



**CITY OF HOUSTON
Houston Health Department**

Bureau of Pollution Control and Prevention

Ambient Air Sample Collected 2906 Lavender St. Houston, TX 77026

on April 26th-28th, 2021

By Peter Chen (Chemist IV) and Youjun Qin (Chemist IV)

**Mobile Ambient Air Monitoring Laboratory
(MAAML)
After Action Report
AMBIENT AIR ANALYSIS**



**HOUSTON HEALTH
DEPARTMENT**

Table of Contents

I.	Purpose of Deployment	3
II.	Definitions	3
III.	Preparation/Set-up	3
IV.	Summary Table and Comments	4
V.	Analytical Results.....	5

I. Purpose of Deployment:

Bureau of Pollution Control and Prevention staff collected ambient air data in the vicinity of the Union Pacific Railroad contamination site in response to requests from the community.

II. Definitions:

MAAML - Mobile Ambient Air Monitoring Laboratory

VOCs - Volatile Organic Compounds

GC/MS - Gas Chromatograph/Mass Spectrometer

O₃ - Ozone

NO₂ - Nitrogen dioxide

µg/m³ - Microgram(s) per cubic meter

EPA - Environmental Protection Agency

NAAQS - National Ambient Air Quality Standards

ppb - Part(s) per billion by volume

TCEQ - Texas Commission on Environmental Quality

ESL - Effects Screening Level

PM - Particulate matter

PM_{2.5} - Particulate matter 2.5 microns or smaller

PM₁₀ - Particulate matter 10 microns or smaller

ND - non-detectable

III. Preparation/Set-up:

Mobile laboratory project chemists deployed the MAAML at Lavender St. to monitor for VOCs by GC/MS, PM using a GRIMM Technologies PM monitor and O₃ and NO₂ using gas-specific analyzers.

IV. Summary Table and Comments:

The ambient air was monitored at the same location, close to Liberty and Lavender St. intersection, from April 26-28, 2021. Shown below in Table 1 are the results of the analysis.

Collection date	Apr 26,2021	Apr 27,2021	Apr 28,2021
Sampling collection time	800 ~1500 CST (7-hour)	900 to 1500 (6-hour)	900 to 1500 (6-hour)
Sampling location	29.788042°, -95.320237° Close to Liberty and Lavender St. Intersection	29.788042°, -95.320237° Close to Liberty and Lavender St. Intersection	29.788042°, -95.320237° Close to Liberty and Lavender St. Intersection
Wind direction	Southeast	Southeast	Southeast
Wind speed	6.6 to 9.5 mph	6.8 to 8.1 mph	12.1 to 13.6 mph
Field observations	No evident odors or plumes	No evident odors or plumes	No evident odors or plumes
Analytical results Detected VOCs	1,3-Butadiene 0.0~0.4 ppb TCEQ ESL long term: 4.5 ppb Benzene 0.1~0.3 ppb TCEQ ESL long term: 1.4 ppb	1,3-Butadiene ND TCEQ ESL long term: 4.5 ppb Benzene 0.1~0.2 ppb TCEQ ESL long term: 1.4 ppb Ethanol estimated 6.0~82.6 ppb TCEQ ESL long term: 1000 ppb	1,3-Butadiene ND TCEQ ESL long term: 4.5 ppb Benzene 0.1~0.2 ppb TCEQ ESL long term: 1.4 ppb Carbon Disulfide 0.0~0.4 ppb TCEQ ESL long term: 1 ppb
PM _{2.5}	Range: 2.0~4.6 µg/m ³ Average: 3.2 µg/m ³ EPA NAAQS 24-hour standard: 35 µg/m ³	Range: 6.4~9.4 µg/m ³ Average: 7.8 µg/m ³ EPA NAAQS 24-hour standard: 35 µg/m ³	Range: 6.2~13.3 µg/m ³ Average: 8.8 µg/m ³ EPA NAAQS 24-hour standard: 35 µg/m ³
PM ₁₀	Range: 2.4~14.0 µg/m ³ Average: 5.0 µg/m ³ EPA NAAQS 24-hour standard: 150 µg/m ³	Range: 6.4~9.7 µg/m ³ Average: 7.9 µg/m ³ EPA NAAQS 24-hour standard: 150 µg/m ³	Range: 7.1~13.8 µg/m ³ Average: 9.8 µg/m ³ EPA NAAQS 24-hour standard: 150 µg/m ³
O ₃	Range: 23.5~65.6 ppb Average: 54.7 ppb EPA NAAQS 8h standard: 75 ppb	Range: 11.5~25.2 ppb Average: 20.2 ppb EPA NAAQS 8h standard: 75 ppb	Range: 16.4~32.2 ppb Average: 27.1 ppb EPA NAAQS 8h standard: 75 ppb
NO ₂	Range: 11.5~29.0 ppb Average: 18.2 ppb EPA NAAQS 1h standard: 100 ppb	Range: 6.0~18.1 ppb Average: 10.7 ppb EPA NAAQS 1h standard: 100 ppb	Range: 3.7~11.2 ppb Average: 6.7 ppb EPA NAAQS 1h standard: 100 ppb

