Cajon (Census Tracts 6073016202, 6073015901)
4. San Diego (Census Tracts 6073003602, 6073003501, 6073005300, 6073005700, 6073003301, 6073004800, 6073003403, 6073004100, 6073002502, 6073003404, 6073003305, 6073005200, 6073003303, 6073002501)

Subsequent Years for Emission Reduction Program

All the identified communities above will be nominated for an emission reduction program in future years. When sufficient community-level monitoring data is collected and analyzed, the District is expected to nominate all identified communities for the Emission Reduction Program per CARB's Blueprint Document. In the meantime, this community-level emission collection process will not delay immediate emission reduction goals.

The District wants to emphasize to all parties that the District will be actively seeking out emission reductions during the monitoring period through inspections at the neighborhood level, complaint

responses, working closely with the communities on identified problem areas, seeking incentive funding for emission reductions, and other avenues as they become available. A more detailed discussion will be presented in the ensuing pages of this document. See Table 5 for listing of the 37 census tracts along with their respective CalEnviroScreen 3.0 rankings.

The District is already receiving incentive funding interest that exceed current funding allotments. CARB incentive funding will be key in future years for immediate emission reductions in the disadvantaged communities. The District feels it will need to receive a significant portion of future incentive funding allotted in future State budgets to realize important emission reductions.

Table 4- Identified Census Tracts in San Diego County per CalEnviroScreen 3.0

These communities are also considered disadvantaged per the AB-535 and AB-1550 as the maps show below in Figures 2 and 3:

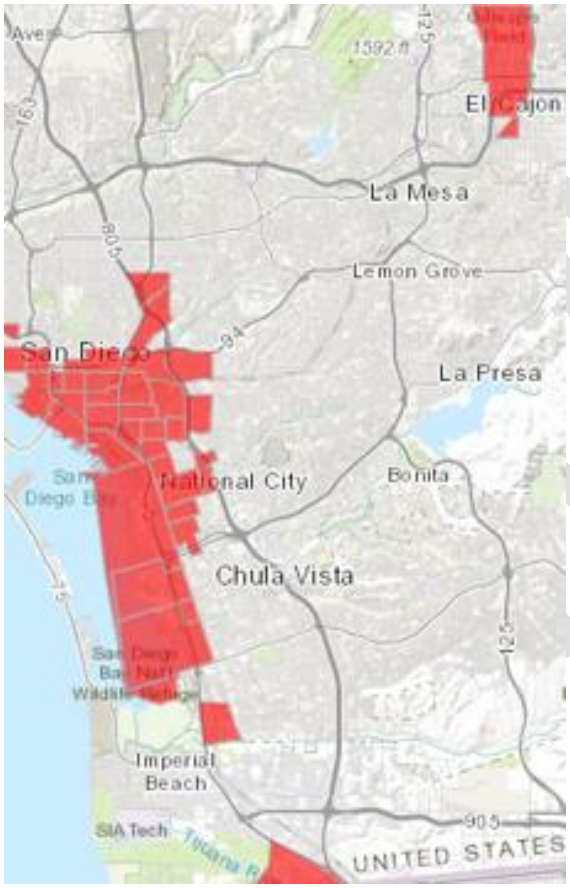

Figure 2- Map above shows AB 535 Communities

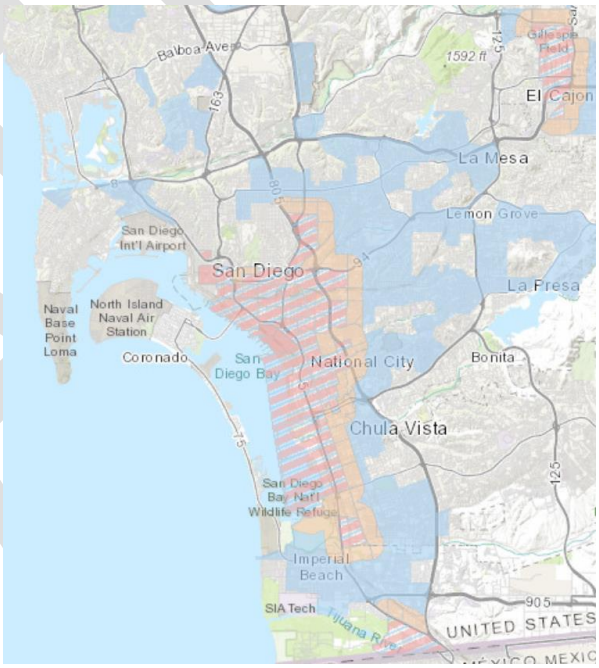

Figure 3-SB 435 and AB 1550 Map

- **SB 535 Communities**
- **AB 1550 Low Income Communities**
- **AB 1550 and SB 535**
- **AB 1550 Communities within ½ mile of SB 535 Community**

Below in Table 6 is CARB-supplied data and show the San Diego nominated communities also score high for the CA Healthy Places Index, and the EJSM Score. The data below points out that these communities have high populations and high population density. The data below emphasizes what has already been

discussed, which is these communities have significant pollution burden and have very sensitive population characteristics.

Table 5- CARB-supplied disadvantaged communities

City/Area	Nominated	SB 535 DAC List CES3.0	CES 3.0 Score (percentile)	CA Healthy Places Index (percentile)	EJSM Score (percentile)	total population	density (pop. per square mile)	PM2.5 (percentile)	Diesel PM (percentile)	Ozone (percentile)	Toxic risk (percentile)	Traffic (percentile)	Mobile (percentile)	Stationary (percentile)	Large stationary source(count)	Area-wide (percentile)	Schools	Day cares	Hospitals	Asthma (percentile)	Low birth rate (percentile)	Cardiovascular disease (percentile)	Poverty (percentile)	Unemployment (percentile)
San Ysidro	X	yes	77	90	77	27,196	9,232	95	46	17	59	100	69	99	0	46	6	11	0	69	69	70	94	97

All the above data shows that the two communities are strong candidates for community monitoring**.**

With assistance from the County of San Diego Health and Human Services additional information on population sensitivity was collected:

- Food security—proxy food deserts, 2015 Data
  - Source: United States Department of Agriculture: Economic Research Service (May 2017). *Food Access Research Atlas, 2015.* Retrieved from https://www.ers.usda.gov/data-products/food-access-research-atlas/download-the-data/.

San Diego International Border Community

(From David Flores of Casa Familiar in italics):

"San Ysidro is home to approximately 30,000 people. San Ysidro residents identified as 93% Hispanic in the 2010 U.S Census with 87% speaking Spanish and 60% speaking both Spanish and English. The linguistic isolation burden percentage was calculated at 86% by the CalEnviroScreen tool. According to the 2010 SANDAG Community Profile, San Ysidro has a relatively young population with 31.6% of residents under 18 years old and 9.1% of residents over 65 years old as compared to 21% and 11%, respectively, in the City of San Diego. The median age in San Ysidro is 29.1, lower than the median age of 33.8 in the City of San Diego. Further, the unemployment rate in San Ysidro is significantly higher at 12.4% when compared to 8.4% in the City of San Diego. The median household income is also significantly lower at $35,993 when compared to the median of $63,198 in the City of San Diego. The poverty rate in San Ysidro is 25.1%, more than double that of the City of San Diego."

The environmental context of the community of San Ysidro is best understood based on its proximity to the U.S.-Mexico International Border. In 1954 interstate 5 was constructed establishing a major route to the border and bisecting the San Ysidro community. In the 1970s Interstate 805 and 905 were constructed, adding an additional physical division within the community of San Ysidro and limiting the pedestrian mobility of San Ysidro residents and travelers. San Ysidro is located immediately adjacent to the busiest land Port-of-Entry (POE) in the Western Hemisphere, the San Ysidro POE. Each day as many as 50,000 vehicles and 25,000 pedestrians cross the POE in the northbound direction and in 2012 passenger vehicle crossing times averaged 74 minutes (BHET Report, 2015). Vehicular cueing to cross this POE extends to beyond 5 miles on local freeways during busy traffic hours. POE Operations reports that 6 of 10 persons entering & exiting through any port of the United States happens through the SY POE, and that this facility has the most 911 emergency calls in all of the National emergency call system. This accounts for disproportionate impacts & exposure of the San Ysidro community to vehicle emissions from border traffic. Further, port reconfiguration and expansion is underway to accommodate a projected 87% increase in traffic by the year 2030 (US General Services Administration, 2017). Changes at the port are likely to have a substantial impact on the air quality in the surrounding South San Diego communities. San Ysidro has been identified as a disadvantaged community under SB 535 with an overall CalEnviroScreen 3.0 percentile calculated at 76-80%, with higher percentage reflecting higher burden based on environmental indicators. Of note, CES 3.0 also calculated the PM2.5 burden at 95% and the traffic burden was calculated at 100%.

Localized Air Quality Monitoring

Casa Familiar, academia, and state/local agencies have been conducting an air study in the San Ysidro area where they have deployed low cost sensors. The study is two-fold. First, it is measuring air pollutants at the community level and, second, an evaluation of the sensors utilized in the study by academia is being conducted. The District has assisted with the San Ysidro study by accommodating the side-by-side placement of the study's sensors next certified instruments at District ambient air quality monitoring stations. This colocation allows for the comparison of new technology to long-established state and federal reference measurement methods used by the District. There is widespread interest in identifying and using low cost sensors to monitor air pollutants and the District is committed to continue assisting with the San Ysidro study and future air quality studies in disadvantaged communities.

Recently, the District partnered with Cal-EPA and the USEPA to locate a $PM_{2.5}$ monitor at the San Ysidro Border Crossing. This first-of-its-kind monitoring was helpful in identifying particulate levels at that port of entry yet was short-lived due to real estate issues. The plan is to resume with monitoring in this general area as soon as possible. This is because data on long-term air pollutant trends are needed if we are to work to mitigate the sources of the pollution. Additionally, such monitoring will assist with the assessment of new, developing technologies and in the creation of protocols for community-level monitoring.

With this, the District is concurrently working on locating a USEPA-required near-road monitor in the San Ysidro community. While the required monitoring is to be used primarily for

measuring nitrogen dioxide (NO_2) and $PM_{2.5}$, this location will also be utilized for measuring other pollutants of community concern and to assist the ongoing The San Ysidro Community Air Quality Study.

Furthermore, the new monitoring location will enable the District to have a place where new sensor technology can be co-located with and who whose data can be compared to federal reference method instrument results. The goal is to have proven low cost, simple to operate, accurate sensors deployed throughout our communities.

The San Diego International Border Community is being selected because the area has the highest traffic percentile in the state and its $PM_{2.5}$ levels are in the 95+ percentile. The District is concerned that the PM2.5 and diesel particulate may be underreported. In the CalEnviroScreen 2.0 report, San Ysidro was not considered a disadvantaged community. It was only when CalEnviroScreen 3.0 was completed that a higher PM2.5 exposure was determined. More community monitoring is needed to ensure the air quality data fully represents the exposure burden of the community.

There are very significant socioeconomic factor indicators that show San Ysidro residents are limited in overcoming the pollution exposure and environmental effects. Over 27,000 residents have Population Burdens, including an 86+ percentile for poverty, 79+ percentile for unemployment, 89+ percentile for education, and 85+ for linguistic isolation. With significant poverty levels and having much of their limited income going towards housing, their ability to protect themselves from pollution exposure is greatly limited.
The San Diego International Border Community is also confronted with pollution from another country, specifically from Tijuana, Mexico. The San Ysidro Community Air Quality Study showed elevated particulate levels in the community when it was downwind of Tijuana. Additional monitoring and cooperation with our neighbors is needed to reduce the elevated pollution levels and better protect the residents of San Ysidro. To this end, it is recommended that Tijuana representatives participate in the Steering Committee.

