

# Developing a community air monitoring network to assess the impact of refinery emissions

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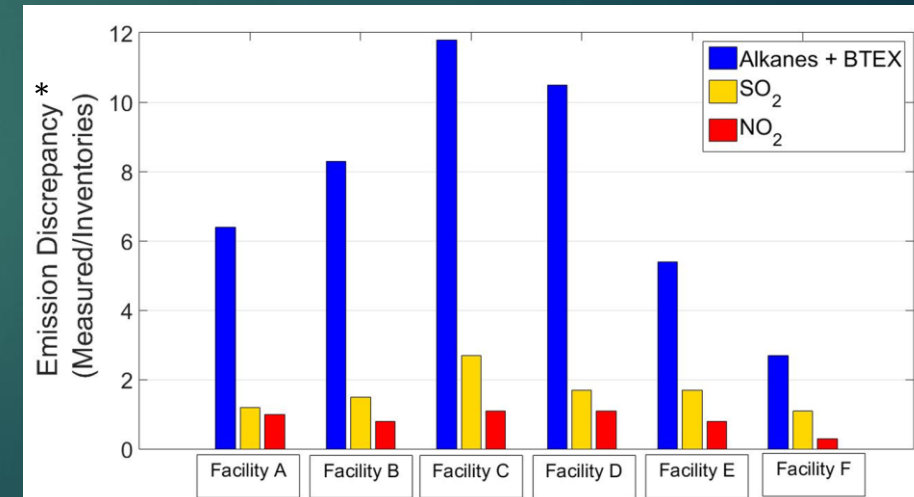


# Background

- ▶ Community air quality concerns about flaring, leaks, and overall refinery activities
- ▶ In 2015, U.S. EPA adopted 40 CFR 63.658 requiring fenceline air monitoring at petroleum refineries for benzene using passive samplers
- ▶ AB 1647 requires fenceline and community air monitoring systems to be installed on and near petroleum refineries
- ▶ South Coast AQMD developed Rule 1180



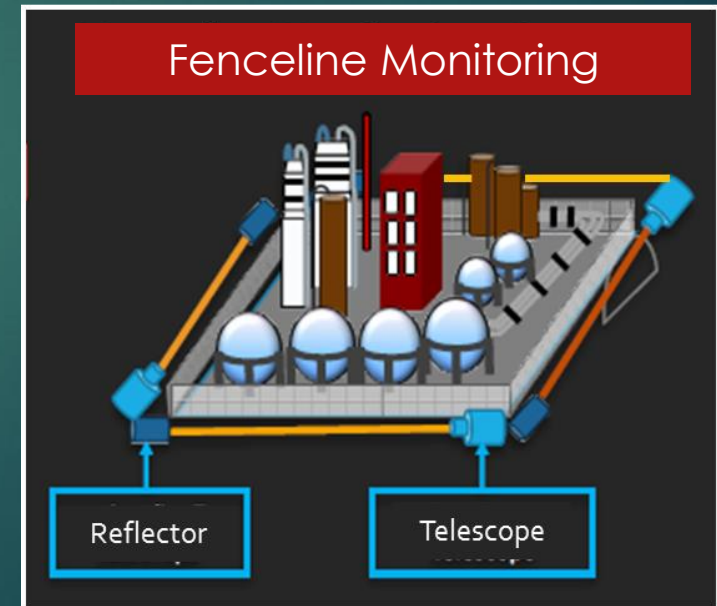
Refineries in the South Coast Air Basin, September 2015



\*Median measured emissions (September 2015) / Reported annual emissions for 2015 divided by 12

# South Coast AQMD Rule 1180

- ▶ Rule 1180 adopted in December 2017
- ▶ Fenceline monitoring by refineries
  - ▶ South Coast AQMD approves refinery plans
- ▶ Community air monitoring stations
  - ▶ Operated by South Coast AQMD
- ▶ Refinery fenceline and community air monitoring to continue indefinitely