Table 1 Summary of Ambient Air Monitoring Results

V. Analytical Results:

Monitoring ran from 800 to 1500 CST on **April 26, 2021**, using MAAML instrumentation to monitor VOCs, PM, O₃, and NO₂ with prevailing southeasterly winds at speeds from 6.6 to 9.5 mph (Figures 1a, 1b). During the run, the chemists noted no odors or emission plumes in the area. The concentration and the TCEQ long-term ESL are provided for 1,3 Butadiene and Benzene. Note, the TCEQ long-term ESL is provided only as a general reference for comparison as the concentrations reflect short-term, not long-term results.

1,3-Butadiene (0.0~0.4 ppb; TCEQ ESL long-term: 4.5 ppb) and Benzene (0.1~0.3 ppb; TCEQ long-term: 1.4 ppb) were detected. Concentrations for other confirmed VOCs ranged low.

On **April 26, 2021** 5-min average PM_{2.5} and PM₁₀ (GRIMM) concentrations ranged from 2.0 to 4.6 µg/m³ (average – 3.2 µg/m³) and 2.4 to 14.0 µg/m³ (average – 5.0 µg/m³), respectively (Figure 2), with no PM concentrations exceeding EPA NAAQS.

24h standards of 35 µg/m³ for PM_{2.5} and 150 µg/m³ for PM₁₀, respectively. 5-min average O₃ concentrations ranged from 23.5 to 65.6 ppb (average – 54.7 ppb) (Figure 3). Although the sampling period was not 8h, for general reference, O₃ concentrations did not exceed EPA NAAQS 8h standard of 75 ppb. 5-min average NO₂ concentrations ranged from 11.5 to 29.0 ppb (average – 18.2 ppb) (Figure 3). NO₂ concentrations did not exceed EPA NAAQS 1h standard of 100 ppb.

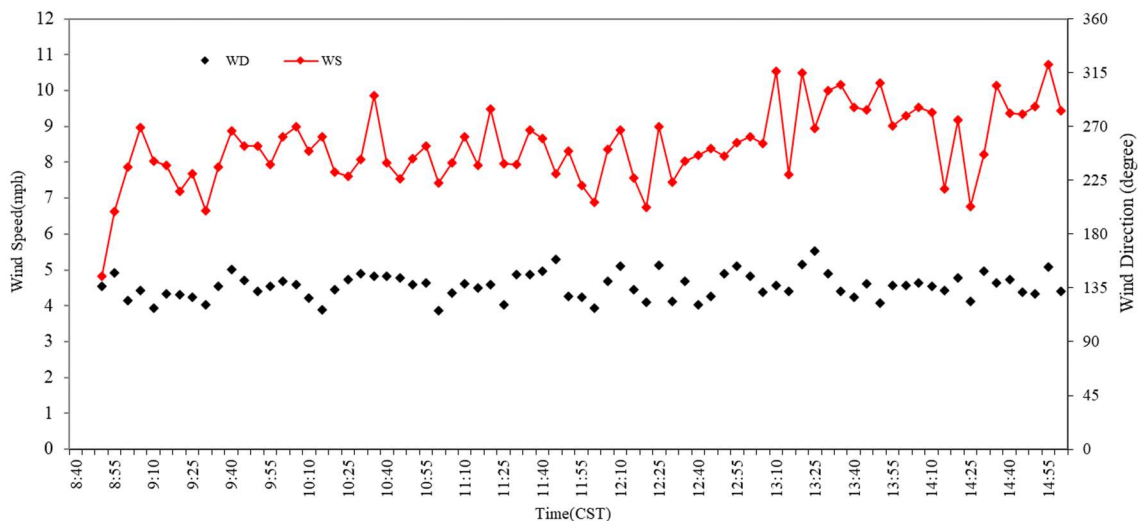


Figure 1a: Time series graph of wind speed and direction – Lavender St. (04/26/21)

