CARE-4-AIR
SITE 1 REPORT: HAMLET, NC

Blue Ridge Environmental Defense League

Enhanced Air Quality Monitoring for Communities
EPA-OAR-OAQPS-22-01
Grant ID: 5X02D46123

Therese Vick and
Mark Barker
June 2025

A1: Title and Preparer Page

Project Name: CARE-4-AIR: BREDL Air Guardians

Effective Date of Plan: July 1, 2023

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A2: Executive Summary

This report details the CARE-4-AIR project's initial air quality monitoring efforts at Site 1 in Hamlet, North Carolina. The overarching goal of the project is to comprehensively monitor air quality, identify potential pollution sources, assess compliance with environmental standards, and collaborate with communities and relevant agencies to foster improvements in local air quality. Monitoring at Site 1 ran from November 22, 2024 to April 7, 2025.

Project Goals and Rationale

The project aims to:

- Determine Pollution Levels: Quantify the concentrations of key air pollutants.
- Identify Pollution Sources: Pinpoint the origins of any detected pollutants.
- Assess Compliance: Determine if current air quality meets federal and state standards.
- Community Engagement: Work with environmental agencies and local communities to address air quality concerns.
- Data-Driven Action: Provide robust data to support advocacy for cleaner air.

Monitoring Site and Duration

Site 1 was strategically located in Hamlet, North Carolina, chosen for its community relevance. The monitoring equipment operated continuously for approximately 4.5 months, providing a significant dataset for analysis.

Advanced Monitoring Equipment

The project utilized a suite of EPA-approved Federal Equivalent Method (FEM) and Federal Reference Method (FRM) instruments, housed within a secure, mobile monitoring trailer. This ensured accuracy and reliability of the data. Instrumentation included:

- Teledyne API Model T640 PM Mass Monitor: This FEM instrument measured Particulate Matter (PM), specifically PM2.5 (fine particles, 2.5 micrometers or less in diameter) and PM10 (inhalable particles, 10 micrometers or less). The T640 provides near real-time, highly accurate measurements using dual-channel technology.

- Teledyne API Model T200 Nitrogen Oxides Analyzer: An FRM instrument used to measure Nitric Oxide (NO), Nitrogen Dioxide (NO2), and total Nitrogen Oxides (NOx). These are common pollutants often associated with combustion processes.

- Aeroqual AQS-1 VOC Monitor: This device measured Total Volatile Organic Compounds (VOCs), which are a group of chemicals that can include known carcinogens and contribute to ground-level ozone formation. The report notes that this monitor provided a general measure of total VOCs rather than individual compound identification. The AQS-1 uses “near reference” to EPA-approved monitoring equipment.

Key Findings and Air Quality Assessment

The comprehensive data analysis yielded several critical insights:

- Compliance with EPA Standards: Crucially, the report found no exceedances of EPA health standards for PM2.5, PM10, or NO2 during the entire monitoring period at Site 1. This indicates that, for the most part, the air quality met federal health benchmarks.

- Low VOC Concentrations: Concentrations of Total VOCs were consistently low, suggesting that industrial or significant local sources of these compounds were not predominant during the monitoring period.

- Impact of Prescribed Burns: While overall air quality was good, specific events, particularly prescribed burns, appeared to significantly impact PM levels for brief periods:

    - March 9, 2025: A notable one-minute spike in PM10 reached 2739 ug/m3. While short-lived, this concentration is indicative of hazardous air quality and was likely directly attributable to a nearby burn.

    - March 13, 2025: A more sustained day-long increase in PM10 pollution was observed, which this report directly correlates with a prescribed burn in the vicinity.

Recommendations for Future Action

Based on the findings, the report offers two key recommendations aimed at mitigating future air quality impacts:

- Strategic Burn Scheduling: It is recommended that prescribed burns should not be conducted on days when moderate to high PM levels are forecasted. This proactive measure could prevent short-term hazardous air conditions.
- Community Monitoring during Burns: The report suggests deploying mobile air monitors directly within communities when large-scale prescribed burns are underway. This would provide real-time, localized data and better inform residents of potential air quality issues.

Project Limitations and Challenges

The report transparently acknowledges certain limitations and operational challenges encountered:

- Limited Monitoring Duration: The 4 to 4.5-month monitoring period provides a snapshot, but long-term trends might require continuous monitoring over a full year or multiple seasons.
- Total VOCs Only: The VOC data measured only total VOCs, meaning specific hazardous VOC compounds could not be identified or quantified individually.
- Operational Issues and Solutions:
    - PM Mass Monitor Pump Failure: In December 2024, the internal pump of the PM Mass Monitor began failing. This was promptly addressed by replacement under warranty. PM data was not lost or affected by the failing pump.
    - NO2 Monitor Calibration Failures: Several instances of NO2 monitor calibration failures occurred. These were resolved by Wilbur Technical Services, demonstrating effective troubleshooting and maintenance.

A3: Email Distribution List

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A4: Table of Contents

A5: Glossary[1]

AQI - The EPA AQI (Air Quality Index) is a tool used by the EPA to communicate daily air quality to the public. It provides a scale (0-500) that indicates how polluted the air is, with higher values representing greater pollution and health concerns. The AQI is based on the levels of five major pollutants: ground-level ozone, particle pollution, carbon monoxide, nitrogen dioxide, and sulfur dioxide.

Criteria pollutant – EPA, as required by the Clean Air Act, has listed six commonly found air pollutants as criteria air pollutants. These six are ozone, particulate matter, carbon monoxide, lead, sulfur dioxide, and nitrogen dioxide.

Data Acquisition System – The DAS is an essential tool that collects and processes data from various sources.