Working with the community and academia, locations throughout the area (Table 7) will be selected to measure for $PM_{2.5}$ and toxic contaminants associated with vehicular exhaust. To ensure success, lessons learned from the San Ysidro Community Air Quality Study will be incorporated into the next level of community testing.

With assistance from the County of San Diego Health and Human Services (HHSA) additional information on population sensitivity is included:

- Food security—proxy food deserts, 2015 Data

Source: United States Department of Agriculture: Economic Research Service (May 2017). *Food Access Research Atlas, 2015.* Retrieved from https://www.ers.usda.gov/data-products/food-access-research-atlas/download-the-data/.

- San Ysidro/ Otay Mesa
  - In 2015:
    - With the exception of Census Tracts 06073010015 and 06073010109, the specified census tracts for San Ysidro/ Otay Mesa were low income. [low income]
    - 06073010009 was a low-income tract with at least 500 people, or 33 percent of the population, living more than ½ mile (urban areas) from the nearest supermarket, supercenter, or large grocery store. [low income and low access]
    - 06073010009, 06073010015, and 06073010109 were urban tracts with at least 500 people, or 33 percent of the population, living more than ½ mile from the nearest supermarket, supercenter, or large grocery store. [low access]
    - Table 9 below shows preventative medication is low, despite health risk is high in the area.
    - Table 10 on the next page confirms the issues in the San Ysidro / Otay Mesa Community.

Table 6- Source: 2017 ESRI Community Analyst.

Census Tracts	2017 Smoked cigarettes in last 12 months (%)	2017 Used prescription drug for asthma (%)	2017 Used prescription drug for high blood pressure (%)	2017 Used prescription drug for high cholesterol (%)
6073010009	16.89%	4.16%	11.19%	10.34%
6073010013	20.14%	4.38%	12.54%	11.98%
6073010111	14.02%	3.98%	9.74%	9.95%
6073010005	20.41%	3.40%	13.35%	11.28%
6073010012	21.46%	5.52%	12.46%	9.40%
6073010109	13.87%	2.38%	10.76%	8.62%
6073010015	13.89%	2.37%	0.77%	8.63%

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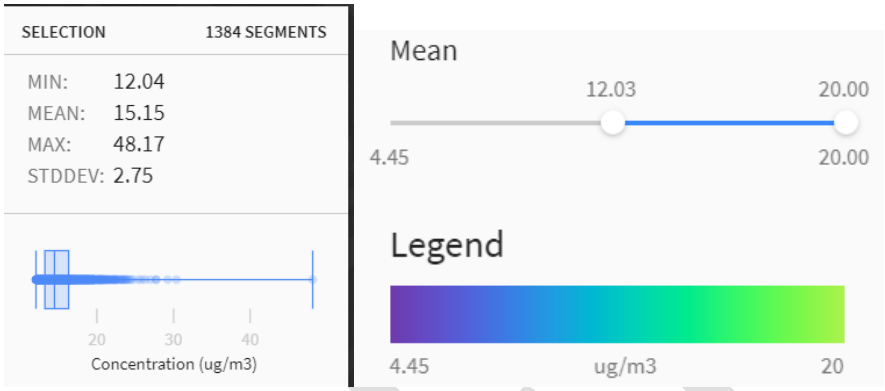
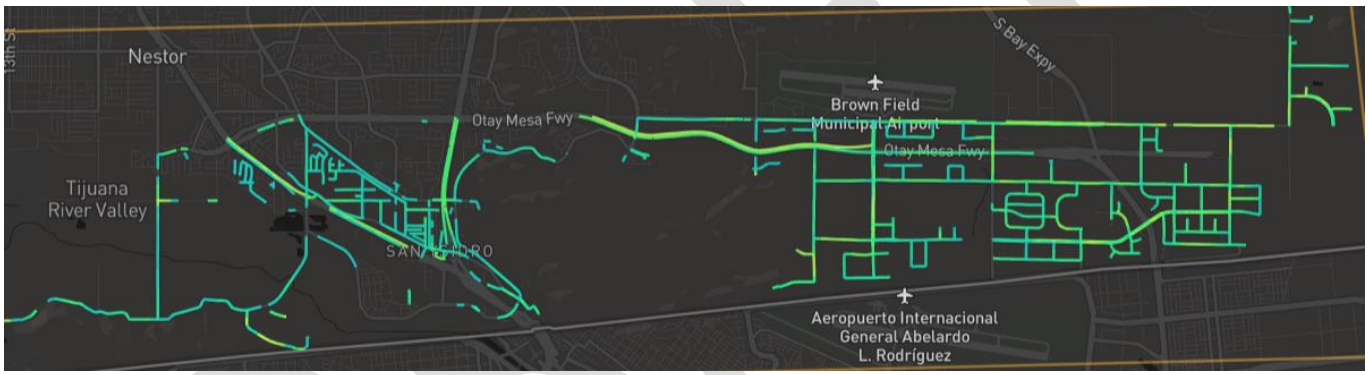
Table 7- San Ysidro / Otay Mesa CalEnviroScreen 3.0 Values

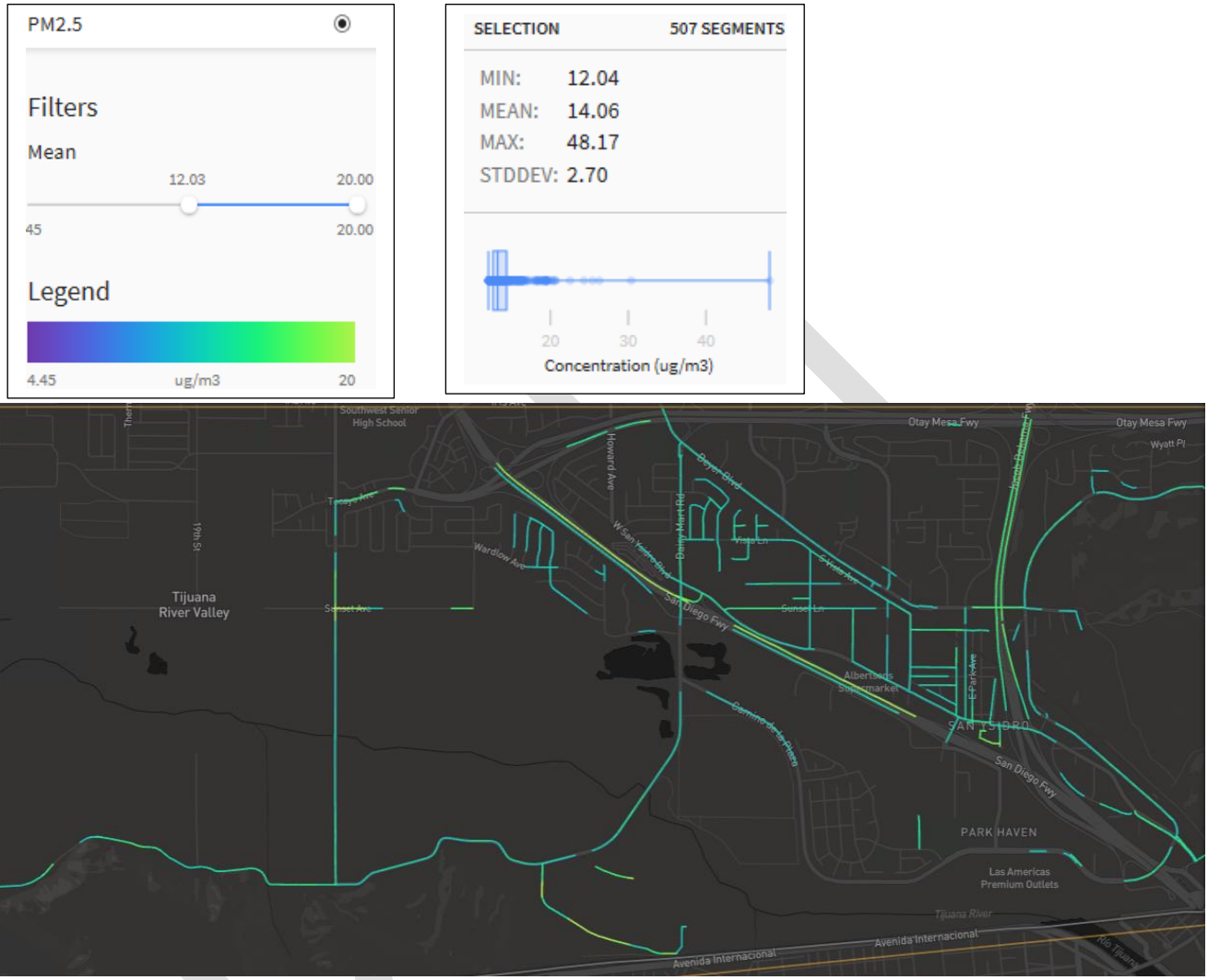
San Diego Rank	31	38	48	49	55	65	100
CA Rank	1837	1991	2281	2337	2571	2695	3457
Census Tract	6073010009	6073010013	6073010111	6073010005	6073010012	6073010109	6073010015
Total Population	6693	5484	3072	7366	4581	4595	2803
Zip code	92173	92173	92173	92173	92173	92154	92154
Area	San Ysidro	San Ysidro	San Ysidro	San Ysidro	San Ysidro	Otay Area	Otay Area
CES 3.0 Score	40.54	39.27	36.66	36.34	34.57	33.53	28.20
CES 3.0 Pctl	76.84	74.90	71.24	70.54	67.59	66.02	56.41
CES 3.0 Pctl Range	**76-80%**	**71-75%**	**71-75%**	**71-75%**	**66-70%**	**66-70%**	**56-60%**
Ozone Pctl	16.94	16.94	16.94	16.94	16.94	16.94	16.94
$PM_{2.5}$ Pctl	**95.27**	**95.27**	**94.96**	**94.96**	**94.96**	**94.96**	**95.27**
Diesel PM Pctl	40.41	46.38	30.11	43.14	30.11	13.91	66.82
Drinking Water Pctl	22.24	22.24	17.30	22.24	22.24	13.12	34.34
Pesticide Pctl	57.24	27.04	**0.00**	**0.00**	**0.00**	36.22	**1.52**
Toxic Release Pctl	57.28	58.27	57.65	59.04	57.82	53.23	73.27
Traffic Pctl	**99.99**	57.51	75.64	61.34	59.94	**100.00**	**99.97**
Cleanup Sites Pctl	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	62.81	78.77
Groundwater Threats Pctl	23.60	56.62	32.03	55.16	32.03	46.01	82.51
Hazardous Waste Pctl	43.11	**8.56**	25.76	**0.00**	25.76	43.11	**97.16**
Imp. Water Bodies Pctl	**94.41**	**94.41**	**94.41**	**94.41**	**94.41**	**99.54**	**94.41**
Solid Waste Pctl	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	61.92	78.52
Poll. Burden Pctl	66.47	48.94	39.84	40.91	37.21	77.59	**96.68**
Asthma Pctl	59.29	68.89	68.89	68.89	68.89	40.93	34.80
Low Birth Weight Pctl	27.80	26.20	55.94	69.49	49.89	54.72	14.79
Cardio Disease Pctl	55.25	69.98	69.98	69.98	69.98	24.20	18.40
Edu Pctl	**90.66**	**95.55**	89.06	**91.62**	**91.29**	72.50	69.40
Linguistic Isolation Pctl	85.63	**91.12**	85.43	**94.56**	88.39	59.38	59.10
Poverty Pctl	87.94	**93.66**	86.79	85.47	87.59	44.02	39.28
Unemployment Pctl	87.38	**96.90**	**96.27**	**93.43**	79.82	59.88	20.10
Housing Burden Pctl	74.73	89.01	72.81	30.01	69.61	67.68	34.69
Pop Char Pctl	74.81	85.91	87.70	86.09	84.49	50.56	24.72