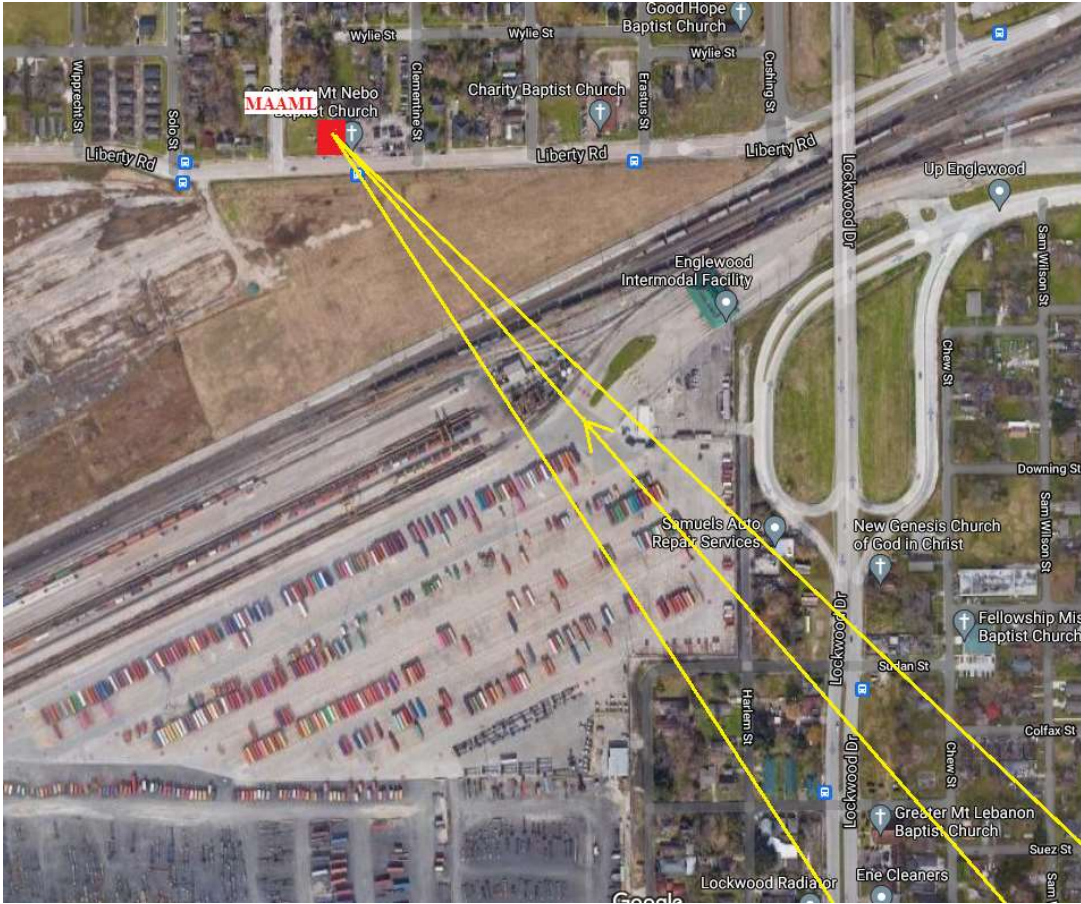


Figure 1b: MAAML deployment site (29.788042°, -95.320237°) and prevailing wind – Lavender St. (04/26/21)

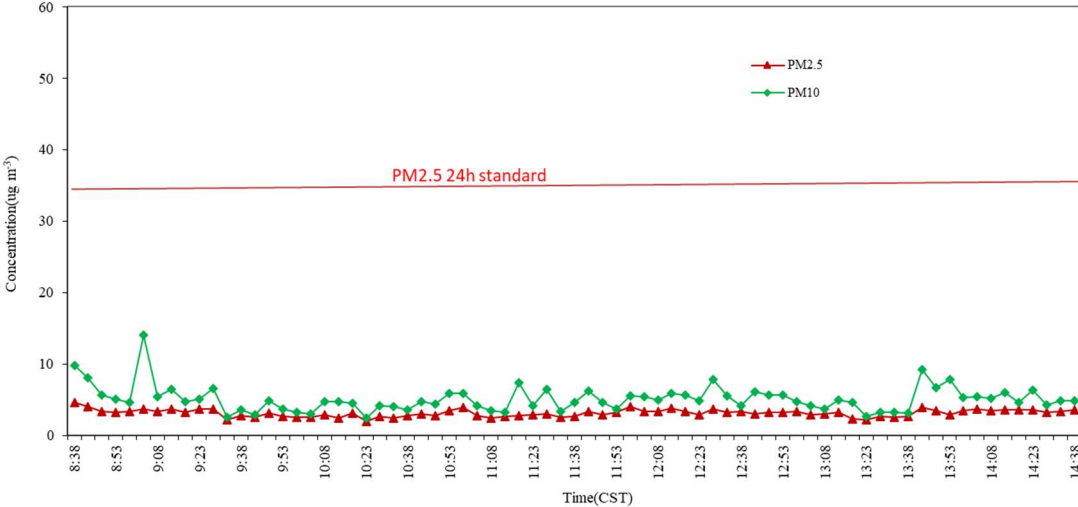


Figure 2: Time series graph of PM_{2.5} and PM₁₀ concentrations – Lavender St. (04/26/21)