NAAQS - The Clean Air Act requires EPA to set National Ambient Air Quality Standards for six principal pollutants ("criteria" air pollutants) which can be harmful to public health and the environment.

NO - Nitric oxide is a colorless gas with the formula NO. It is one of the principal oxides of nitrogen. Nitric oxide is a free radical: it has an unpaired electron. An important intermediate in industrial chemistry, nitric oxide forms in combustion systems and can be generated by lightning in thunderstorms.

NO2 - Nitrogen dioxide (NO2) is a reddish-brown, pungent gas that is a key component of air pollution, particularly in urban areas. It's a member of the nitrogen oxides family (NOx) and forms when nitrogen and oxygen react, often during combustion processes like burning fossil fuels. NO2 is a highly reactive gas that contributes to the formation of smog, acid rain, and other air pollutants, and it can also irritate the respiratory system.

NOx - NOx is shorthand for nitric oxide (NO) and nitrogen dioxide (NO2), the nitrogen oxides that are most relevant for air pollution. These gases contribute to the formation of smog and acid rain, as well as affecting tropospheric ozone. NOx gases are usually produced from the reaction between nitrogen and oxygen during combustion of fuels, such as hydrocarbons, in air; especially at high temperatures, such as in car engines. In areas of high motor vehicle traffic,

[1] Definitions provided by a combination of sources: U.S. EPA, Google AI, and Wikipedia

such as in large cities, the nitrogen oxides emitted can be a significant source of air pollution. NOx gases are also produced naturally by lightning.

PM 2.5 - Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles less than 2.5 micrometers in diameter (PM2.5) are referred to as "fine" particles and are believed to pose the greatest health risks among particulates. Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs.

PM 10 - Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. PM10 describes inhalable particles, with diameters that are generally 10 micrometers and smaller. PM10 is referred to as coarse particulates. PM10 and PM2.5 often derive from different emissions sources, and also have different chemical compositions.

Pollution Rose - A pollution rose is a diagram that illustrates how wind direction correlates with pollutant concentrations at a specific location. It's similar to a wind rose, but instead of showing wind speed, it depicts pollutant levels associated with different wind directions. This helps visualize the impact of wind on pollutant dispersion and identify potential source directions. In this report, all pollution rose directions indicate the direction the wind is blowing from.

Prescribed Burn - The practice of intentionally setting a fire to change the assemblage of vegetation and decaying material in a landscape for forest management, ecological restoration, land clearing, or wildfire fuel management purposes.

QAPP – The Quality Assurance Project Plan is a required EPA technical document. The QAPP is a formal planning document which describes how environmental information operations are planned, implemented, documented, and assessed during the life cycle of a project.

SOP - Each air monitoring unit requires Standard Operating Procedures. The SOP document outlines step by step procedures for various equipment functions.

VOC - VOC is an abbreviation for volatile organic compounds. They are carbon-based substances that readily evaporate under normal air pressure and are commonly found in indoor and outdoor environments. These compounds can be harmful to human health and contribute to air pollution, particularly smog formation.

Wind Rose - A wind rose gives a diagram view of how wind speed and direction are typically distributed at a particular location. Presented in a circular format, the wind rose shows the frequency of winds blowing from particular directions. In this report, all wind roses directions indicate the direction the wind is blowing from.

A6: Thanks

BREDL would like to thank the following for their assistance during this project:

- North Carolina Department of Environmental Quality
- North Carolina Department of Environmental Quality Division of Air Quality
- U.S. Environmental Protection Agency
- Zuber Farooqui, PhD, California Air Resources Board
- Wilbur Technical Services
- Our trailer site host
- Our chapter Concerned Citizens of Richmond County
- BREDL Executive Director and staff
- BREDL chapters, members and friends
- BREDL Board of Directors

A7: About

CARE-4-AIR Project

CARE-4-AIR is conducting monitoring of nitric oxide (NO), nitrogen dioxide (NO2), nitrogen oxides (NOx), particulate matter (PM2.5 and PM10), and volatile organic compounds (VOCs) as requested by our chapter organizations at six sites in Tennessee, North Carolina, South Carolina, Georgia, and Virginia. These sites are all currently subject to significant sources of air pollution, including: coal-burning power generation, wood-burning biomass gasification, industrial landfill, biochar production, wood pellet manufacturing, railroad operation, biomass plant operation, coal ash deposition, natural gas compressor stations, prescribed forest burning, and asphalt plants. Many of the affected communities are experiencing possible health impacts associated with air pollution generated by these industrial operations.

BREDL, through our technical contractor Wilbur Technical Services (WTS), is using a set of EPA-approved Federal Equivalent Method (FEM) air monitoring instruments including Teledyne API Model T640 PM Mass Monitor and the EPA-approved Federal Reference Method (FRM) Teledyne API Model T200 nitrogen oxides analyzer. We are also using the Aeroqual AQS-1 VOC monitor for total VOCs. Several units will work in conjunction with the pollutant analyzers. These include: Teledyne units T700U Gas Dilution Calibrator, T701H Zero Air Generator, Vaisala WXT 530 meteorological sensor and DR DAS Envidas Ultimate Data Acquisitions System.

These instruments are mounted inside a Pro-Line aluminum utility trailer. Two BREDL staff will analyze the data generated by this system and share the data and their analyses with participating BREDL chapters. BREDL staff will collaborate actively with the chapters in the planning and implementation of a broad spectrum of actions to seek remediation of air pollution found to be significant by CARE-4-AIR, including: public education campaigns; active participation in public commenting opportunities for permit applications, zoning appeals, and other administrative proceedings; active communication with local, state, and federal government agencies whose mission is the safekeeping of the environment and public health; and public demonstrations.