# Rule 1180 Refineries

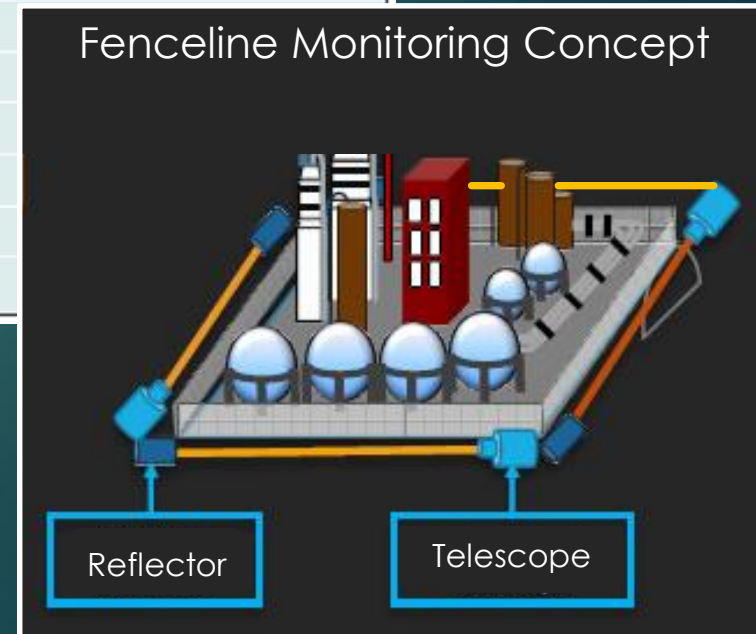
Applies to all petroleum refineries in the Basin with throughput capacity over 40,000 barrels per day of crude oil