Note: Standards are used as a reference line but applicable only to 24-hour

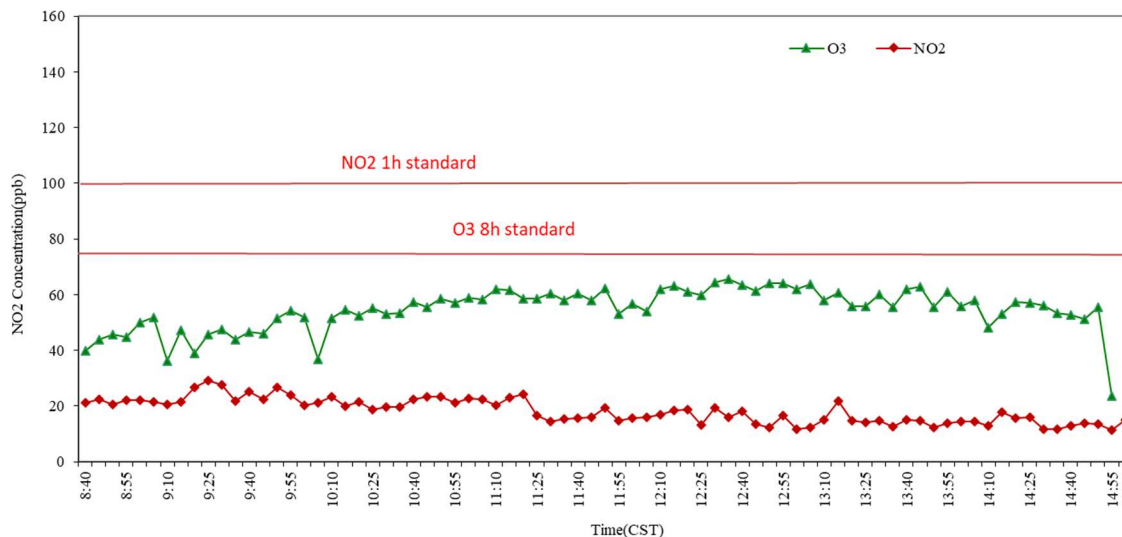


Figure 3: Time series graph of O₃ and NO₂ concentrations – Lavender St. (04/26/21)

Note: Standards are used as a reference line but applicable only to 8h for O₃ and 1h for NO₂

Monitoring ran from 800 to 1500 CST on **April 27, 2021**, using MAAML instrumentation to monitor VOCs, PM, O₃, and NO₂ with prevailing southeasterly winds at speeds from 6.8 to 8.1 mph (Figures 4a, 4b). During the run, the chemists noted no odors or emission plumes in the area. The concentration and the TCEQ long-term ESL are provided for Ethanol and Benzene. Note, the TCEQ long-term ESL is provided only as a general reference for comparison as the concentrations reflect short-term, not long-term results.

Ethanol (6.0~82.6 ppb; TCEQ ESL long-term: 1000 ppb) and Benzene (0.1~0.2 ppb; TCEQ long-term: 1.4 ppb) were detected. Concentrations for other confirmed VOCs ranged low.

On **April 27, 2021** 5-min average PM_{2.5} and PM₁₀ (GRIMM) concentrations ranged from 6.4 to 9.4 µg/m³ (average – 7.8 µg/m³) and 6.4 to 9.7 µg/m³ (average – 7.9 µg/m³), respectively (Figure 5), with no PM concentrations exceeding EPA NAAQS 24h standards of 35 µg/m³ for PM_{2.5} and 150 µg/m³ for PM₁₀, respectively. 5-min average O₃ concentrations ranged from 11.5 to 25.2 ppb (average – 20.2 ppb) (Figure 6). Although the sampling period was not 8h, for general reference, O₃ concentrations did not exceed EPA NAAQS 8h standard of 75 ppb. 5-min average NO₂ concentrations ranged from 6.0 to 18.1 ppb (average – 10.7 ppb) (Figure 3). NO₂ concentrations did not exceed EPA NAAQS 1h standard of 100 ppb.