Below are PM-2.5 Levels that are above annual national ambient air quality standard in San Diego International Border Community based on Aclima Mobile Monitoring Data:

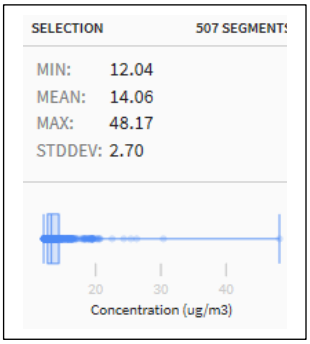


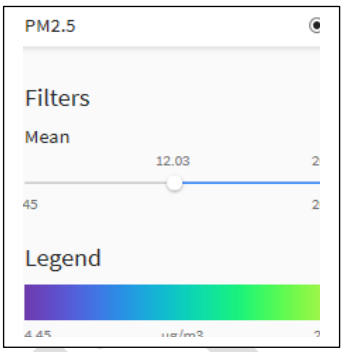


PM-2.5 Levels That Are Above Annual National Ambient Air Quality Standard in the community based on Aclima Mobile Monitoring Data

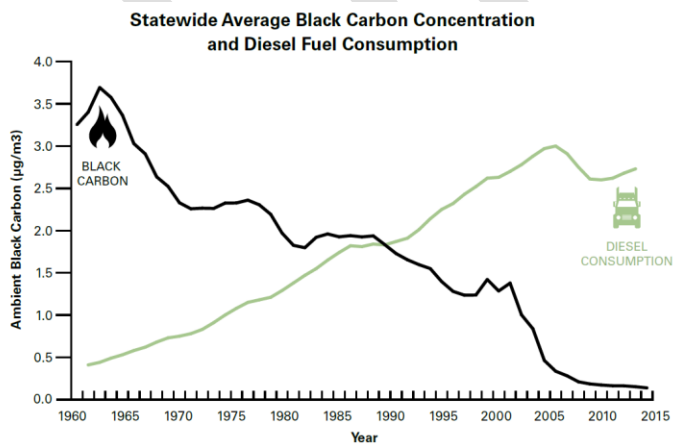


Below are PM-2.5 Levels That Are Above Annual National Ambient Air Quality Standard in Otay Mesa Area based on Aclima Mobile Monitoring Data





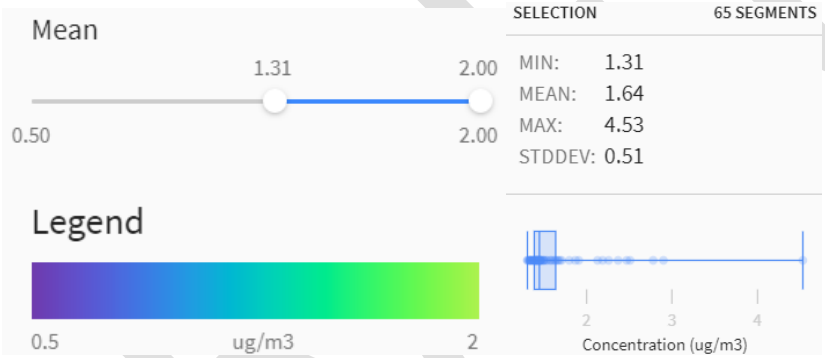
Statewide Ambient Black Carbon Levels (graph from CARB):



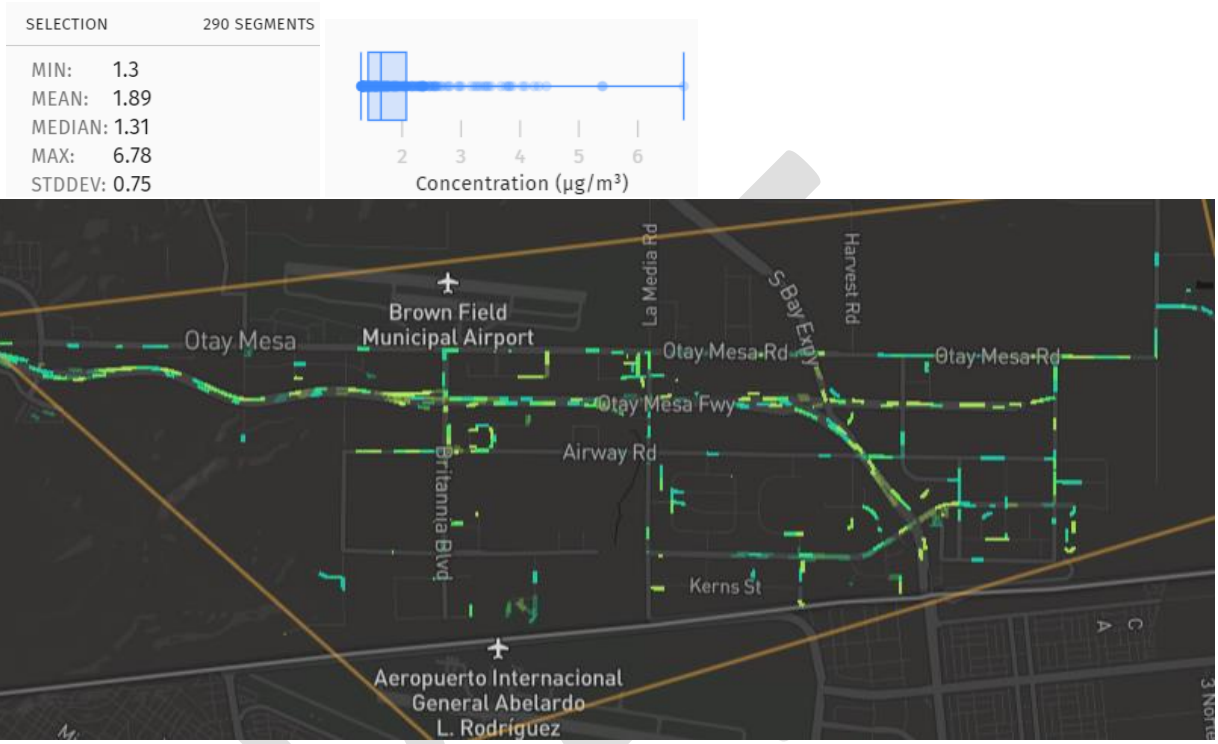
Below are Elemental Carbon Levels based on samples collected from three District Regional Monitoring Stations; Values are in micrograms per cubic meter (µg/m^3):

	Aug-Dec 2008	Jan-Dec 2009	Jan-Dec 2010
EL CAJON	1.3	1.3	1.2
ESCONDIDO	1.3	1.2	1.1
DOWNTOWN	1.5	1.3	1.1

Utilizing the black carbon data from above and considering it as ambient levels for the region the values below show elevated black carbon levels from Aclima Mobile Monitoring Data:



Below are black carbon levels From Aclima Mobile Monitoring Data in Otay Mesa Area Above Previous Determined Ambient Levels:



COMMUNITY MONITORING PLAN

The District will start with the Portside Community monitoring plan and build from there:

https://www.sdapcd.org/content/dam/sdc/apcd/PDF/AB_617/AB-617%20Elements%20and%20Required%20Criteria_San%20Diego_June%202019.pdf

Much of the same monitoring equipment planned for the Portside Community is expected in the Border Community.

Before deciding on a District plan for community monitoring, previous work by others was reviewed. For example, the San Ysidro Air Quality Study has progressed where sensors were utilized to measure air pollutants. This study included San Ysidro residents, Casa Familiar, San Diego State University, University of Washington, and OEHHA. Non-EPA reference sensors were placed throughout the community where particulates were counted, and other pollutants measured. Recently Casa Familiar received ½ million dollars from CARB to purchase and operate additional non-EPA reference sensors. Because there will be many sensors operated in these communities, the District feels strongly that compounds not measured by these sensors such as diesel and toxic volatile organic compounds be measured. EPA-reference test methods should

be utilized to verify accuracy of the community sensors. To this end the District is committed to assist Casa Familiar with quantifying their sampling. Working collaboratively community-level emissions will be determined to assist with identifying pollution sources and corresponding emission reductions.

The District operates air monitoring stations spread throughout the County as shown in Figure 7 below. While the District's monitoring stations are mostly intended for measuring regional air quality, these stations will be very useful with community monitoring.

Figure 7- Regional Monitoring Locations

Two stations are being built in the San Ysidro and Otay areas. USEPA has requested we operate a PM2.5 (continuous) monitor at the Otay Port of Entry, and we will also be operating an USEPA-required near-road monitoring station at the San Ysidro Fire Station, immediately adjacent to Interstate 5. At the San Ysidro location we will be operating NO_2 and PM2.5 (continuous) monitors. The District will propose measuring black carbon as well due to the high vehicular traffic volume in this area.

Low cost sensors are gaining popularity for their simplicity and ease of use and these devices show much promise. This being said, the District feels they need constant scrutiny and comparison if we are to depend on their measurements for decision making. The District will work closely with interested parties who wish to compare sensors to reference test methods by allowing colocation at the proposed San Ysidro Near-Road Monitor site. To this end, the District also plans to undertake the testing of some portable sensors at these stations in order to create some direct comparisons of reference methods vs. portable sensors. Additionally, as our instrument technicians gain experience with portable sensors, the District will be able to provide helpful information to others who wish to operate such sensors.

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The District plans to locate stationary sampling equipment in areas of concern within each of the identified communities. We will measure for toxics using SUMMA© canisters (which is a vacuum canister type of sampler), and PM2.5 (via filter samples). Using portable sampling will enable testing in other areas as needed and allow the District to sample the air as a part of its response to community concerns and air pollution complaints.

Once data is collected and its accuracy verified it will allow the District to inform the community of its findings via a website posting and with quarterly updates at steering committee meetings. These data will enable the public to provide feedback and ideas, which the District very much values and appreciates.

The District has monitored criteria pollutants in San Diego County for many decades, including in the Barrio Logan and Otay Mesa areas. Unfortunately, these measurements do not provide definitive health-related answers for the community. The District therefore proposes to conduct measurements designed to specifically answer questions on airborne contaminants from mobile sources, such as elemental carbon (EC) and toxic volatile organic compounds (VOCs). The values for these contaminants in CES are largely based on estimates from emissions inventories and modeling. The CES scoring in the identified neighborhoods is also consistent with the rankings from the National Air Toxics Assessment (NATA) database.

The District proposes to monitor for EC (an indicator of diesel exhaust) as well as toxic-VOCs that are found in gasoline and diesel emissions, such as benzene, 1,3-butadiene, toluene, acrolein, etc. These are currently measured by our Toxic-VOC program, so the results from the proposed neighborhoods can be compared to our existing database.