Funding for this project has been provided by U.S. Environmental Protection Agency and Blue Ridge Environmental Defense League.

Community Site Assessment

CARE-4-AIR will serve our selected chapter organizations in the southeastern U.S., providing on-site, real-time air quality monitoring and assistance with data storage, data interpretation, data analysis, and the design, organization, and implementation of environmental protection campaigns to ameliorate the air quality problems identified through the use of the Wilbur Technical Services designed trailer. BREDL's chapter organizations are community-based grassroots organizations located in areas affected by large-scale industrial projects which threaten the communities' air, water, soil, natural environment, and quality of life.

BREDL has been working with our chapter partners since January 2022 on securing the sampling locations for our CARE-4-AIR monitoring project. With one possible exception, BREDL is working with community-based organizations who are also chapters of the BREDL 501(C)3 nonprofit organization.

Originally, we planned to include up to 12 host sites for our project. EPA concerns regarding the timespan of data collection at each site has reduced the number of host sites to six. Non-selected sites will be placed on a waiting list.

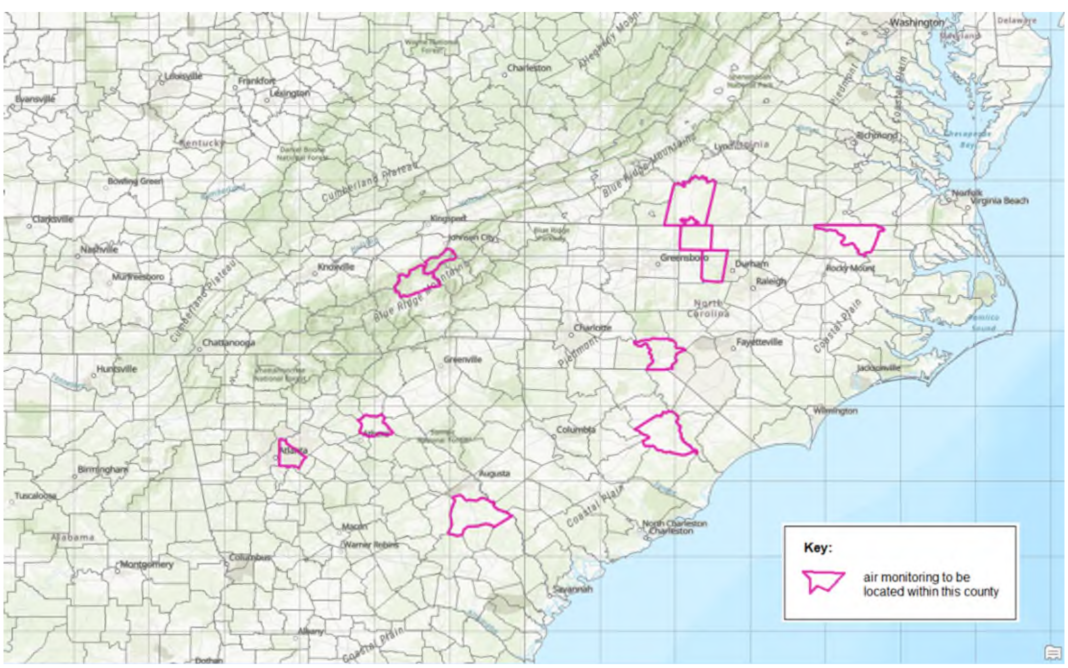


Figure A7-1: Potential locations for air monitoring

Air Monitoring Trailer

The BREDL CARE-4-Air project utilizes a Pro-Line 8’ long x 7’ wide x 7’ tall, flat front mobile aluminum cargo trailer containing state of the art air monitoring equipment to collect ambient air concentrations of PM2.5, PM10, NO_2, NO, NOx, and total VOCs. The equipment is powered by a standard RV 30-amp receptacle. The trailer includes surge protection and a UPS battery backup for the onboard computer. Trailer equipment will automatically reboot in case of power interruption. The installation of insulation, electrical wiring, equipment racks, equipment and associated tubing was overseen or completed by Wilbur Technical Services in New Hampshire.

A sampling inlet is located on the trailer’s roof to allow ambient air to flow into the air monitoring equipment inside the trailer.

Air Monitoring Equipment

The ambient air is analyzed by a Teledyne API Model T200 nitrogen oxides analyzer, designated as US EPA Federal Reference Method (FRM) for determining compliance with NO_2 National Ambient Air Quality Standards (NAAQS), a Teledyne API Model T640 PM Mass Monitor, designated as US EPA Federal Equivalent Method (FEM) for determining compliance with particulate matter mass concentration NAAQS, and an Aeroqual AQS-1 VOC module, which the manufacturer states can deliver data with very strong correlation to EPA-approved monitors – ‘Near Reference’. The Teledyne API Model T200 nitrogen oxides analyzer is officially designated as US EPA Federal Reference Method (FRM), Designation Number RFNA-1194-099. The Teledyne API Model T640 PM Mass Monitor is officially designated as US EPA Federal Equivalent Method (FEM) for determining compliance with particulate matter mass concentration National Ambient Air Quality Standards (NAAQS). The US EPA designation number for 5.0 LPM Model T640 monitor (PM2.5) is EQPM-0516-236. Note that T640 is FEM for PM 2.5 only. The T640 PM 10 measurement is not FEM.