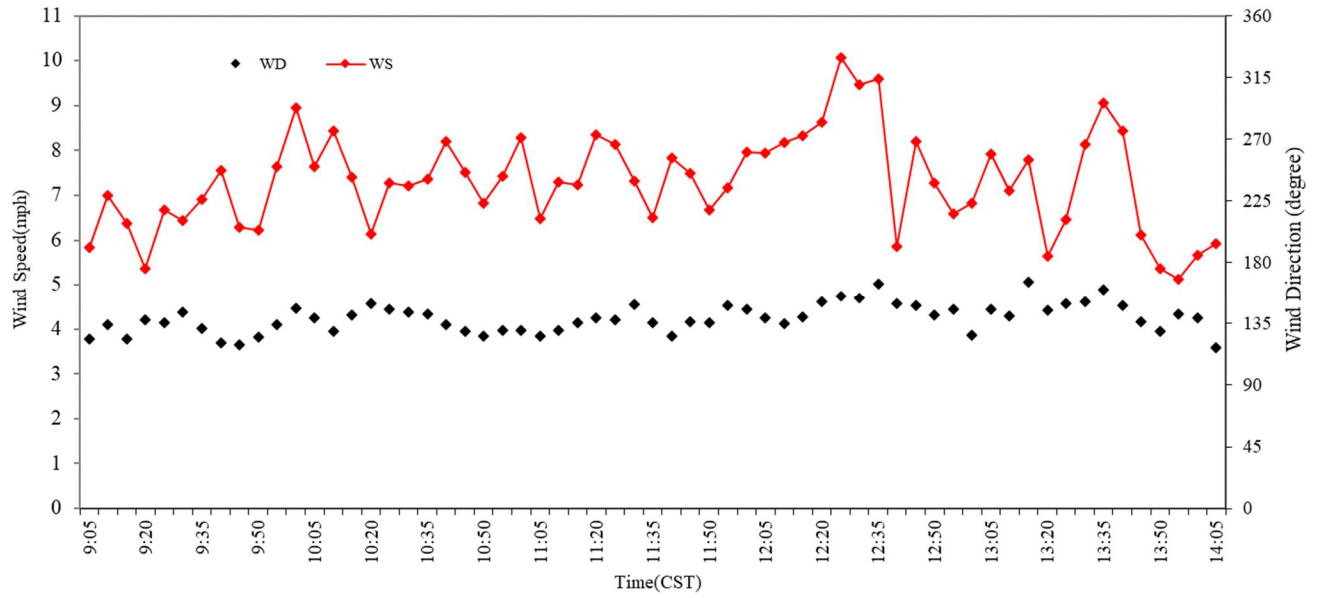


Figure 4a: Time series graph of wind speed and direction – Lavender St. (04/27/21)

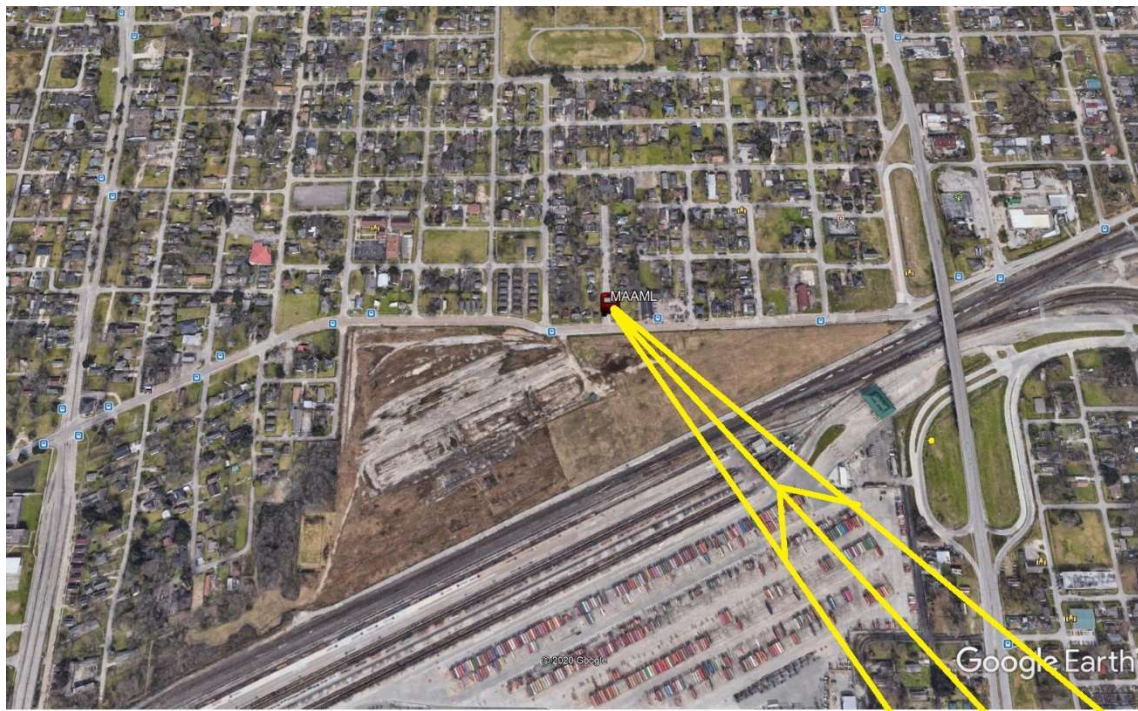


Figure 4b: MAAML deployment site (29.788042°, -95.320237°) and prevailing wind – Lavender St. (04/27/21)