ONCE STEERING COMMUNITY FORMED, DEVELOP STRATEGIES TO REDUCE EMISISON EXPOSURE:

1. Identify District strategies that can be implemented now
    a. Completed BARCT analysis by December 31, 2018.
    b. Conduct increased mobile monitoring program
    c. Re-assess a community-level inspection strategy by 3/31/20
    d. Advocate for incentive funding
    e. Identify any needed regulatory changes
        i. Currently considering lowering the cancer threshold requiring risk reduction found in Rule 1210
    f. Re-prioritize inspection strategies as needed
    g. Develop community partnerships that foster engagement
        i. Develop steering committee
        ii. Schedule public meetings
    h. Coordinated with CARB on community monitoring platform

2. Investigate Community Mitigation Strategies
    a. Air filtration, buffers, and vegetative barriers
    b. Reduced vehicle miles traveled plans
    c. Alternate truck routes

d. Green vehicles, fueling stations
e. Clean homes
f. Additional air monitoring

Long-Term (3 years – 10 years)

1. Annual review of community factors, including air quality data
    a. Re-prioritize inspection strategies as needed
        i. Check non-compliance rates
        ii. Have air pollution sources changed?
    b. Adjust incentive funding strategy as needed
        i. Funding sources may change
        ii. Will they affect our reduction goals?
    c. Adjust community monitoring as needed
        i. Technologies may change
        ii. Pollution sources may change
    d. Review regulations
    e. Review community strategies

MOBILE SOURCE PROGRAM AND INSPECTION STRATEGY IN DISADVANTAGED COMMUNITIES

Historically, the District has regulated stationary sources of air pollution for more than 64 years. However, because over seventy percent of the total air pollution in San Diego County is emitted by mobile sources the District sees a need to reduce emissions from these sources.

The State of California is a vast geographic region with thousands of miles of roads, hundreds of construction sites, tens of thousands of diesel-powered vehicles and pieces of off-road equipment. It therefore makes sense to engage the inspection resources of the San Diego County Air Pollution Control District to help with the mobile source inspections within San Diego county.

In 2014 the District signed a Memorandum of Understanding (MOU) with the California Air Resources Board (CARB) allowing enforcement of certain mobile source regulations. The MOU grants the District authority to enforce specific mobile source regulations, including the *In-Use Off-Road Diesel Vehicle Regulation* (for off-road construction equipment) and the *In-Use On-Road Heavy-Duty Diesel Vehicles Regulation* (a statewide truck and bus regulation). These rules focus on reducing diesel exhaust emissions and the public's exposure to toxic diesel pollutants, which adversely impact public health (they are a known carcinogen).

In 2014, when the MOU was signed, the CARB Enforcement Report provided the following statewide non-compliance rates for three main regulations:

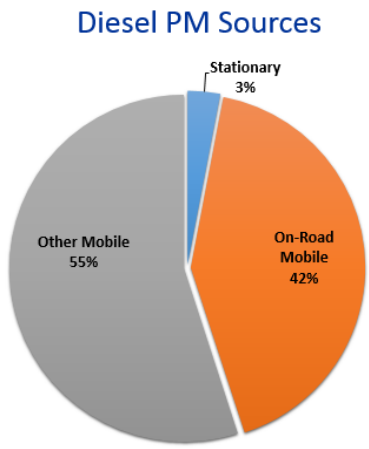
Table 9- Statewide Non-Compliance Rates for Mobile Equipment

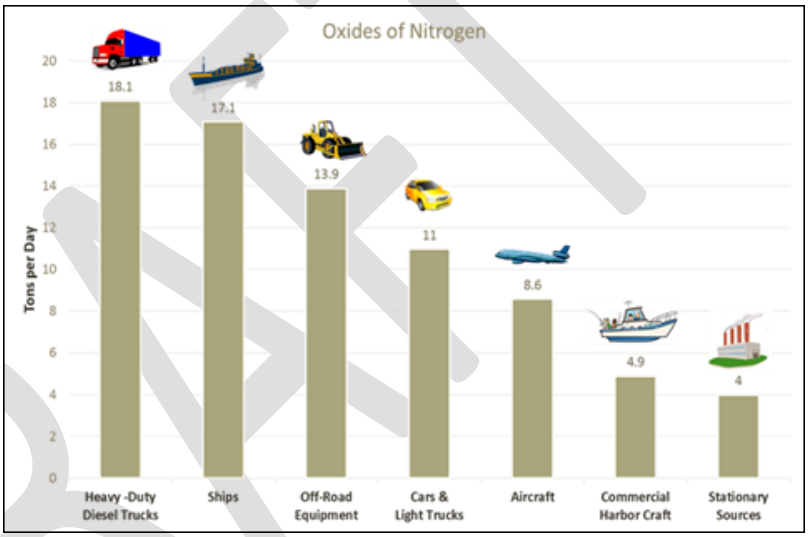
Non-Compliance Rate	Regulation	No. of Inspections
21%	Truck and Bus Program	5,372
32%	Transport Refrigeration Unit Program (TRU)	2,443
23%	Off-Road Diesel Vehicle Program	336

During the same period, the non-compliance rate for stationary source inspections was about 7 % (based on 8,791 inspections). The District has been striving to decrease the non-compliance rates for mobile source regulations by partnering up with CARB, enhancing outreach and training efforts, and increasing the number of inspections.

The graphs in Figure 9 highlight the sources of nitrogen oxides and diesel particulate matter (PM). Nitrogen oxides contribute to the formation of ozone, which negatively impacts public health by damaging lung tissue and being an eye, nose, and throat irritant. Especially vulnerable are children, the elderly, and people with respiratory ailments. Diesel particulate matter can contribute to a range of health problems, including irritation to the eyes, throat and nose, cardiovascular disease, and lung cancer.

Figure 9





Enforcing mobile source regulations is critical to reducing air pollutant emissions from those sources in San Diego County. The District has been working to address this issue by undertaking substantial public outreach, closely working with stakeholders and doing inspections of vehicles to verify compliance with On-Road regulations. Inspections are being done at the Otay Mesa Border crossing areas. Additionally, we have divided the county into 4 sectors where each one is assigned to a mobile source inspector who is responsible for enforcing all regulations under the MOU with CARB. Furthermore, the District inspectors are conducting mobile equipment inspections at construction sites. They are monitoring locations where illegal truck idling is likely to occur (such as in downtown San Diego and the Port Area), and packing houses where Transport Refrigeration Units (TRU's) on trucks and trailers operate. In 2017, we revised the MOU to allow the District to settle citations issued for Off-Road equipment and TRU violations. Settling these citations in-house will make the process more efficient and will allow District staff to closely work with operators as they correct deficiencies.

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Based on 2017 data, Table 10 shows the existing mobile source non-compliance rates in San Diego.

Table 10- Mobile Source Non-Compliance Rates Based on District Inspections

Non-Compliance Rate	Regulation	No. of Inspections
33%	Truck and Bus Program & Transport Refrigeration Unit Program	787
19%	Off-Road Diesel Vehicle Program	2,967

Table 11- (7/19/2018) below is an update on the Mobile Source Inspection Compliance Rates

Mobile Source Inspection Stats
Jan - June, 2018

	Total Inspections	Total Violations	% Violations
Commercial Vehicle Idling	99	1	1%
State Truck and Bus	278	25	9%
TRU	256	61	24%
Off-Road	2,357	310	13%
Heavy Duty Vehicle Inspection Program	39	4	10%
Emission Control Label	152	3	2%
Drayage Truck	2	0	0%
School Bus Idling	7	0	0%
Sum	3,190	404	13%

The District's mobile source program continues to evolve, and we have been able to increase the number of inspections and work to educate the regulated businesses, which will lead to increased compliance.

STATIONARY SOURCE INSPECTION PROGRAM AND STRATEGY IN DISADVANTAGED COMMUNITIES

The San Diego Air Pollution Control District's mission statement is "*Improve air quality to protect public health and the environment*." In order to support this mission, the Compliance Division has the following programs:

- ✓ Stationary Source Inspections – We strive to inspect all permitted facilities at least once a year. Currently the District has 8,228 active permits for various sources.

- ✓ Air Quality Complaints – The District quickly responds to all air quality complaints, often on the same day. In 2017 we received and responded to 801 air pollution related complaints.

- ✓ Asbestos Inspections – Asbestos is a hazardous air pollutant for which there's no safe level of exposure. The District enforces asbestos regulations meant to prevent asbestos emissions during renovation and demolition projects. This prevents human exposure to asbestos fibers and public nuisances.

- ✓ Statewide Portable Equipment Registration Program (PERP) - The District inspects PERP registered equipment to verify compliance with the State's Portable Diesel Engine Airborne Toxic Control Measure (ATCM) and other applicable requirements.

Although most stationary sources are inspected annually, certain sources are inspected more frequently. For example, sources subject to Title V of the Clean Air Act are inspected twice per year. Additionally, for several years the District has been conducting more frequent inspections in the portside community, which is considered a disadvantaged community in accordance with CalEPA.

San Diego International Border Community

Currently the San Ysidro and Otay Mesa areas have 137 District-permitted businesses, which represent about 1.7% of all permits in San Diego County (see Attachment 7 for a listing of the permits). The majority of the 137 permits are for engines, gasoline dispensing facilities, and coating operations.

In addition to inspecting the permitted sources within these areas, the District's mobile source team began conducting mobile equipment inspections in November 2017 in this community and in other communities that have been identified as disadvantaged communities by CalEPA.

To gain a better understanding of the causes of excess air pollutant emissions the District evaluated the Notices of Violations (NOV) issued for facilities located in the San Diego International Border Community (see Table 16).

Since January 1, 2016, a total of 2,205 NOVs have been issued to facilities located in San Diego County. Table 19 shows that 75 of the NOVs issued (3.4%) were for facilities located in San Ysidro/Otay Mesa areas. Out of the 75 NOVs issued, 32 NOVs were emission related, 37 were for an administrative violation (meaning the NOVs were issued for not having records available on site or for not conducting required maintenance), and 6 were issued for operating without a permit.