The Teledyne API T200 measures the amount of NO present in a gas by detecting the chemiluminescence which occurs when nitrogen oxide (NO) is exposed to ozone (O3). This reaction is a two-step process. In the first step, one molecule of NO and one molecule of O3 collide and chemically react to produce one molecule of oxygen (O2) and one molecule of nitrogen dioxide (NO2). Some of the NO2 molecules created by this reaction retain excess energy from the collision and exist in an excited state, where one of the electrons of the NO2 molecule resides in a higher energy state than normal. This chemical reaction is illustrated by the following equation:

Where:

$$NO + O3 \rightarrow NO2 + O2 + hv$$

hv = emitted photon energy

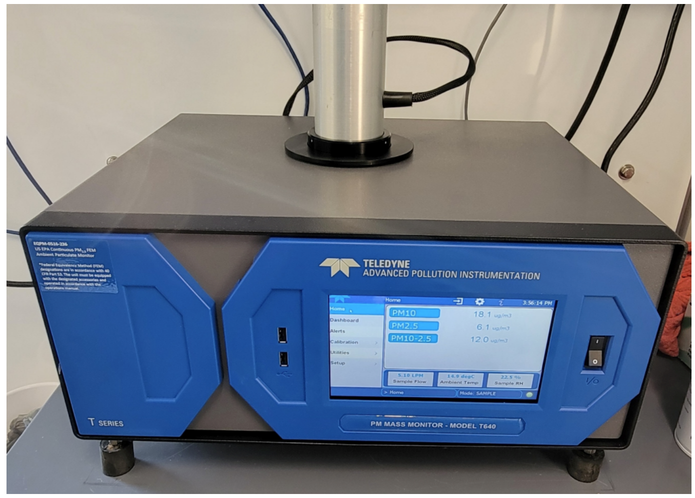
The reaction results in electronically excited NO2 molecules which revert to their ground state, resulting in an emission of light or chemiluminescence.

To determine the concentration of NO, the sample gas is blended with O3 in a reaction chamber causing the reaction to occur. The chemiluminescence that results from the reaction is monitored by an optically filtered high-sensitivity photomultiplier. The optical filter and photomultiplier respond to light in a narrow-wavelength band unique to the NO and O3 reaction. The electronic signal produced in the photomultiplier is proportional to the NO concentration.

The only gas that is actually measured by the T200 is NO. NO2, and therefore NOx (which is defined here as the sum of NO and NO2 in the sample gas), contained in the gas is not detected because NO2 does not react with O3 to create chemiluminescence. To measure the concentration of NO2, and therefore the concentration of NOx, the T200 periodically switches the sample gas stream so that the pump pulls it through a special converter cartridge filled with molybdenum (Mo, “moly”) chips that are heated to a temperature of 315°C.[2]

[2] Preceding related paragraphs were copied or paraphrased from 083730200B DCN8137, Teledyne API, User Manual, Models T200 and T200 U, NO/NO2/NOx Analyzers, June 17, 2019

The Teledyne API Model T640 is a real-time, continuous particulate matter (PM) mass monitor that uses scattered light spectrometry for measurement; specifically, it employs broadband spectroscopy using 90° white-light scattering with a polychromatic light-emitting diode (LED).



The Model T640 PM Mass Monitor is an optical aerosol spectrometer that converts optical measurements to mass measurements by determining sampled particle size via scattered light at the single particle level according to Lorenz-Mie Theory. In brief, the sampling head draws a representative sample of ambient aerosol at a flow rate of 5 lpm. The aspirated particles are then dried (i.e., brought below 35% RH) with the Aerosol Sample Conditioner (ASC) and moved into the optical particle sensor where scattered light intensity is measured to determine particle size diameter. The particles move separately into the T-aperture through an optically differentiated measurement volume that is homogeneously illuminated with polychromatic light. The polychromatic light source, an LED, combined with a 90° scattered light detection, achieves a precise and unambiguous calibration curve in the Mie range, resulting in a large size resolution.

Each particle generates a scattered light impulse that is detected at an 85° to 95° angle where amplitude (height) and signal length are measured; the amplitude of the scattered light impulse is directly related to the particle size diameter. The T-aperture and simultaneous signal length measurements eliminate border zone error, which is characterized by the partial illumination of particles at the border of the measurement range.[3]

The Aeroqual AQS-1 VOC analyzer module continuously measures volatile organic compounds (VOCs) and gases in ambient air.

[3] Preceding related paragraphs were copied or paraphrased from 08354C DCN8394, Teledyne API, User Manual, Model T640, PM Mass Monitor, April 20, 2021

Air is actively sampled by pump and travels through a glass and Teflon coated inlet system to the analyzer module. This module incorporates photo-ionization detector (PID) sensor technology. A long-life 10.6 eV deep UV lamp breaks VOCs down into positive and negative ions. The detector measures the current of the ionized gas, which is proportional to detectable VOCs. Automatic Baseline Correction promotes a stable zero and removes humidity effects. The VOC module is sensitive to a wide range of VOCs, including benzene and toluene.[4]

A Vaisala WXT 530 meteorological weather station is included in the air monitoring trailer. The measurement parameters include: Wind Speed and Direction, Pressure, Temperature, and Relative Humidity.