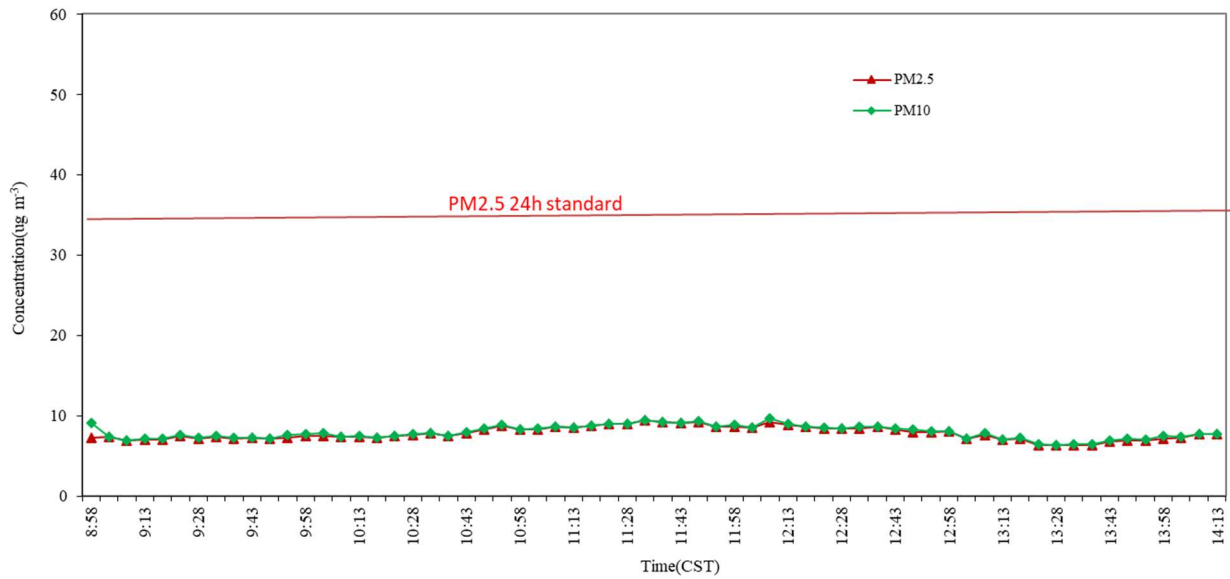


Figure 5: Time series graph of PM_{2.5} and PM₁₀ concentrations – Lavender St. (04/27/21)

Note: Standards are used as a reference line but applicable only to 24-hour

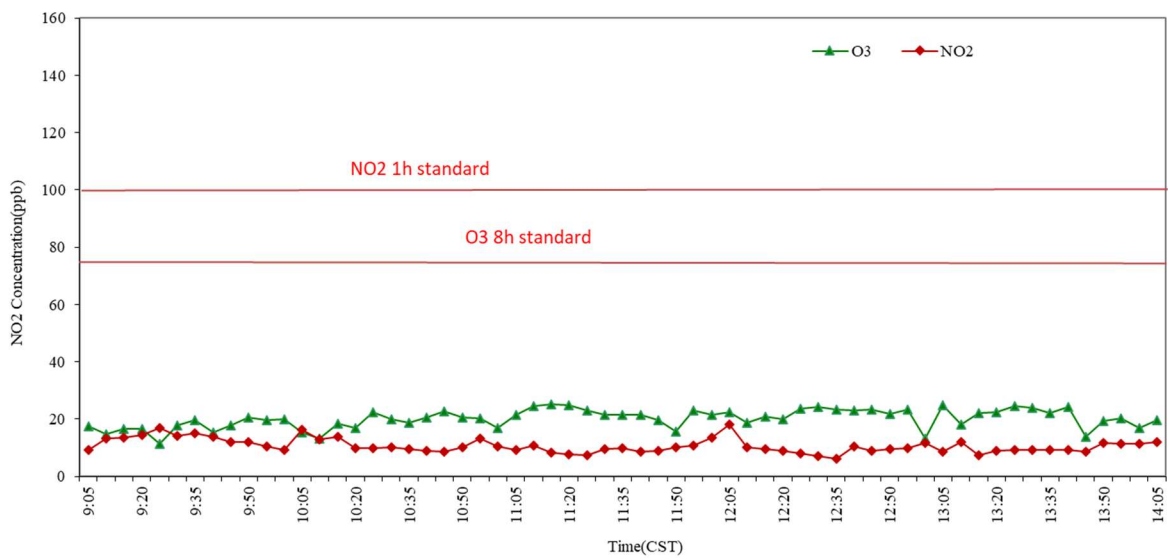


Figure 6: Time series graph of O₃ and NO₂ concentrations – Lavender St. (04/27/21)

Note: Standards are used as a reference line but applicable only to 8h for O₃ and 1h for NO₂

Monitoring ran from 900 to 1500 CST on **April 28, 2021** using MAAML instrumentation to monitor VOCs, PM, O₃, and NO₂ with prevailing southeasterly winds at speeds from 12.1 to 13.6 mph (Figures 7a, 7b). During the run, the chemists noted no odors or emission plumes in the area. The concentration and the TCEQ long-term ESL are provided for 1,3 Butadiene and Benzene. Note, the TCEQ long-term ESL is provided only as a general reference for comparison as the concentrations reflect short-term, not long-term results.

1,3-Butadiene (ND; TCEQ ESL long-term: 4.5 ppb) was not detected. Benzene (0.1~0.3 ppb; TCEQ long-term: 1.4 ppb) and Carbon Disulfide (0.0~0.4 ppb; TCEQ ESL long term: 1 ppb) were detected. Concentrations for other confirmed VOCs ranged low.