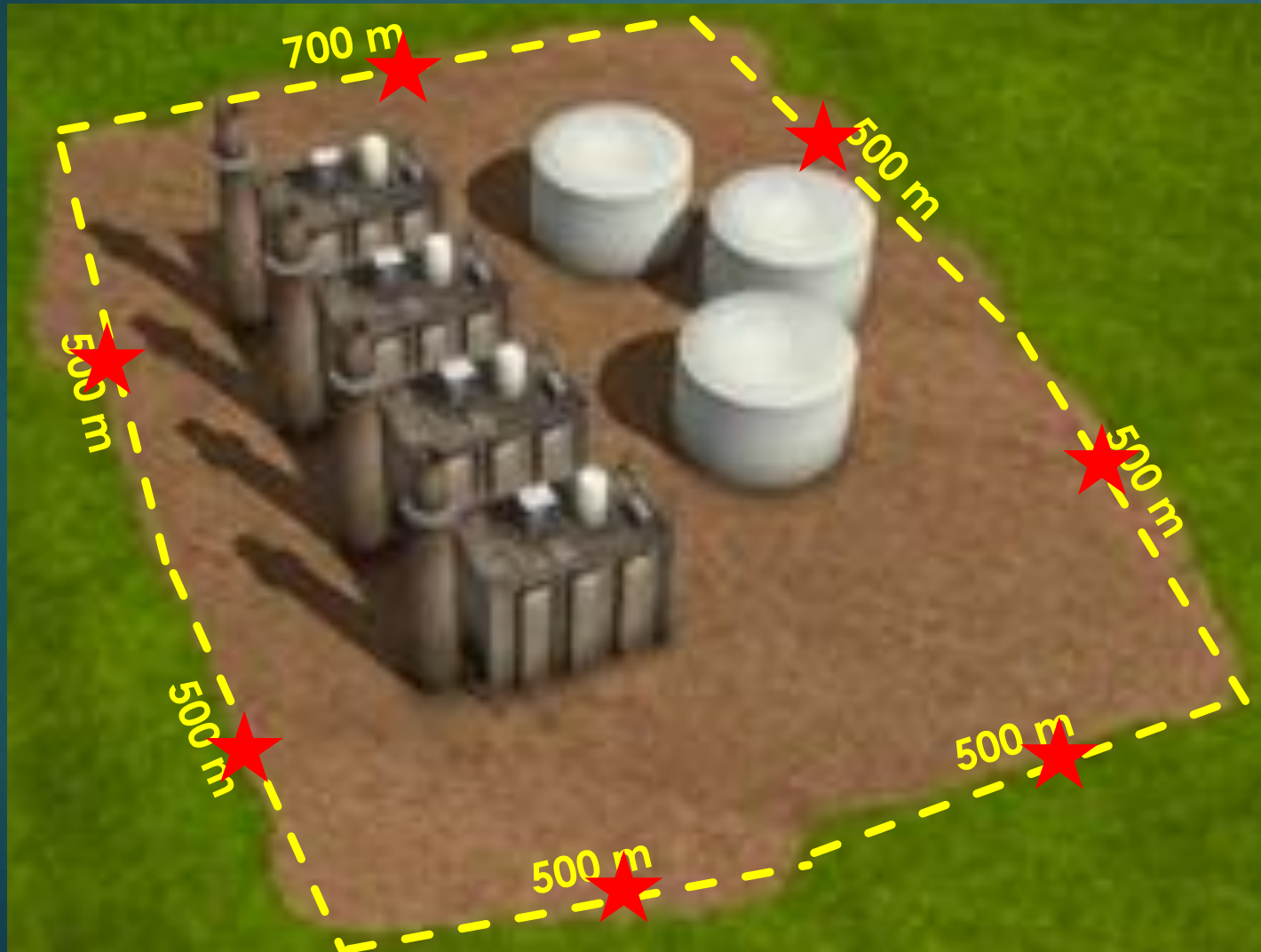
# Fenceline Air Monitoring

- ▶ Conducted by the refineries
- ▶ Guidelines:
  - ▶ Continuous air quality information (5-min averages)
  - ▶ Data will be shared with the public in real-time via dedicated websites
- ▶ NOTE: Not intended for emergency notification
  - ▶ It may provide additional useful information for emergency situations

Criteria Air Pollutants
Sulfur Dioxide
Nitrogen Oxides
Volatile Organic Compounds
Total VOCs (Non-Methane Hydrocarbons)