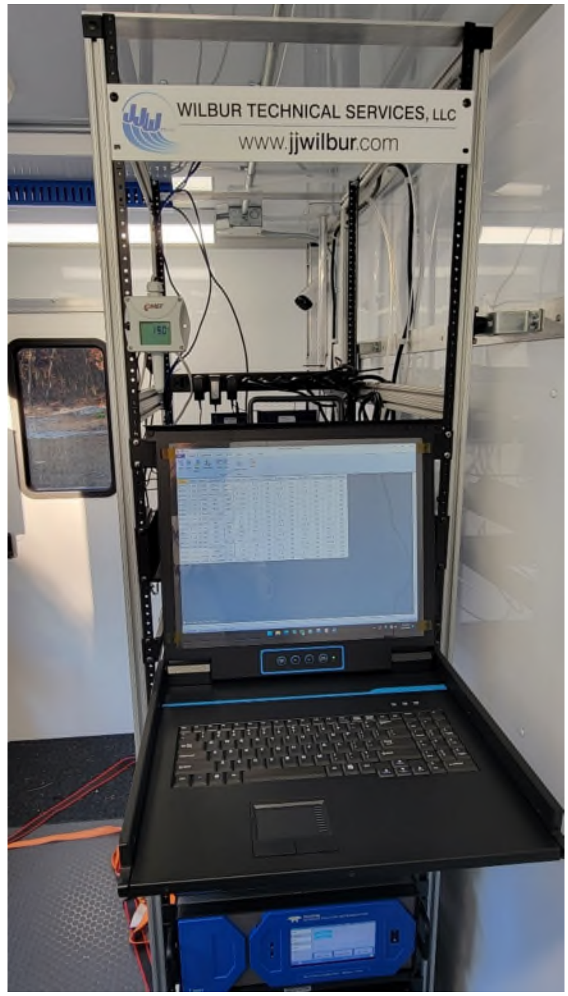
The transmitters use Vaisala WINDCAP sensor technology for wind measurement. The wind sensor has an array of three equally spaced ultrasonic transducers on a horizontal plane. The unit determines wind speed and wind directions by measuring the time it takes the ultrasound to travel from one transducer to the other two.

The wind sensor measures the transit time (in both directions) along the three paths established by the array of transducers. The transit time depends on the wind speed along the ultrasonic path. For zero wind speed, both the forward and reverse transit times are the same. With wind along the sound path, the up-wind direction transit time increases and the down-wind transit time decreases.

The Vaisala PTU module contains separate sensors for pressure, temperature, and humidity measurement.[5]

[4] Preceding related paragraphs were copied or paraphrased from MRK-D-0048 V4, Aeroqual, Dust Sentry/Pro/AQS User Guide, February 2019
[5] Preceding related paragraphs were copied or paraphrased from M211840EN-F, User Guide, Vaisala Weather Transmitter, WXT530 Series, 2022

Data Acquisition System



Data from the air monitoring equipment and weather station feed into a Dr. DAS ENVIDAS Ultimate central computer Data Acquisition System (DAS) for automatic logging. ENVIDAS is an intelligent, multi-function, high-performance state-of-the-air data acquisition and reporting system. Collected data is stored onboard the trailer in its central DAS computer and daily data reports are emailed via cellular phone data to a BREDL email address specifically setup to receive daily data and alerts for this project. The DR Envidas DAS system calculates hourly averages based on the minute readings. Daily data and reports, and any alerts, are emailed to a dedicated BREDL email address with emails stored on Purehost servers. Emails are automatically forwarded to the project co-managers, which also serves as data backup. Data may also be viewed and collected manually either onsite or remotely. Data may be backed up on a flash drive during site visits. Remote access is via cellular phone network. Access to the computer and cellular phone account logins are restricted to Wilbur Technical Services, our contracted technical support, and CARE-4-Air project co-managers, Therese Vick and Mark Barker.

Primary Data

Appropriate protocols, as outlined throughout our QAPP and included SOPs, are followed to ensure the air monitoring trailer primary data integrity. Mark Barker, Project Operations Manager, oversees trailer maintenance and on-site responsibilities. Therese Vick, Project Quality Assurance Manager, oversees data quality control. Collected raw data reports and alerts sent to our project’s central email account are viewed by both Therese and Mark, as well as the current site chapter.

Existing Data

We have mapped the current EPA/State air monitors using ArcGIS. We determine the existing, permanent PM 2.5, PM 10 and NO_2 monitors that are nearest to our trailer site location for each of our selected sites. We download the hourly data for each monitor for the length of time the trailer is at that site. Using VBScripts we extract the data for the appropriate monitor and combine the hourly data into one spreadsheet. The existing data is screened with primary data.

Community Outreach

For each site, the raw data is emailed to a central BREDL email address housed on the Purehost.com servers. Those emails are automatically forwarded to those on the email address’ forward list. This includes Therese Vick, Project QAM, Mark Barker, Project Ops Manager, and the site chapter representative. Raw data is not shared with the public. Verified data is data that has gone through quality control checks and will be made public once available. The data may be presented to the public at community meetings, through the press, and on our website. Per our EPA grant requirements, data must be released to the public.

Standing Operating Procedures

The equipment Standard Operating Procedures (SOPs) will be updated, as needed, by Mark Barker. Our SOPs are incorporated into our QAPP. Current approved printed copies of the QAPP and SOPs are stored on our air monitoring trailer for quick access. Electronic copies of our QAPP and SOPS, as well as equipment user manuals, are stored on a Google Drive for remote or field access as needed. They are also stored on the QAM and Ops Manager computers. We have SOPs for Nitrogen Dioxide, Particulate Matter, Volatile Organic Compounds, Zero Air Generator, and Calibrator.

Equipment Maintenance, Calibrations, Quality Checks

Air monitoring trailer equipment maintenance is completed by the Ops Manager under the supervision of Wilbur Technical Services.

Remote calibrations are conducted by WTS. Onsite calibrations are conducted by the Ops Manager. The VOC "hot swap" factory calibration is completed by Aeroqual.

Quality checks are conducted by WTS, Ops Manager and QAM as outlined throughout our QAPP.

WTS uses programmed email alerts for percent error failure of an automated check. Upon failure, WTS performs a remote calibration of the equipment utilizing Numaview Remote program from Teledyne API.