On April 28, 2021 5-min average PM_{2.5} and PM₁₀ (GRIMM) concentrations ranged from 6.2 to 13.3 µg/m³ (average – 8.8 µg/m³) and 7.1 to 13.8 µg/m³ (average – 9.8 µg/m³), respectively (Figure 8), with no PM concentrations exceeding EPA NAAQS 24h standards of 35 µg/m³ for PM_{2.5} and 150 µg/m³ for PM₁₀, respectively. 5-min average O₃ concentrations ranged from 16.4 to 32.2 ppb (average – 27.1 ppb) (Figure 9) with no O₃ concentrations exceeding EPA NAAQS 8h standard of 75 ppb. 5-min average NO₂ concentrations ranged from 3.7 to 11.2 ppb (average – 6.7 ppb) (Figure 9) with no NO₂ concentrations exceeding EPA NAAQS 1h standard of 100 ppb.

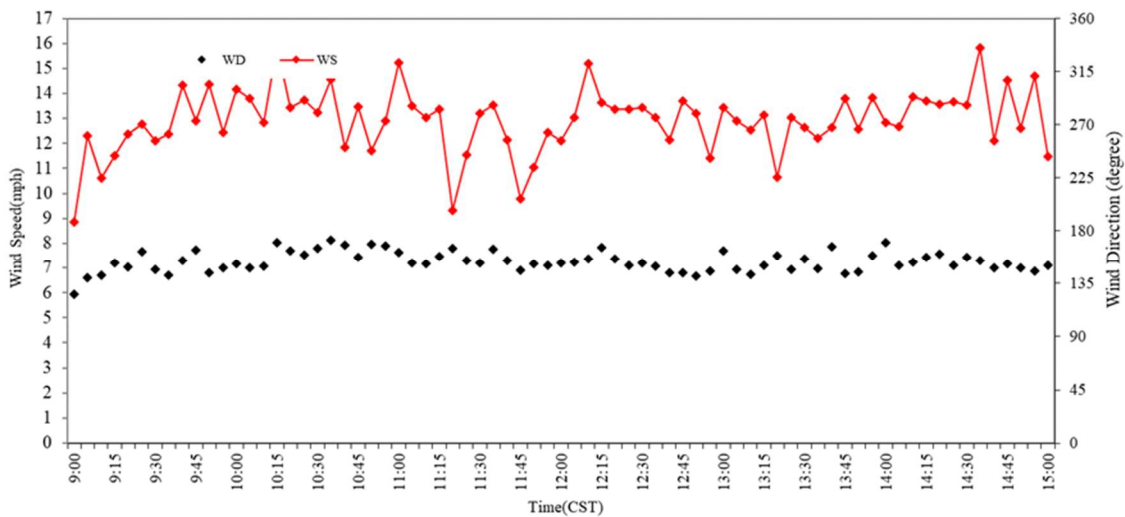


Figure 7a: Time series graph of wind speed and direction – Lavender St. (04/28/21)