Table 12- NOV Breakdown by Category

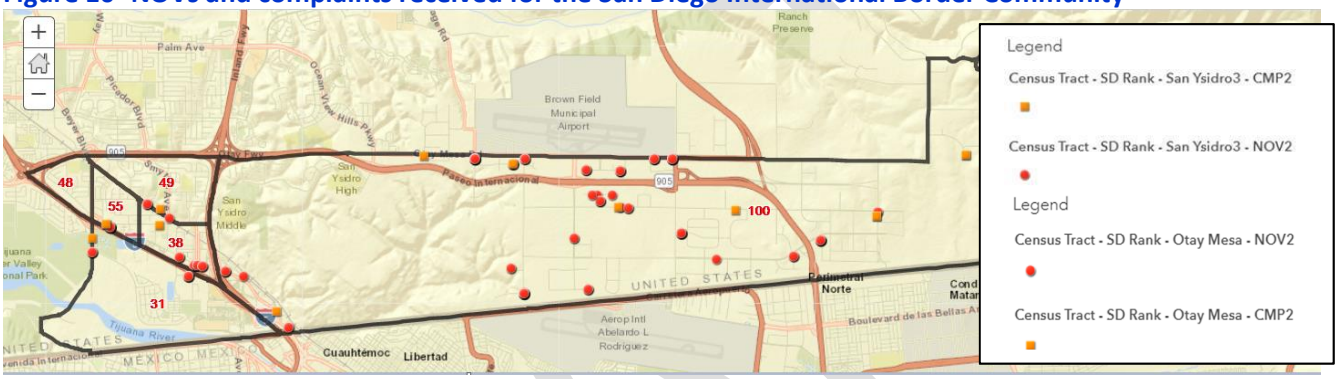
Inspections				
Inspections -San Diego County	**2016**	**2017**	**2018**	**2019**
Stationary Source Inspections	7720	8691	8687	4437
Asbestos Inspections	690	661	1140	819
Air Quality Complaints	824	920	1022	556
Portable Equipment Registration Program (PERP) Inspections	461	617	769	401
On-Road Inspections	-	787	1006	667
Off-Road Inspections	-	2967	4240	2108

Inspections (Zip Codes 92173)	2016	2017	2018	2019
No. of Active Permitted Operations	**23**			
Stationary Source Inspections	27	52	12	18
Asbestos Inspections	10	5	2	1
Air Quality Complaints	4	5	2	2
PERP Inspections	0	0	0	0
On-Road Inspections	-	8	0	0
Off-Road Inspections	-	1	-	-
Inspections (Zip Codes 92154)	**2016**	**2017**	**2018**	**2019**
No. of Active Permitted Operations	**241**			
Stationary Source Inspections	215	166	161	114
Asbestos Inspections	5	8	9	10
Air Quality Complaints	12	16	12	6
PERP Inspections	1	2	0	0
On-Road Inspections	-	352	153	217
Off-Road Inspections	-	34	20	8
Notices of Violations (NOVs) - Stationary Source				
Number of NOVs Issued- San Diego County	884	1015	953	631
Number of NOVs Issued (Zip Codes 92154)	30	27	23	14
Number of NOVs Issued (Zip Codes 92173)	6	12	5	2
Percentage of NOVs Issued (Zip Codes 92154)	3%	3%	2%	2%
Percentage of NOVs Issued (Zip Codes 92173)	1%	1%	1%	0%
Mobile Source Citations				
Number of Citations- San Diego County -On-Road	-	240	179	195
Number of Citations Issued- San Diego County -Off Road	-	562	545	177
Number of Citations Issued (Zip Codes 92154) -On-Road	-	110	31	91
Number of Citations Issued (Zip Codes 92154) -Off-Road	-	11	10	-
Number of Citations Issued (Zip Codes 92173) -On-Road	-	1	-	-
Number of Citations Issued (Zip Codes 92173) -Off-Road	-	-	-	-
Percentage of Citations Issued (Zip Codes 92154)-On-Road	-	46%	17%	47%
Percentage of Citations Issued (Zip Codes 92154)-Off-Road	-	2%	2%	-
Percentage of Citations Issued (Zip Codes 92173)-On-Road	-	0.40%	-	-
Percentage of Citations Issued (Zip Codes 92173)-Off-Road	-	-	-	-
Non-Compliance Rate -Stationary Source				
Non- Compliance Rate-San Diego County	9%	9%	8%	10%
Non- Compliance Rate-(Zip Codes 92154)	13%	14%	13%	11%
Non- Compliance Rate-(Zip Codes 92173)	15%	19%	31%	10%
Non- Compliance Rate - Mobile Source				
Non- Compliance Rate-San Diego County	-	21%	14%	13%
Non- Compliance Rate-(Zip Codes 92154)	-	31%	24%	-
Non- Compliance Rate-(Zip Codes 92173)		11%	-	-

The percentage of violations issued to gasoline stations is significant. The District offers gas station training classes multiple times per year, but it will enhance outreach by promoting its training classes that will educate facility operators about staying in compliance.

In addition to evaluating the NOVs issued for the San Ysidro/Otay Mesa areas the District also analyzed the number of air quality complaints received for these communities. Since January 2016, we have received a total of 1,739 air quality complaints for San Diego County, with 54 of these complaints being in the San Ysidro/Otay Mesa areas. This is approximately 3% of all complaints received (see Figure 22). The vast majority of the complaints (70%) were related to odors and dust, but there were a few related to smoke and asbestos removal.

Figure 10- NOVs and complaints received for the San Diego International Border Community



In summary, the following actions will be taken to better serve the San Diego International Border Community:

- ✓ The District will be conducting mobile source inspections at the San Ysidro/Otay Mesa areas at least twice a month.
- ✓ The District will continue to work with CARB to establish an agreement with CHP that will allow the District to conduct inspections independently, which will result in more frequent inspections at CHP stations.
- ✓ District will enhance our outreach efforts by promoting our training classes and educating facilities on how to avoid violations.
- ✓ The District will further engage with the community to ensure residents and business owners understand how we can serve them.

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POTENTIAL METRICS TO TRACK PROGRESS FOR STEERING COMMUNITY TO CONSIDER:

Emission reductions due to plan (calculated or measured)
Number of public meetings
Amount of incentive dollars spent
Additional number of monitors / sensors implemented
Number of additional inspections (mobile and stationary)
Amount of reduction in health risk (acute, chronic, cancer)
Local economic impacts
Number of hospital visits

DISTRICT CONTACT INFORMATION:

San Diego County Air Pollution Control District
Robert Kard, Director/Air Pollution Control Officer
10124 Old Grove Road
San Diego, CA 92131
(858) 586-2600

Lead Contact: Jon Adams; Jon.adams@sdcounty.ca.gov; (858) 586-2653

District Subject Matter Experts:

Inspections and Public Complaints– Mahiany Luther, mahiany.luther@sdcounty.ca.gov

Air Quality Monitoring- Bill Brick, bill.brick@sdcounty.ca.gov

Incentives/Grants- Kathy Keehan, kathleen.keehan@scounty.ca.gov

Emission Inventory/BARCT/Permitting- jim.swaney@sdcounty.ca.gov

California Environmental Quality Act (CEQA)- paula.forbis@sdcounty.ca.gov

Note: Contact information will be updated upon any change

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APPENDIX 1

SAN DIEGO INTERNATIONAL BORDER COMMUNITY

STEERING COMMITTEE NOMINATION FORM AND BYLAWS

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SAN DIEGO INTERNATIONAL BORDER STEERING COMMITTEE NOMINATION FORM

NAME: _____

PHONE NUMBER: _____

EMAIL ADDRESS: _____

AFFILIATION: **Community Residents** _____ **Community Businesses / Workers** _____

Academia _____ **Power Supplier** _____ **Medical Expert:** _____ **SANDAG** _____

City of San Diego _____ **Other Agencies/Organizations** _____ **Tijuana Community** _____

Caltrans_____ **USEPA**_____

REQUEST IS FOR: PRIMARY MEMBER: _____ **Alternate:** _____ **(You can request both)**

INTEREST IN PARTICIPATION: What special knowledge, experience, or perspective can you provide?

_____

_____

_____

_____

_____

_____

Print Name: _____

Signature: _____

Date: _____

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GOALS OF STEERING COMMITTEE

The goals of the committee are straight forward. The committee is to hear updates on community air quality monitoring and emission reduction efforts and to provide suggestions to maximize results. The committee will hear concerns from the public and other stakeholders and alert appropriate parties so action, as warranted, can occur promptly.

COMMITTEE BYLAWS

1. The Air Pollution Control District (District) will select the members with deference given to suggestions by each of the interest groups in #2 below.
2. Community residents are those who reside in the census tracts selected for the identifying community and will make up a majority of the committee members.
3. Community Business / workers are those who work and/or own a business in the San Ysidro/Otay Mesa area as defined by the census tracts selected for identifying the community.
4. There may one alternate for each committee member.
5. Members will serve on a voluntary basis, without compensation, for a two-year term provided, however, that members may continue to serve until a successor has been appointed.
6. Members can be re-appointed.
7. The District or a District-hired facilitator will chair the meetings.
8. The District will open the meeting; approve the draft agenda and meeting notes by simple majority; adjust the order of agenda items to help facilitate meeting; and close the meeting.
9. Meetings will be held monthly or as deemed appropriate.
10. Members will notify the District and their alternate if they cannot make meeting.
11. Meetings will be open to the public.
12. The District or a District-hired facilitator will take minutes of the meeting.
13. The District or District-hired facilitator will send out a draft agenda and draft minutes from previous meeting at least 10 days prior to the meeting.
14. The District will accept agenda suggestions up to five days prior to the meeting.
15. The District will update the agenda if required at least three days prior to any meeting.
16. All meetings will have time set aside for public comment.
17. Public comment will be limited to three minutes per person.
18. All meetings will be at a time and location conducive for community involvement.
19. District staff will give an update on community monitoring and emission reductions at each meeting.
20. The bylaws will be reviewed and updated as needed on an annual basis

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APPENDIX 2

San Ysidro Community Air Study

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The following information is excerpted from the draft Final Report of the San Ysidro Community Air Study, funded by the California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment (OEHHA) to the University of Washington (Edmund Seto, PI, with community partner Casa Familiar and San Diego State University (https://oehha.ca.gov/calenviroscreen/general-info/san-ysidro-community-air-study).

(Report reference: *San Ysidro Community-Engaged Air Monitoring Study to Inform CalEnviroScreen.* Elena Austin, David Flores, Graeme Carvlin, Jeff Shirai, Vanessa Galaviz, Angelica Ruiz, Javier Emmanuel Castillo Quiñones, Zohir Chowdhury, Penelope JE Quintana, Edmund Seto. *Draft Final Report, January 2019.)*

Summary of San Ysidro Community Air Study:

Background: CalEnviroScreen (CES) is an environmental justice screening tool used within California that scores census tracts based on pollution burden and population vulnerability in order to identify disadvantaged communities for consideration for prioritization of funding opportunities under particular programs, including the Greenhouse Gas Reduction Fund (Office of Environmental Health Hazard Assessment (OEHHA), 2017). US-Mexico border communities face air pollution impacts from both sides of the border that may not be well represented in CES. To examine the issue, and to improve data along the US-Mexico border at San Ysidro, the California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment (OEHHA) contracted the University of Washington (UW) and its community partners to conduct a community-engaged air quality monitoring study.

Under the version 3.0 of CES, San Ysidro is classified as a disadvantaged community, with census tracts that fall within the highest 25% of census tracts within the state that are impacted by a combination of high levels of $PM_{2.5}$ air pollution, low educational attainment, high linguistic isolation, poverty, unemployment, and housing burden. Surrounded by freeways, and adjacent to the San Ysidro Port of Entry (POE) -- the largest land port of entry in North America -- the community is heavily impacted by the cumulative impacts of high roadway traffic. The San Ysidro census tract that is at the San Ysidro Port of Entry has the highest traffic levels in all of California.

Community engagement: For the San Ysidro study, a community-engaged process was developed, which developed partnerships and an organizational structure to conduct research and improve understanding of air quality concerns in the community. The project formed a Community Steering Committee (CSC) and Technical Advisory Group (TAG) that advised all aspects of the research. The research team worked with the community to assess and document environmental health knowledge and community needs. The CSC guided the selection of sites within the community for deployment of lower-cost community air monitors, as well as the design of a website where the public could access data in both English and Spanish. Hourly data can be requested through the website. The TAG worked with the research group to ensure that data collected from the monitors and data analyses were of high quality.

Air Monitoring: Fourteen lower-cost community air monitors were developed by the UW team, which included sensors for fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), nitric oxide (NO), nitrogen dioxide (NO_2), ozone (O_3), temperature, and relative humidity. A system was developed to transmit data from these monitors in the community via cellular network to data servers at the UW, where they could then be processed for QA/QC and displayed on the community website. All monitors were co-located in the field and calibrated against regulatory reference instruments in collaboration with the San Diego Air Pollution Control District. One year of data were collected by the community air monitors, in 2017, with additional data until May, 2018. In addition to the use of lower-cost community air monitors, the research team conducted snapshot campaigns that measured black carbon (BC) levels at select sites in San Ysidro to improve understanding of traffic-specific toxic pollutants.