Figure A7-2: Panoramic view inside our air monitoring trailer

The objective and goals of CARE-4-AIR

Objective

BREDL community-based chapters have been concerned about air quality issues related to facilities operating in their neighborhoods. We are focusing on particulates, nitrogen dioxide and total Volatile Organic Compounds (VOCs) as these pollutants are common with all the facilities and have well-documented adverse health impacts. These pollutants often have emission limits stated in air permits. Chapters want to increase community awareness and use the data to inform local, state, and federal agencies to improve the air quality in affected communities. High quality air monitoring instruments will be installed in a mobile trailer, which will operate for 4 to 5 months at each site selected for air monitoring. The instruments will measure PM 2.5, PM 10, NO2, NOx, NO and total VOCs.

Short-term Goals

- Identify contributing sources of air pollution, including particulates, nitrogen dioxide and VOCs, in our communities selected for air monitoring.
- Determine the extent to which the monitored pollutants reach unhealthy levels in communities in which air monitoring occurs.
- If the data results indicate potential impacts to air quality, BREDL will engage with air quality agencies, including EPA, and state and local governments to investigate and evaluate next steps.
- Compare air quality data with nearby air monitors for the same time period. The air monitor for each monitored criteria pollutant that is the closest in proximity to each of our sites will be used for data comparison. These agency monitors may be too far away to determine impacts to local ambient air. Data may indicate: (a) need for permanent air quality monitors in underserved communities; (b) need for change in background concentrations used for agency air modeling; and (c) potential need to enhance the EPA Air Now coverage in affected communities.
- Create educational fact sheets for the monitored pollutants and their health impacts on the local community.

- Bring attention to communities who may feel that their air quality concerns have been ignored by holding community meetings, press events, and agency meetings as warranted by monitoring results.
- Increase community participation in air quality decisions by attendance at local and state meetings and hearings. Additionally, help communities understand the complicated processes that may impact them such as zoning and permit actions. This can take many forms such as providing written comments on pending permits and policy decisions and speaking at public hearings.
- BREDL and our chapters will obtain a better understanding of air monitoring, data, analysis, and impacts, which will empower community members to become confident and involved with air quality issues in their area.
- Engage in community organizing to strengthen facility air permits.

Long-term Goals

- Reduction of air pollutant emissions, ambient air concentrations of pollution, and human exposure to air pollutants. This could be measured by better air pollution controls or less production throughput in air permits.
- Increase in the number of monitors used in the EPA/State air monitoring network to reach underserved communities.

A8: Time Period

BREDL began collecting data at Site 1 at 6 PM on November 22, 2024 and concluded at 11 AM on April 7, 2025 for about a 4.5 month period.

A9: Location

Site 1 Location: Hamlet, North Carolina

There are several facilities of concern in the Hamlet, North Carolina area. For this map, we chose to focus on the ITD facility as the anchor point as indicated by the symbol in the center of the circle in Figure A9:1. Our air monitoring trailer was located within the highlighted circle.

Please note that references to site host names and specific site locations are redacted to protect the privacy of participants, security of the trailer and its equipment, and integrity of this project.

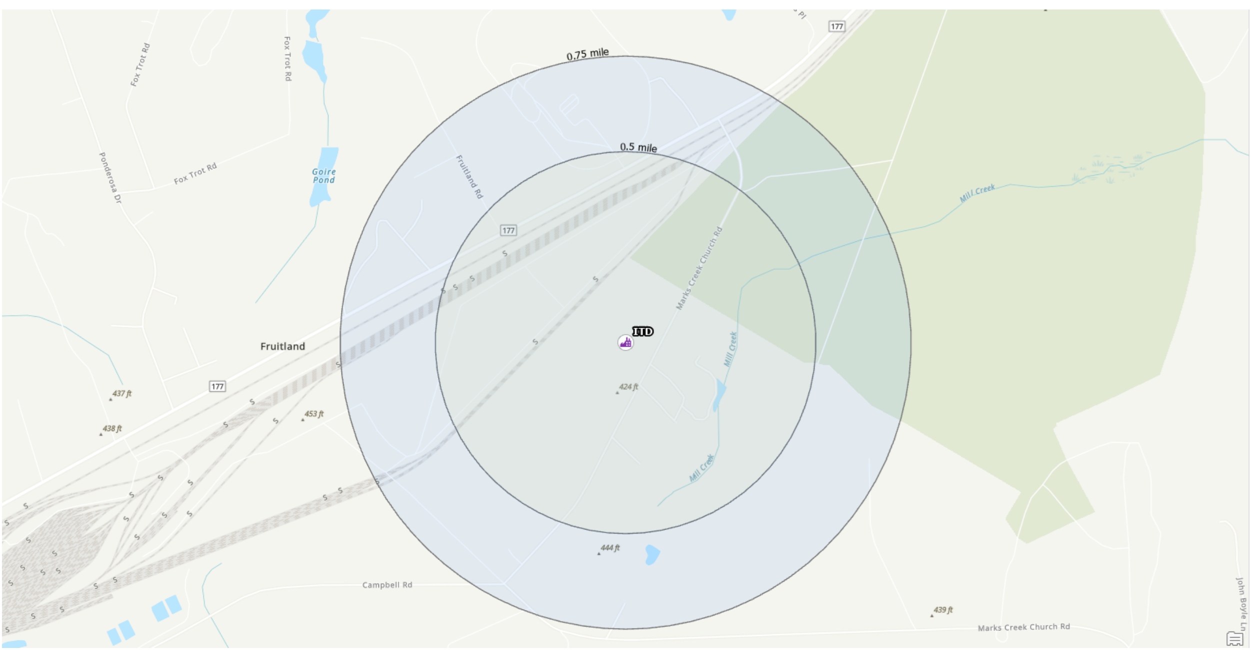


Figure A9:1: Our air monitoring trailer was located within the outer light blue ring

B1: Pollutants

Our BREDL Environmental Air Sampling Trailer (BEAST) is equipped to measure VOCs, PM 2.5, PM 10, NO2, NO, and NOx. Three of the six pollutants, which we monitored, are designated as criteria pollutants by U.S. EPA. PM 2.5, PM 10, and NO2 are criteria pollutants. According to the EPA, "criteria pollutants" are the six most common air pollutants for which National Ambient Air Quality Standards (NAAQS) are set by the agency to protect public health and welfare. These pollutants are: carbon monoxide, lead, ground-level ozone, nitrogen dioxide, particulate matter, and sulfur dioxide. The EPA regulates these pollutants by developing science-based guidelines (criteria) for setting permissible levels in the air.