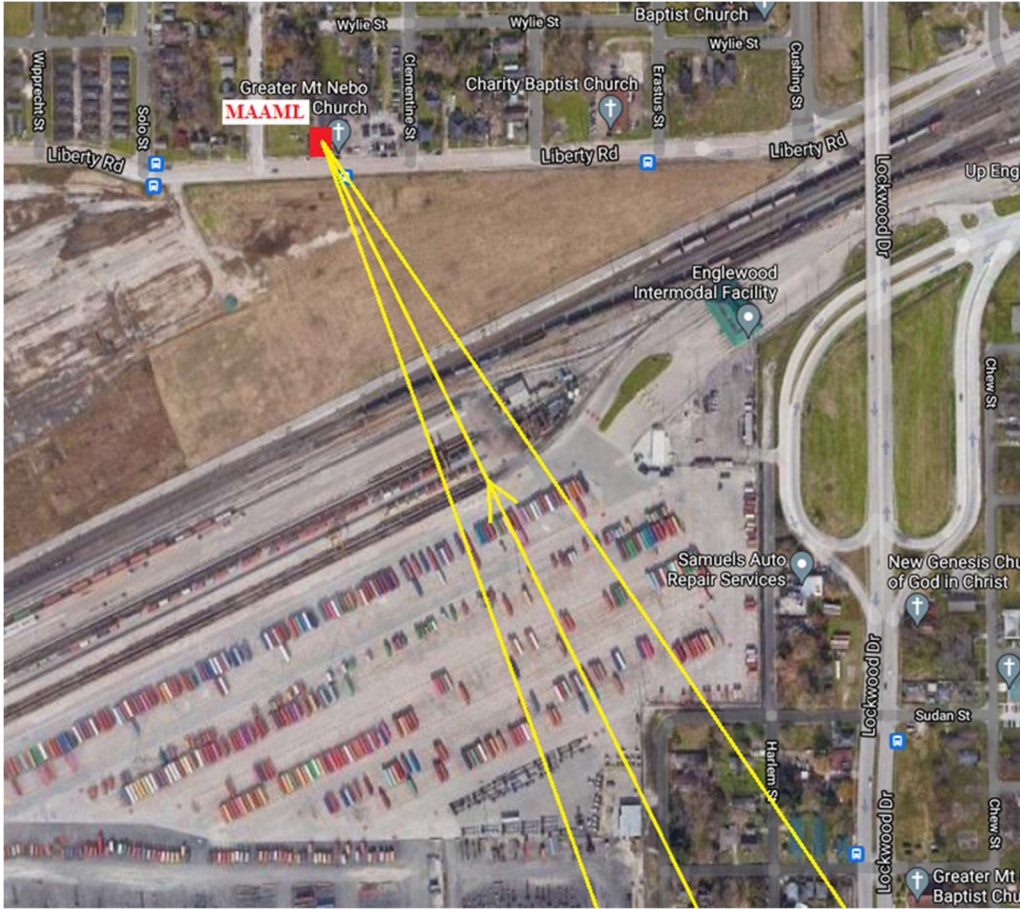


Figure 7b: MAAML deployment site (29.788042°, -95.320237°) and prevailing wind – Lavender St. (04/28/21)

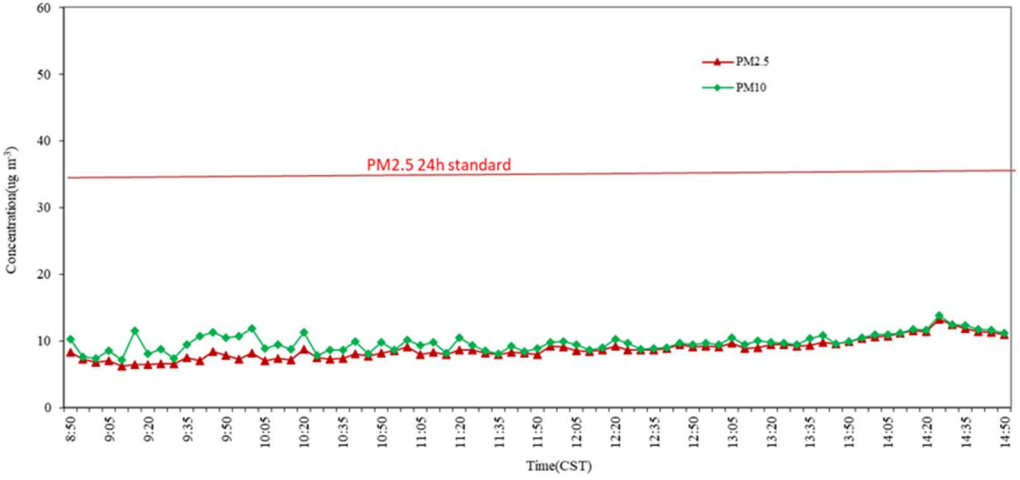


Figure 8: Time series graph of PM_{2.5} and PM₁₀ concentrations – Lavender St. (04/28/21)

Note: Standards are used as a reference line but applicable only to 24-hour

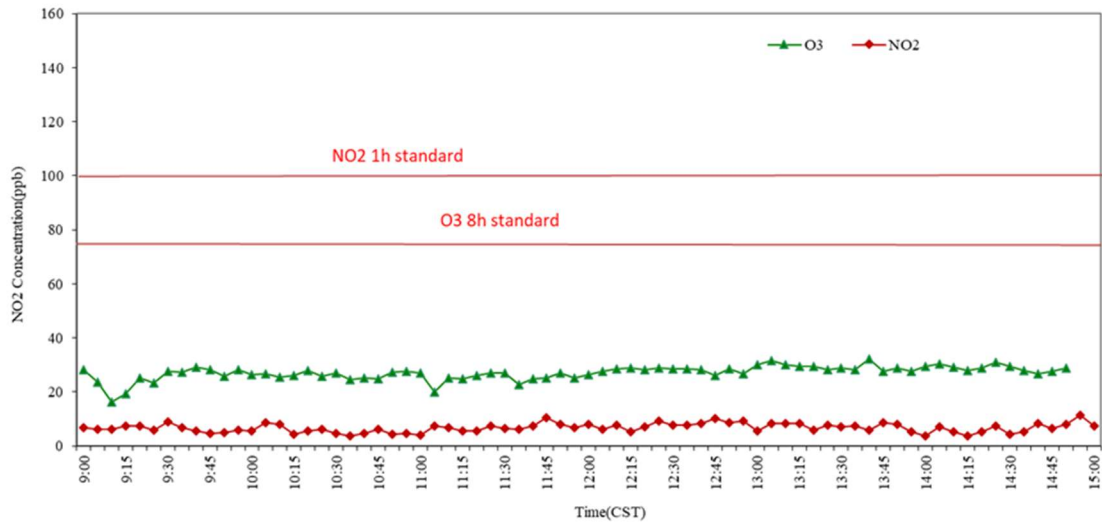


Figure 9: Time series graph of O₃ and NO₂ concentrations – Lavender St. (04/28/21)

Note: Standards are used as a reference line but applicable only to 8h for O₃ and 1h for NO₂