Formaldehyde
Acetaldehyde
Acrolein
1,3-Butadiene
Styrene
BTEX Compounds (Benzene, Toluene, Ethylbenzene, Xylenes)
Other Compounds
Hydrogen Sulfide
Carbonyl Sulfide
Ammonia
Black Carbon
Hydrogen Cyanide
Hydrogen Fluoride*



# Fenceline Air Monitoring



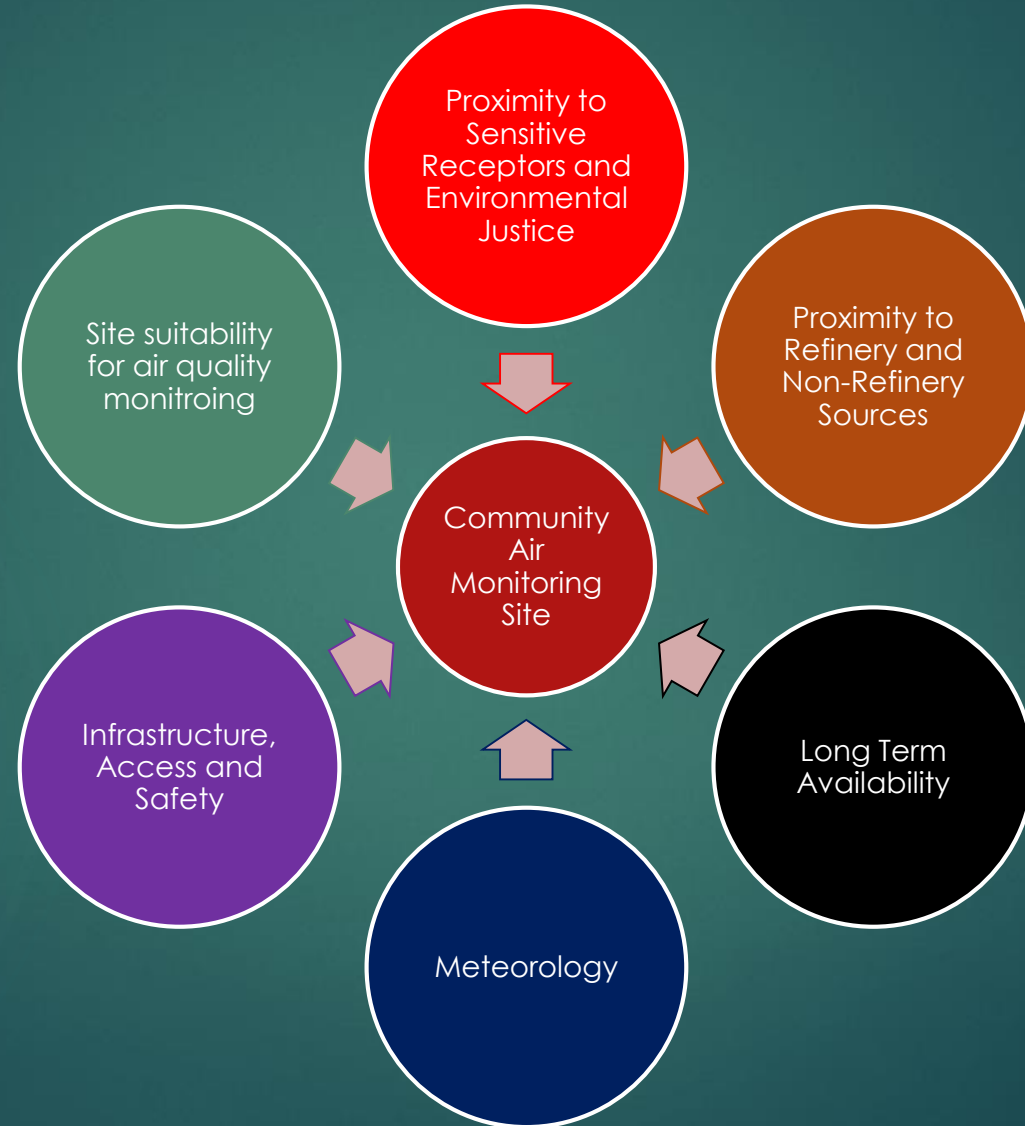
- ▶ Adequate fenceline coverage
  - ▶ Open path technology
  - ▶ Point monitors
- ▶ Maintain good detection capabilities
  - ▶ UV-DOAS; FTIR; H<sub>2</sub>S and BC point monitors
- ▶ Maintain appropriate pathlength