Pollutant Regulatory Standards

Collected data for NO2, PM 2.5 and PM 10 will be screened for NAAQS comparison and to identify trends. VOC data will be used to identify trends and readings associated with specific sources – based on wind parameters.

"The Clean Air Act identifies two types of national ambient air quality standards. Primary standards provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings."[6]

The newly revised 2024 primary PM 2.5 health standard[7] will be emphasized during this project. While the 24-hour standard remained the same at 35 ug/m^3, the annual standard became more stringent, changing from 12.0 ug/m^3 to 9.0 ug/m^3. The EPA Air Quality Index[8] (AQI) has also been adjusted for this new standard. The new PM 2.5 primary standard went into effect on May 6, 2024. Since we will be limited by remaining at site locations for less than a year, we will focus on the short-term Averaging Time NAAQS, not the annual NAAQS.

[6] https://www.epa.gov/criteria-air-pollutants/naaqs-table
[7] Ibid.
[8] https://www.airnow.gov/aqi-and-health/

Figure B1-1: NAAQS Table[9] for Project's Monitored Pollutants

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Nitrogen Dioxide (NO2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb	Annual Mean
Particle Pollution (PM)	PM2.5	primary	1 year	9.0 µg/m3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m3	98th percentile, averaged over 3 years
	PM10	primary and secondary	24 hours	150 µg/m3	Not to be exceeded more than once per year on average over 3 years

Figure B1-2: Short-term Averaging Time NAAQS[10]

Pollutant	Type	Averaging Time	Concentration Level
NO_2	Primary	1-Hour	100 ppb
PM 2.5	Primary	24-Hour	35 ug/m^3
PM 10	Primary	24-Hour	150 ug/m^3

[9] https://www.epa.gov/criteria-air-pollutants/naaqs-table
[10] Ibid.

PM 2.5

Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles less than 2.5 micrometers in diameter (PM2.5) are referred to as "fine" particles and are believed to pose the greatest health risks among particulates. Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs.

PM 2.5 Health Impacts:

- *increased hospital admissions*
- *aggravated asthma Increases in respiratory symptoms (coughing, difficult/painful breathing)*
- *chronic bronchitis*
- *decreased lung function*
- *premature death*
- *increases dementia risk*
- *risks for heart attacks, heart disease, strokes, irregular heartbeat*
- *increases premature births*

Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, fires, etc.) and certain industrial processes. The primary chemical constituents of outdoor particles are sulfate, nitrate, and organic and black carbon.

PM 10

Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. PM10 describes inhalable particles, with diameters that are generally 10 micrometers and smaller. PM10 is referred to as coarse particulates. PM10 and PM2.5 often derive from different emissions sources, and also have different chemical compositions.

PM10 sources include combustion of gasoline, oil, diesel fuel and wood, dust from construction sites, crushing and grinding operations, landfills and agriculture, wildfires and brush/waste burning, industrial sources, wind-blown dust from open lands, pollen, mold and fragments of bacteria.

PM 10 Health Impacts:

Short-term exposure:

- *difficulty breathing*
- *coughing*
- *eye, nose, and throat irritation*
- *chest tightness and pain*
- *fatigue*
- *general respiratory discomfort*

Long-term exposure:

- *lung tissue damage*
- *asthma*
- *heart failure*
- *cancer*
- *adverse birth outcomes*
- *chronic obstructive pulmonary disease (COPD)*
- *premature death*

VOC

VOC is an abbreviation for volatile organic compounds. They are carbon-based substances that readily evaporate under normal air pressure and are commonly found in indoor and outdoor environments. These compounds can be harmful to human health and contribute to air pollution, particularly smog formation.

VOC Health Impacts:

- *eye, nose, and throat irritation*
- *headaches*
- *nausea*
- *difficulty breathing*
- *loss of coordination*
- *damage to the central nervous system*
- *damage to liver and kidneys*
- *Some VOCs are also carcinogens*

VOCs can be found in both indoor and outdoor environments, with sources ranging from household products to industrial processes and even natural sources. Outdoor sources include vehicle exhaust, fossil fuel burning, wood burning, industrial emissions, and natural sources (plants).

Examples of VOCs include: benzene, toluene, xylene, 1,3-butadiene, and formaldehyde.

NO

Nitric oxide is a colorless gas with the formula NO. It is one of the principal oxides of nitrogen. Nitric oxide is a free radical: it has an unpaired electron. An important intermediate in industrial chemistry, nitric oxide forms in combustion systems. Sources include combustion of fossil fuels and certain industrial processes. NO can be generated by lightning in thunderstorms.

NO Health Impacts:

- *contact can irritate skin and eyes*
- *irritate nose and throat*
- *irritate the lungs*
- *shortness of breath*
- *headaches*
- *fatigue*
- *dizziness*
- *nausea*

NO2

Nitrogen dioxide (NO2) is a reddish-brown, pungent gas that is a key component of air pollution, particularly in urban areas. It's a member of the nitrogen oxides family (NOx) and forms when nitrogen and oxygen react, often during combustion processes like burning fossil fuels. NO2 is a highly reactive gas that contributes to the formation of smog, acid rain, and other air pollutants, and it can also irritate the respiratory system.