Findings: The study found significant positive associations between border wait times at the San Ysidro Port of Entry and air pollutant levels at nearby sites. (See additional text Tables, and Figures, below).After integrating traffic data from Caltrans and emissions factors from the California Air Resources Board's EMFAC 2017, significant associations were observed between mobile source emissions along I-5 and I-805 sites leading to the POE, and near-roadway community air monitoring sites

for $PM_{2.5}$, CO, and NO_x. Comparing two sites downwind of the I-5 freeway, pollutant concentrations were higher for the site that was approximately 200 ft. of the freeway than the other site located 300 ft. farther. The diurnal patterns of traffic-related air pollutants generally matched those of hourly roadway traffic emissions and border wait times, peaking in the afternoon hours. (See additional text and Figures, below). Holidays were found to be significantly related to higher traffic flows and levels of traffic-related air pollution emissions.

Findings from the snapshot campaign found higher BC levels in the nighttime than the daytime, particularly in the Spring and Fall, but not in the Summer. More specific to sources than $PM_{2.5}$ generally, BC levels are often associated with heavy duty diesel traffic and illegal burning activities. Also, BC is typically associated with smaller sized and the more toxic components of PM, such as PAHs (World Health Organization (WHO), 2012). Interestingly, the campaign measured high Spring/Fall/Winter nighttime BC levels not only at sites near the POE, but also at the Tijuana Estuary Visitor's Center, which was considered one of the "background" sites for the study. EC/OC and $PM_{2.5}$ composition analyses of gravimetric samples also found relatively minor differences between the background site and a site in San Ysidro. These finding suggests that there important regional pollutant sources in the Baja border air basin, which is consistent with previous findings from CALMEX 2010 and other research studies (e.g., (Takahama et al., 2014)).

Potentially relevant to future iterations of CES, our study compared $PM_{2.5}$ levels in San Ysidro to those of the Donovan monitoring site. In the current version 3.0 CES, $PM_{2.5}$ is assumed to be 2.88% higher at San Ysidro compared to Donovan. However, the study observed from community air measurements that on average San Ysidro was 12% higher than at the Donovan site.

Implications: The study produced important lessons for future community air monitoring studies within California. The study demonstrated the potential for meaningful engagement with community to collect improved data that can be integrated into the community's CES score. Moreover, the study found considerable evidence from analysis of the air quality monitoring data that support the environmental justice concerns raised by San Ysidro community members, particularly around the issue of POE and traffic-related air quality impacts, as well as regional US-Mexico border shared air basin impacts.

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Selected further data from Austin et a., 2019 draft report: sections on A. diurnal air quality and B. patterns and impact of northbound passenger vehicle delays on air quality

(Report reference: *San Ysidro Community-Engaged Air Monitoring Study to Inform CalEnviroScreen.* Elena Austin, David Flores, Graeme Carvlin, Jeff Shirai, Vanessa Galaviz, Angelica Ruiz, Javier Emmanuel Castillo Quiñones, Zohir Chowdhury, Penelope JE Quintana, Edmund Seto. *Draft Final Report, Contract January 2019.)*

A. Diurnal Air Quality Patterns

In the San Ysidro Air Study, there was strong interest expressed by the community, both at general meetings and in discussions with the CSC, in characterizing diurnal patterns in air pollution concentrations at the different sites within the community. The following figures present diurnal patterns observed by season for each site in the study domain for PM2.5, CO, and NO (Figure 1-3). For this purpose, data from January 2018 - May 2018 is included to have a more complete representation of winter characteristics.

There is clear evidence of diurnal patterns in the data as well as important seasonal shifts. Generally, concentrations peak in the morning hours, probably related to early morning low boundary layer height coupled with increased traffic emissions. Seasonally concentrations in the Fall and Winter are higher and have more pronounced diurnal effects.

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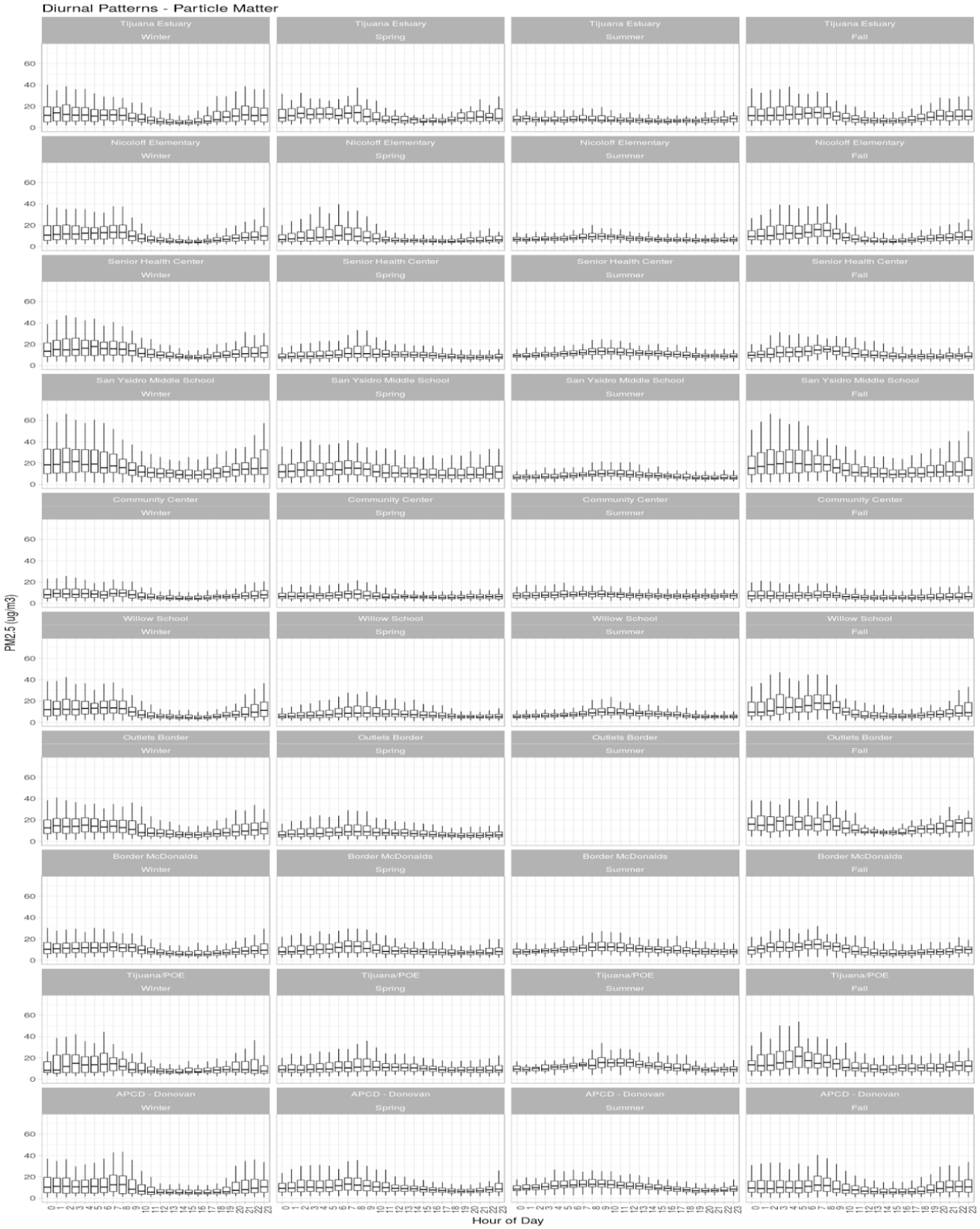

Figure 1. Diurnal Patterns of $PM_{2.5}$ by Season and Site.

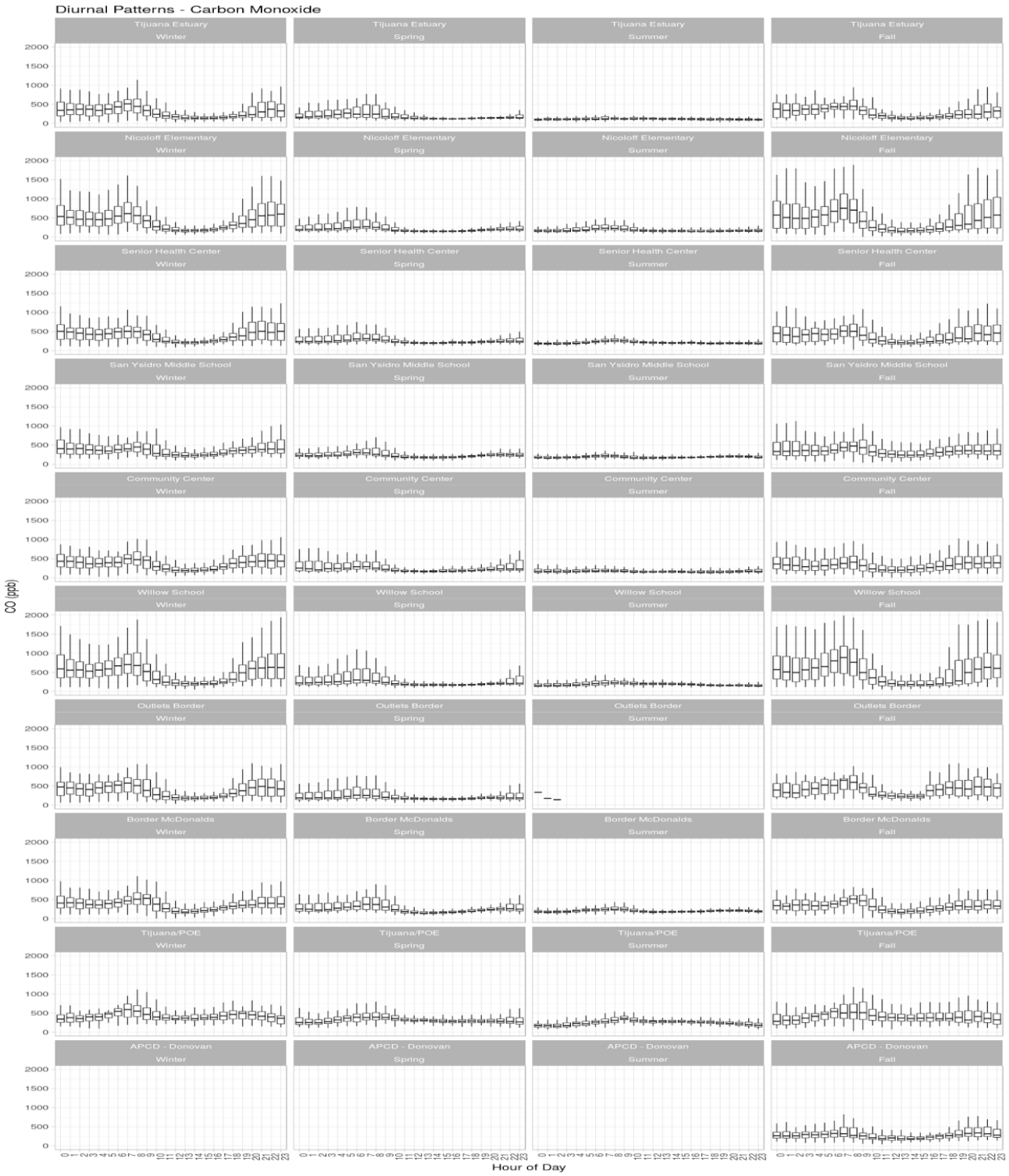

Figure2. Diurnal Patterns of CO by Season and Site.