# Community Air Monitoring

- ▶ Network of 10 air monitoring stations in communities neighboring seven major refineries
- ▶ Conducted by the South Coast AQMD
- ▶ Continuous air quality information
- ▶ Data will be shared with the public in near real-time via dedicated website
- ▶ Public education

Refinery	Number of Stations
Marathon, Carson	3
Marathon Wilmington	
Torrance Refining Company	2
Chevron El Segundo	2
Phillips 66 Carson	2
Phillips 66 Wilmington	
Valero Wilmington	1

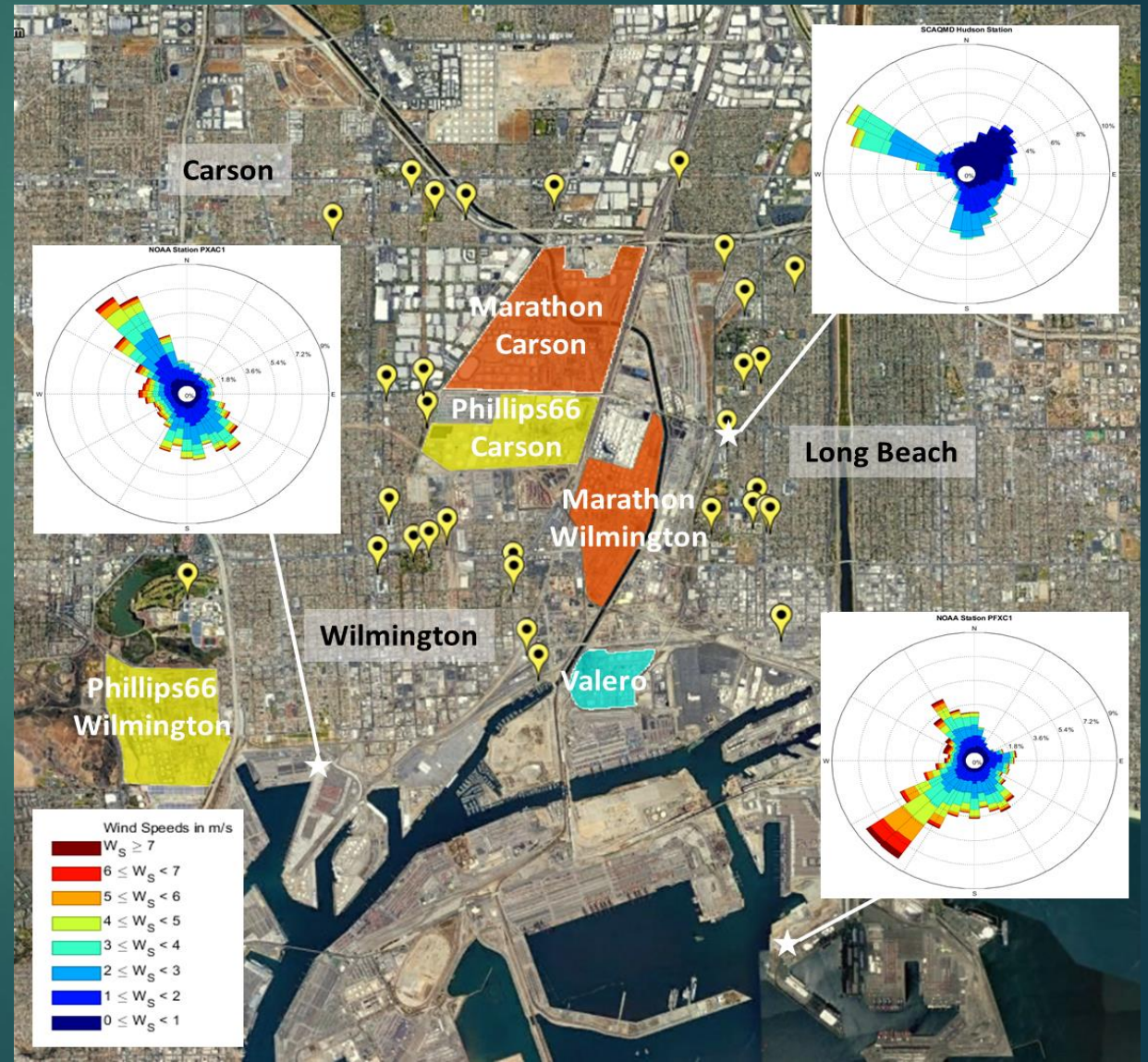
# Community Site Selection





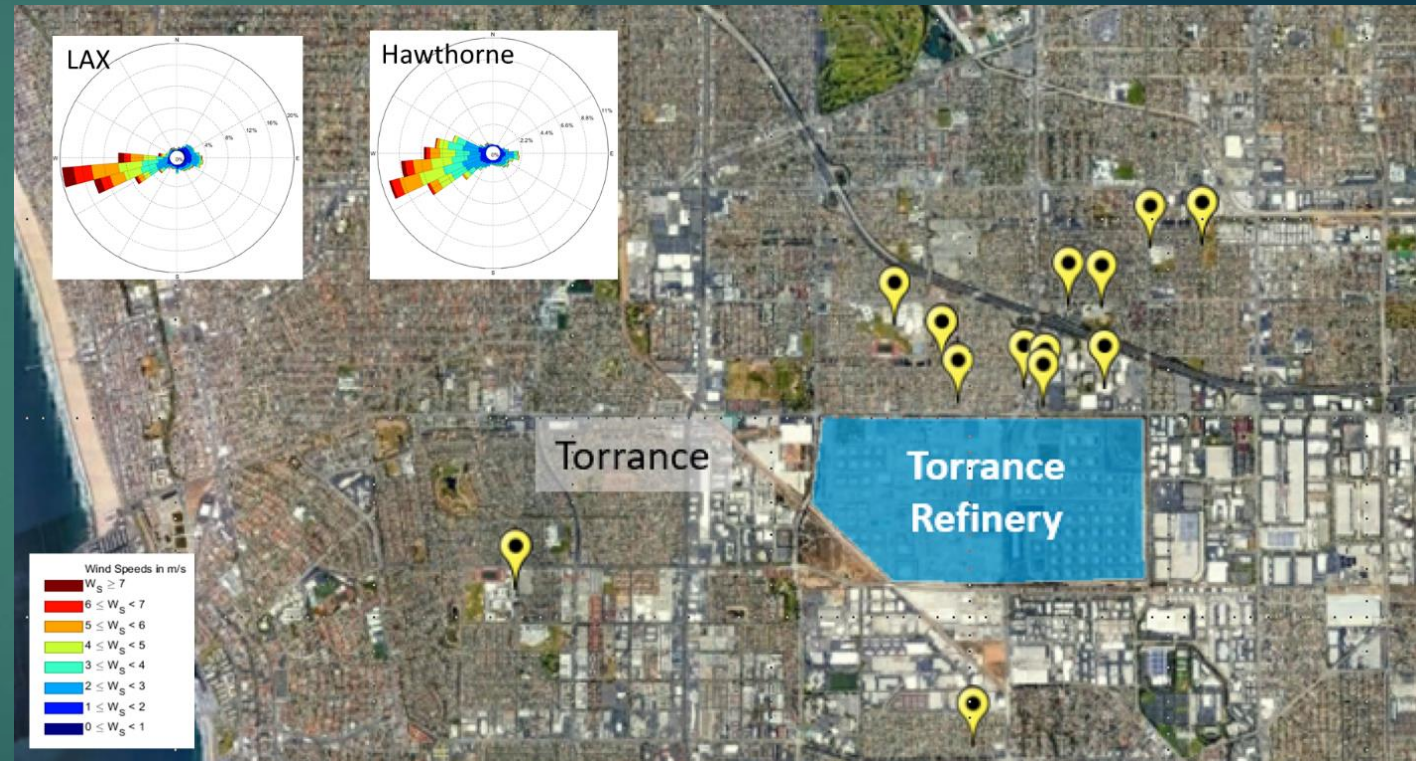
# Community Site selection (Carson, Wilmington, Long Beach)