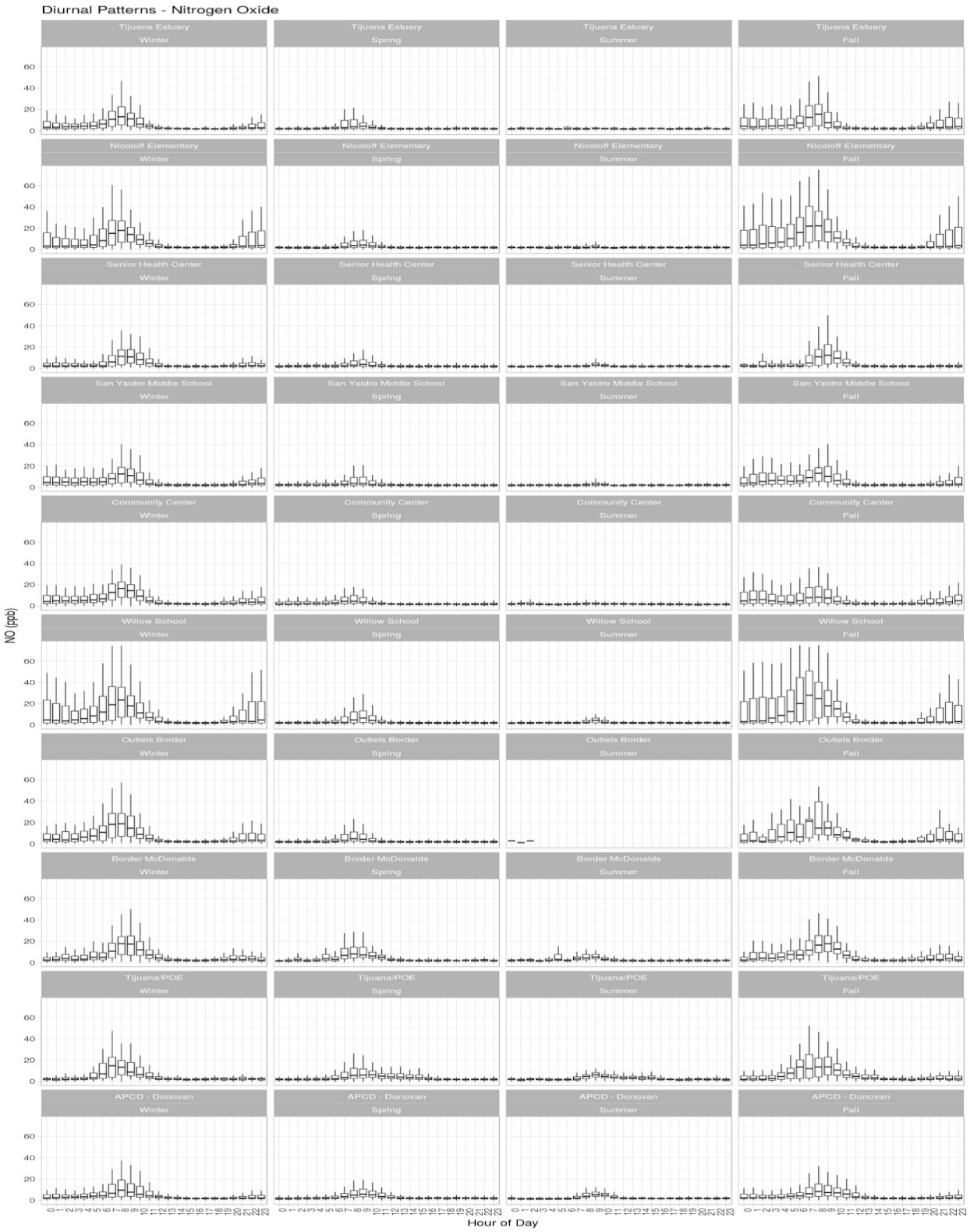

Figure3. Diurnal Patterns of NO by Season and Site.

B. Impact of Northbound Passenger Vehicle Delays on Air Quality

Using the data from the low cost UW sensors located in San Ysidro, A Generalized Linear Model was used to assess the impact of border wait times on $PM_{2.5}$ concentration at the different monitoring sites in the San Ysidro study. The border wait time was determined to be an important factor in the model by comparing the Bayesian information criterion (BIC) value of the models with and without this variable.

The form of the model used was as follows, with "s" in the model indicating applying a spline:

log([PM2.5]) = intercept + s(WaitTime, by=site) + s(dayofweek) + s(hourofday) + s(Temp)

The effect of the passenger delay was allowed to vary by monitoring location. **Table** shows the average effect of Passenger Vehicles Time for the various monitoring sites. The Estuary Site (considered a reference site in our study) shows no response to Vehicle Wait Time. The Port of Entry site (Tijuana side) shows the strongest effect. The model estimated that at the POE site, a 100-minute passenger vehicle wait time resulted in an average increase of $PM_{2.5}$ of 3.25 µg/m^3. Other sites showing a significant increase in $PM_{2.5}$ concentration associated with increased border wait times were the Senior Health Center (2.10 µg/m^3) and The FRONT Arte Cultura (2.10 µg/m^3). The reference site (Tijuana Estuary) showed a non-significant change in $PM_{2.5}$ of -0.06 µg/m^3. Results for all sites are presented in **Figure** .

Table 1. Increase in $PM_{2.5}$ associated with a 100-minute Northbound border delay for sites in our study after controlling for time trends by season, month and time of day.

Site	PM2.5 Increase (ug/m3)	Confidence Interval alpha = 95%	
Tijuana/POE	***3.25***	***1.22***	***5.28***
The FRONT Arte Cultura	***2.10***	***0.09***	***4.12***
Senior Health Center	***2.08***	***0.07***	***4.10***
Border McDonalds	1.75	-0.27	3.76
Willow School	1.66	-0.35	3.68
APCD - Donovan	1.33	-0.67	3.34
Community Center	1.31	-0.69	3.31
Outlets Border	1.10	-0.93	3.13
Nicoloff Elementary	0.89	-1.12	2.90
San Ysidro Middle School	0.54	-1.47	2.55
Tijuana Estuary	-0.06	-2.08	1.96

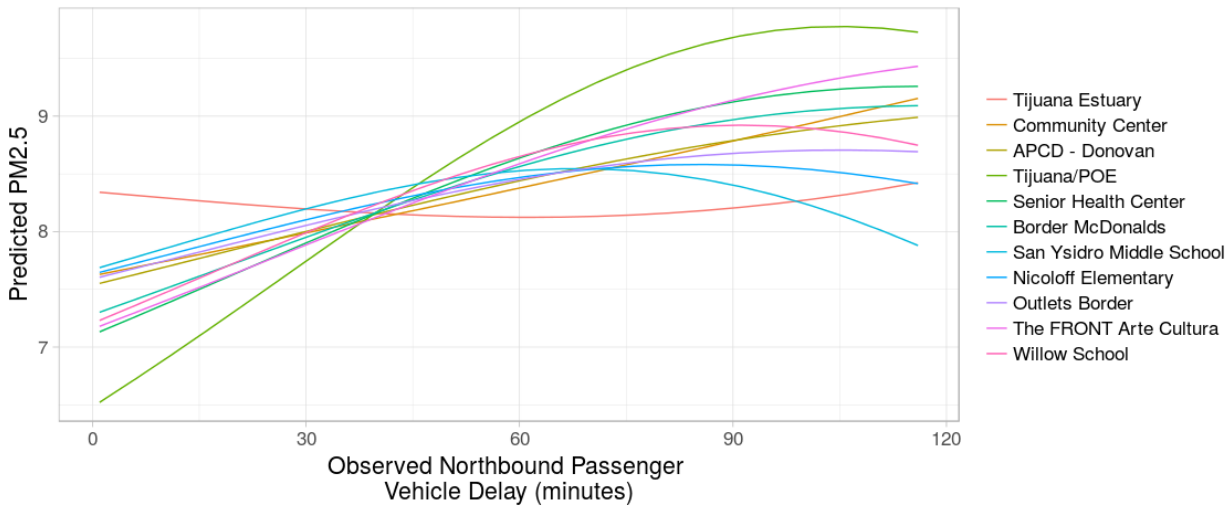

Figure 4. Modeled concentrations of $PM_{2.5}$ at various community sites based on border vehicle delay.

Similar analysis of the NO data finds that Northbound border delay is a significant factor for increased NO levels at the Tijuana POE with an increase for a 100-minute delay of 13.51 ppb and at the Senior Health Center and Border McDonalds of 4.79 and 4.17 ppb, respectively (**Table**). The Donovan APCD site also showed an increase in NO concentrations associated with SY border wait times.

Table 2. Increase in NO associated with a 100-minute Northbound border delay for sites in our study after controlling for time trends by season, month and time of day.

Site	NO Increase (ppb)	Confidence Interval alpha = 95%	
Tijuana/POE	13.51	9.31	11.41
APCD - Donovan	8.12	3.97	6.05
Senior Health Center	4.79	0.62	2.70
Border McDonalds	4.17	0.00	2.09
Outlets Border	4.08	-0.13	1.97
Tijuana Estuary	3.90	-0.27	1.81
Nicoloff Elementary	3.40	-0.75	1.32
The FRONT Arte Cultura	3.28	-0.89	1.20
San Ysidro Middle School	2.49	-1.66	0.42
Willow School	1.29	-2.87	-0.79
Community Center	0.53	-3.61	-1.54

Summary of Community Air Quality Measurements by Site

The following Tables present air quality summaries from the community air monitors for the year 2017 (Jan 1 2017 - Jan 1 2018) for $PM_{2.5}$ and NO concentrations, the pollutants that met data quality objectives.

The results for the CO concentration are also presented, though the study was not able to verify performance over the year, as the SDAPCD Donovan site does not have a CO monitor.

For the entire year of monitoring, the average concentrations are given at each site (Table 3). To produce this, hourly averages were calculated for hours that had 75% percent data completeness. Each season had to have a minimum of 50% of days to be included in the hourly average. The Outlets Border site did not meet this requirement and was not included in the table. The difference in concentrations reported at each site as compared to the measurement at Donovan, for $PM_{2.5}$ ranged approximately +/- 4 ug/m^3. By comparison, CES 3.0 estimates a 0.4 ug/m^3 increase for San Ysidro as compared to Donovan. Similar variations are shown in the table for average NO concentrations, ranging from 0 to 4 ppb higher at sites in San Ysidro than observed at Donovan. Variations by season for each pollutant are presented in Tables 5-7.

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Table 3. Summary of mean $PM_{2.5}$ and NO by site.

Site	PM2.5 (ug/m3)	Standard Deviation	Difference with Donovan	Concentration Measured at Donovan
San Ysidro Middle School	15.3	10.1	3.9	11.4
The FRONT Arte Cultura	13.2	5.5	1.8	
Tijuana Estuary	12.2	9.4	0.8	
Tijuana/POE	12.2	5.4	0.8	
Senior Health Center	11.7	4.2	0.3	
Nicoloff Elementary	11.7	8.5	0.3	
APCD - Donovan	11.3	5.3	-0.1	
Border McDonalds	10.3	3.8	-1.1	
Willow School	10.1	5.4	-1.3	
Community Center	7.7	3.1	-3.7	
Outlets Border				
Site	**NO (ppb)**	**Standard Deviation**	**Difference with Donovan**	**Concentration Measured at Donovan**
Willow School	7.8	5.8	4.0	1.8
Nicoloff Elementary	6.1	4.1	2.3	
Border McDonalds	5.2	2.3	0.5	
Tijuana/POE	4.9	2.7	0.9	
Community Center	4.5	2.2	0.4	
Tijuana Estuary	4.5	2.7	0.9	
San Ysidro Middle School	4.3	2.0	0.2	
APCD - Donovan	4.1	2.1	0.3	
Senior Health Center	3.6	1.8	0.0	
The FRONT Arte Cultura	3.5	1.8	0.0	
Outlets Border				

Table 4. Summary of $PM_{2.5}$ for all sites monitored in 2017, by season.

WINTER PM2.5 (µg/m3)							
Sites	LATITUDE	LONGITUDE	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	32.54	-117.03					
Community Center	32.55	-117.05	1775	8.8	6.6	6.8	6.6
APCD - Donovan	32.58	-116.92	1333	11.3	10.0	7.4	10.6
Tijuana Estuary	32.57	-117.13	1158	13.7	11.6	10.3	11.2
The FRONT Arte Cultura	32.55	-117.05	48	21.6	7.3	21.6	11.3
Senior Health Center	32.57	-117.06	1375	14.8	9.8	11.6	10.6
Community Residence	32.56	-117.05	738	13.0	7.5	10.6	9.4
Border McDonalds	32.54	-117.03	1775	12.1	8.3	9.7	9.5
San Ysidro Middle School	32.56	-117.04	1048	11.1	10.8	7.5	9.0
Nicoloff Elementary	32.57	-117.07	1775	9.9	7.6	7.5	7.9
Outlets Border	32.54	-117.04	1775	16.3	11.6	13.0	13.6
Willow School	32.55	-117.04	1375	12.3	12.1	8.3	10.5
SPRING PM2.5 (µg/m3)							
	LATITUDE	LONGITUDE	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	32.54	-117.03	1334	12.0	9.5	9.6	7.1
Community Center	32.55	-117.05	2184	7.4	4.3	6.5	4.5
APCD - Donovan	32.58	-116.92	2399	11.3	9.1	8.8	7.2
Tijuana Estuary	32.57	-117.13	456	12.2	9.5	9.5	10.2
The FRONT Arte Cultura	32.55	-117.05	1881	11.5	6.6	9.8	6.7
Senior Health Center	32.57	-117.06	1943	11.6	6.7	10.0	6.0
Community Residence	32.56	-117.05					
Border McDonalds	32.54	-117.03	1943	10.3	6.5	8.6	7.2
San Ysidro Middle School	32.56	-117.04	2184	8.9	6.6	7.3	5.8
Nicoloff Elementary	32.57	-117.07	1943	7.4	5.5	6.0	4.3
Outlets Border	32.54	-117.04	2084	11.2	6.5	9.5	6.4
Willow School	32.55	-117.04	2184	8.7	8.1	6.3	5.6
SUMMER PM2.5 (µg/m3)							
	LATITUDE	LONGITUDE	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	32.54	-117.03	2016	15.2	9.1	13.1	7.8
Community Center	32.55	-117.05	1971	8.2	3.8	7.6	4.3
APCD - Donovan	32.58	-116.92	2049	11.2	5.6	10.0	5.8
Tijuana Estuary	32.57	-117.13	936	7.9	4.3	6.8	4.4
The FRONT Arte Cultura	32.55	-117.05	2207	13.1	6.2	11.8	6.4
Senior Health Center	32.57	-117.06	2208	11.4	4.4	10.5	4.9
Community Residence							
Border McDonalds	32.54	-117.03	2208	10.7	5.1	9.6	5.8
San Ysidro Middle School	32.56	-117.04	1740	9.6	10.9	7.7	4.8
Nicoloff Elementary	32.57	-117.07	2200	7.9	4.5	7.0	3.9
Outlets Border							
Willow School	32.55	-117.04	2208	7.8	4.1	6.8	4.3
FALL PM2.5 (µg/m3)							
	LATITUDE	LONGITUDE	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	32.54	-117.03	2550	20.3	19.0	14.8	15.8
Community Center	32.55	-117.05	2479	7.9	6.7	5.9	5.0
APCD - Donovan	32.58	-116.92	2544	12.1	9.2	9.6	9.8
Tijuana Estuary	32.57	-117.13	2554	11.3	9.7	8.5	7.9
The FRONT Arte Cultura	32.55	-117.05	2590	18.5	15.6	13.3	14.5
Senior Health Center	32.57	-117.06	2334	13.1	8.3	10.8	8.1
Community Residence							
Border McDonalds	32.54	-117.03	2545	13.2	9.1	10.6	10.6
San Ysidro Middle School	32.56	-117.04	2357	21.7	16.4	16.9	16.4
Nicoloff Elementary	32.57	-117.07	2530	12.3	10.4	8.9	9.0
Outlets Border							
Willow School	32.55	-117.04	2374	12.9	12.9	8.8	9.7

Table 5 Summary of NO for all sites monitored in 2017, by season.

WINTER NO (ppb)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE					
Community Center	1775	8.5	10.7	3.9	8.3
APCD - Donovan	1333	4.2	5.6	2.3	2.5
Tijuana Estuary	1158	5.0	7.2	2.2	2.6
The FRONT Arte Cultura	48	14.9	16.6	6.5	19.6
Senior Health Center	1375	6.4	8.3	2.7	5.7
Community Residence	738	8.2	9.3	4.3	9.2
Border McDonalds	1775	9.5	11.7	4.2	10.0
San Ysidro Middle Scho	1048	5.1	7.0	2.4	2.7
Nicoloff Elementary	1775	7.2	9.8	2.7	6.9
Outlets Border	1775	12.7	17.8	3.6	15.1
Willow School	1375	9.9	13.1	3.5	11.3
SPRING NO (ppb)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	1838	5.1	5.4	3.3	4.0
Community Center	2184	3.2	3.6	20.1	1.1
APCD - Donovan	2399	4.0	5.2	2.3	2.0
Tijuana Estuary	1501	2.8	3.2	1.9	1.0
The FRONT Arte Cultura	1881	3.6	5.2	2.2	1.1
Senior Health Center	1943	2.7	2.8	2.0	1.0
Community Residence					
Border McDonalds	1943	4.3	5.9	2.4	2.1
San Ysidro Middle Scho	2184	2.8	3.2	1.0	1.0
Nicoloff Elementary	1943	2.7	3.2	1.9	1.0
Outlets Border	2084	3.5	5.5	2.1	1.0
Willow School	2184	3.6	5.2	2.1	1.1
SUMMER NO (ppb)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	2016	3.1	3.7	2.3	1.7
Community Center	2024	2.3	2.6	1.8	1.4
APCD - Donovan	2049	2.6	2.5	2.0	1.6
Tijuana Estuary	1093	2.0	1.0	1.9	1.1
The FRONT Arte Cultura	2207	2.3	3.0	2.0	1.2
Senior Health Center	2208	2.4	2.4	2.0	1.3
Community Residence					
Border McDonalds	2208	3.1	3.9	2.2	1.7
San Ysidro Middle Scho	1891	2.1	1.4	2.0	1.2
Nicoloff Elementary	2208	2.1	2.2	1.9	1.2
Outlets Border					
Willow School	2208	2.4	2.9	2.0	1.3
FALL NO (ppb)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	2550	13.1	19.5	5.7	12.9
Community Center	2480	12.2	17.2	4.4	12.9
APCD - Donovan	2544	5.6	6.4	3.1	5.2
Tijuana Estuary	2584	8.3	12.4	2.7	7.3
The FRONT Arte Cultura	2590	14.3	22.4	3.1	15.3
Senior Health Center	2334	8.5	12.7	2.8	7.8
Community Residence					
Border McDonalds	2545	12.8	18.0	5.3	13.3
San Ysidro Middle Scho	2358	7.7	10.8	3.1	7.1
Nicoloff Elementary	2554	11.9	16.3	3.8	14.5
Outlets Border					
Willow School	2374	14.7	21.9	3.4	17.3

Table 6. Summary of CO for all sites monitored in 2017, by season.

WINTER CO (ppm)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE					
Community Center	1775	0.43	0.27	0.35	0.37
APCD - Donovan					
Tijuana Estuary	1158	0.32	0.22	0.24	0.27
The FRONT Arte Cultura	48	0.67	0.32	0.63	0.53
Senior Health Center	1375	0.43	0.26	0.33	0.35
Community Residence	738	0.43	0.25	0.36	0.39
Border McDonalds	1775	0.45	0.29	0.38	0.40
San Ysidro Middle School	1048	0.35	0.19	0.30	0.22
Nicoloff Elementary	1775	0.42	0.29	0.32	0.39
Outlets Border	1775	0.50	0.35	0.38	0.47
Willow School	1375	0.50	0.32	0.39	0.45
SPRING CO (ppm)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	1838	0.37	0.20	0.33	0.17
Community Center	2184	0.26	0.14	0.21	0.13
APCD - Donovan					
Tijuana Estuary	1501	0.20	0.13	0.15	0.09
The FRONT Arte Cultura	1881	0.26	0.17	0.20	0.11
Senior Health Center	1943	0.27	0.14	0.22	0.09
Community Residence					
Border McDonalds	1943	0.29	0.18	0.22	0.17
San Ysidro Middle School	2184	0.24	0.11	0.21	0.10
Nicoloff Elementary	1943	0.24	0.15	0.18	0.10
Outlets Border	2084	0.26	0.17	0.19	0.12
Willow School	2184	0.27	0.18	0.19	0.13
SUMMER CO (ppm)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	2016	0.31	0.14	0.29	0.12
Community Center	2024	0.19	0.09	0.17	0.07
APCD - Donovan					
Tijuana Estuary	969	0.01	0.25	0.10	0.05
The FRONT Arte Cultura	2206	0.20	0.10	0.18	0.06
Senior Health Center	2208	0.22	0.09	0.21	0.06
Community Residence					
Border McDonalds	2208	0.22	0.10	0.20	0.06
San Ysidro Middle School	1891	0.20	0.06	0.19	0.05
Nicoloff Elementary	2208	0.19	0.10	0.17	0.07
Outlets Border	1	0.17	NA	0.17	0.00
Willow School	2208	0.20	0.10	0.18	0.07
SUMMER CO (ppm)					
	N	MEAN	SD	MEDIAN	IQR
Tijuana/POE	2550	0.62	0.42	0.51	0.41
Community Center	2479	0.47	0.36	0.35	0.45
APCD - Donovan					
Tijuana Estuary	2476	-0.53	0.06	-0.55	0.03
The FRONT Arte Cultura	2589	0.55	0.45	0.39	0.56
Senior Health Center	2334	0.49	0.34	0.37	0.45
Community Residence					
Border McDonalds	2545	0.49	0.40	0.36	0.44
San Ysidro Middle School	2358	0.42	0.25	0.36	0.28
Nicoloff Elementary	2554	0.49	0.39	0.35	0.53
Outlets Border					
Willow School	2374	0.54	0.45	0.39	0.59

References:

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