- ▶ 5 refineries
  - ▶ Marathon Carson and Wilmington
  - ▶ Phillips 66 Carson and Wilmington
  - ▶ Valero Wilmington
- ▶ Communities of Carson, Wilmington, Long Beach
- ▶ Complex wind patterns
- ▶ Evaluated approximately 30 potential sites



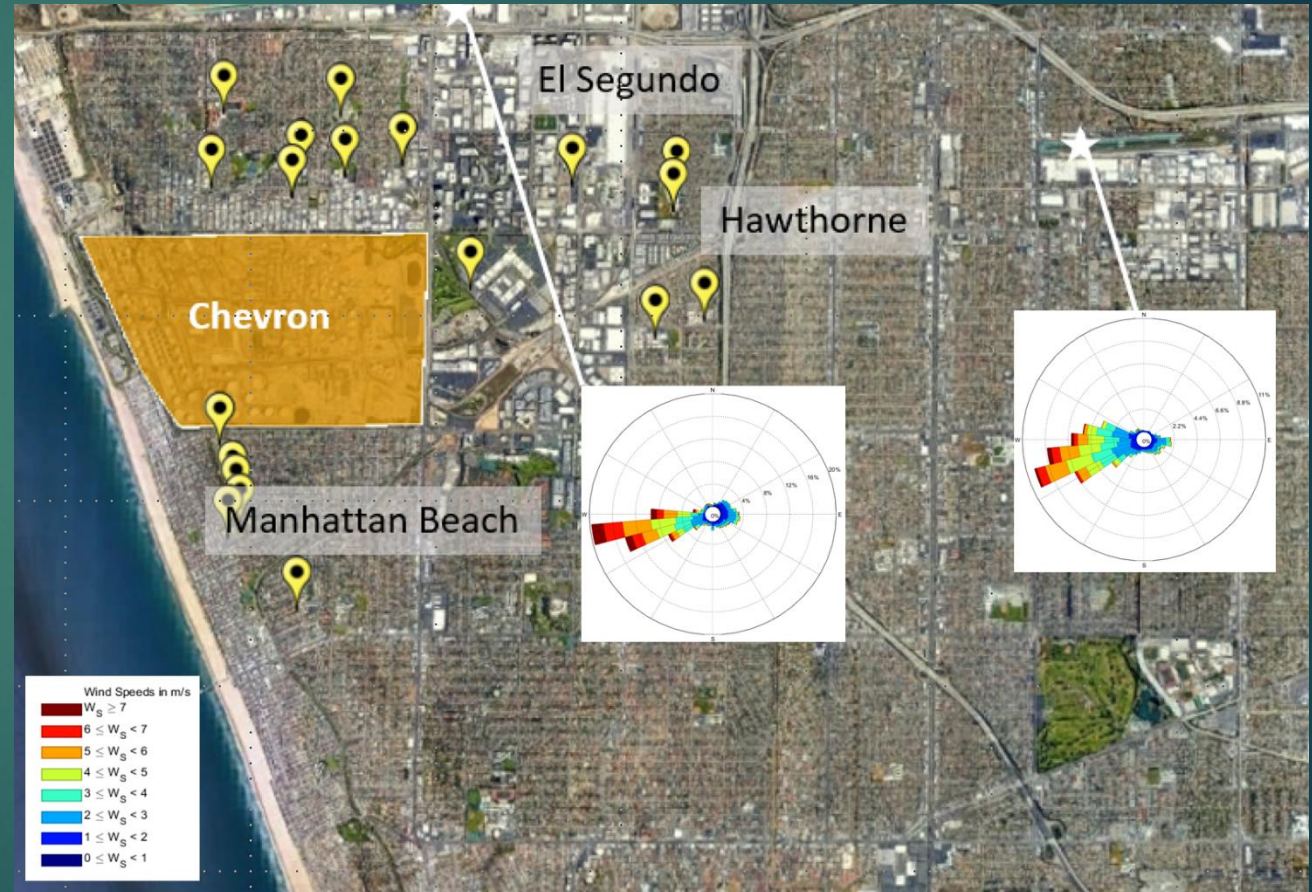
# Community Site selection (Torrance Refinery)

- ▶ Torrance refinery
- ▶ Torrance Community
- ▶ Consistent wind patterns
  - ▶ Dominated by coastal sea breeze from southwest
- ▶ Evaluated 13 potential sites



# Community Site selection (Chevron El Segundo Refinery)

- ▶ Chevron refinery
- ▶ Communities of El Segundo, Manhattan Beach, Hawthorne, Del Aire.
- ▶ Consistent wind patterns
  - ▶ Dominated by coastal sea breeze from southwest
- ▶ Evaluated 19 potential sites



# Air Monitoring Equipment Selection



# Community Air Monitoring Instrumentation

- ▶ White cell multi-pollutant analyzers – time resolution ~5 min
  - ▶ UV-DOAS – BTEX, SO<sub>2</sub>, HCHO
  - ▶ FTIR - 1,3-butadiene, acetaldehyde, acrolein, NH<sub>3</sub>, HCN, total VOC's
- ▶ Automated mini GC – time resolution ~1 hr
  - ▶ Very sensitive 0.1 ppb detection limit for VOC's including BTEX
- ▶ Chemiluminescence/Pulsed fluorescence – time resolution 5 min
  - ▶ H<sub>2</sub>S
- ▶ Off-axis integrated cavity output spectroscopy (OA-ICOS)
  - ▶ HF and H<sub>2</sub>S (for refineries with HF)
- ▶ Aethelometer
  - ▶ Black carbon (BC)
- ▶ Meteorology station



# Community Air Monitoring Timeline

Community meetings to collect public feedback on Refinery Community Monitoring

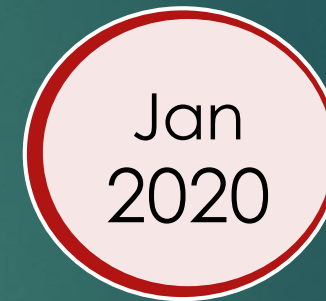


Draft Community Air Monitoring Plan

Public Meeting to collect feedback

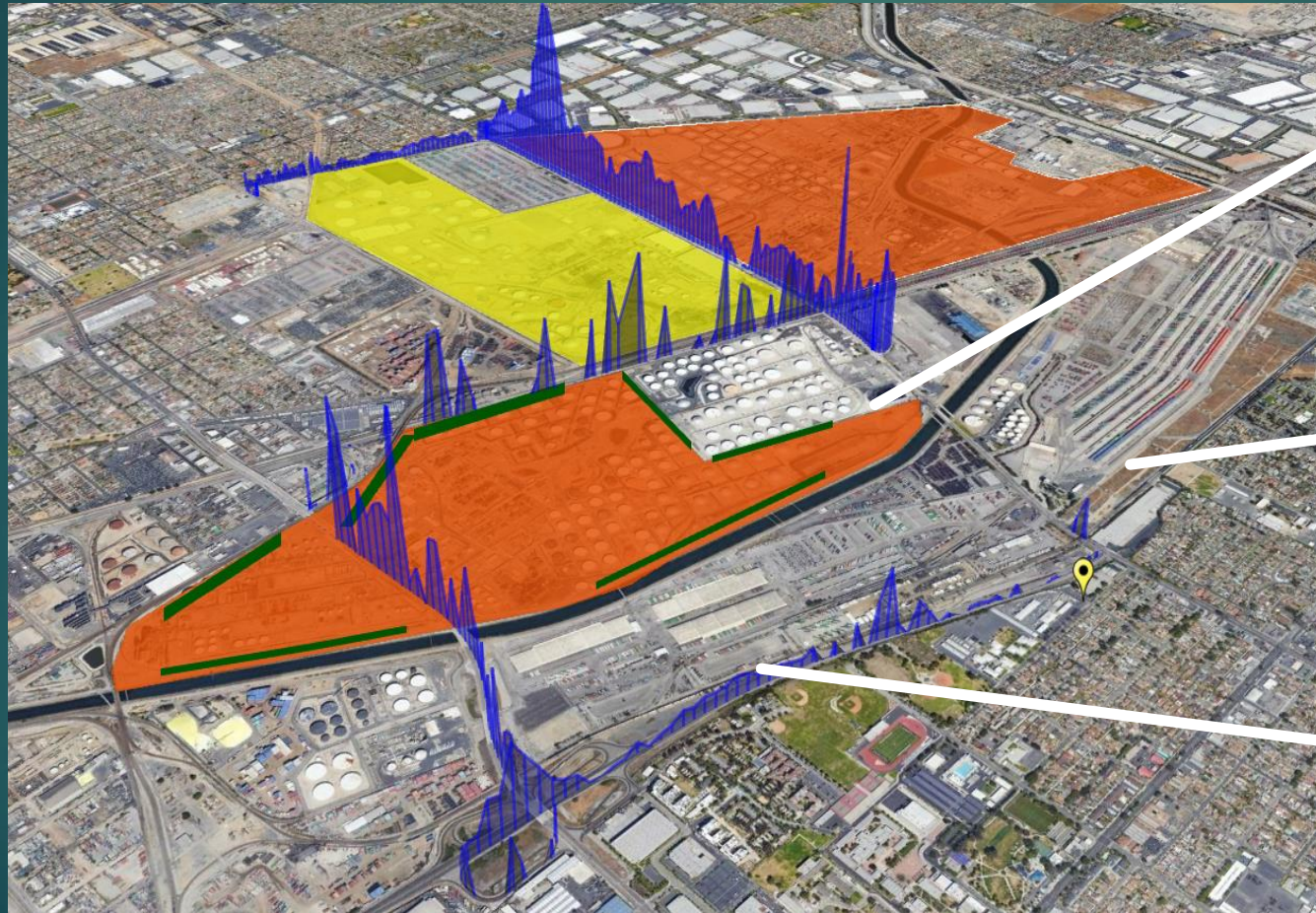


Community air monitoring begins



Set-up of Rule 1180 community air monitoring network

# Linking Fenceline and Community air Monitoring



# Summary

- ▶ Rule 1180 will establish
  - ▶ Fenceline air monitoring at seven major refineries
  - ▶ Community monitoring network in communities near refineries
- ▶ Understand the impact of refinery emissions on air quality in communities
- ▶ Display air quality data to the public in near real time via a user friendly website
  - ▶ Including notifications based on well established health-based standards (NAAQS; CAAQS; OEHHA)
- ▶ Educational material to better understand / interpret the collected fenceline and community data



# Thank You

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<https://www.aqmd.gov/home/rules-compliance/rules/support-documents/rule-1180-refinery-fenceline-monitoring-plans>