NO2 Health Impacts:

- *can irritate airways in the human respiratory system.*
- *can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing),*
- *can increase hospital admissions and visits to emergency rooms.*
- *longer exposures may contribute to the development of asthma and potentially increase susceptibility to respiratory infections.*
- *Increased risk of death*

Sources of NO2 include emissions from vehicles, fossil fuel combustion, industrial processes, and natural sources such as lightning and forest fires. The burning of fuel is the primary source of emissions.

NOx

NOx is shorthand for nitric oxide (NO) and nitrogen dioxide (NO2), the nitrogen oxides that are most relevant for air pollution. These gases contribute to the formation of smog and acid rain, as well as affecting tropospheric ozone. NOx gases are usually produced in the air from the reaction between nitrogen and oxygen during combustion of fuels, such as hydrocarbons, and especially at high temperatures, such as in car engines. In areas of high motor vehicle traffic, such as in large cities, the nitrogen oxides emitted can be a significant source of air pollution. NOx gases are also produced naturally by lightning. Biomass burning is also a source of NOx.

NOx Health Impacts:

- *can irritate the respiratory system, leading to coughing, wheezing, shortness of breath, and difficulty breathing*
- *headaches*
- *nausea*
- *abdominal pain*
- *in some cases, reduce the body's ability to utilize oxygen*
- *long-term exposure can worsen asthma symptoms and may even contribute to the development of the condition.*
- *can exacerbate existing respiratory diseases, such as asthma, and can also worsen heart conditions*

B2: Local Emissions

There are several major emissions sources of our monitored pollutants in the Hamlet, North Carolina area. All five of these sources emit PM 2.5, PM 10, NO2, and VOCs.

- Enviva Pellet Plant
- International Tie Disposal
- CSX Railyard
- Duke Energy Gas Turbines
- North Carolina Electric Membership Corporation

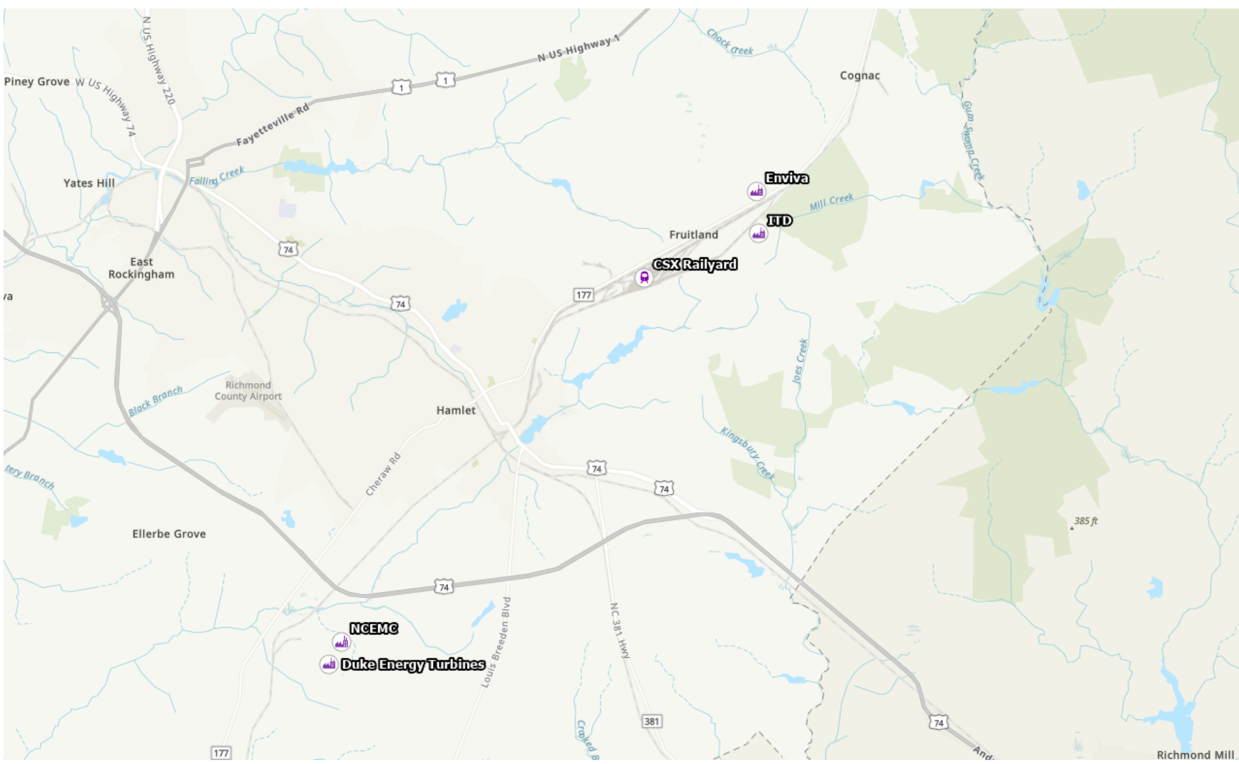


Figure B2-1: Map of Hamlet area major sources of emissions

In addition, there are other sources of these pollutants in the area including highways, asphalt plants, and various manufacturing operations.

C1: Findings

Key findings from our Site 1 data collection.

- There were no exceedances of the EPA health standards for PM 2.5 (35 ug/m3 for a 24-hour averaging time), PM 10 (150 ug/m3 for a 24-hour averaging time), and NO2 (100 ppb for a 1-hour averaging time) during our Site 1 data collection.
- Overall, VOC concentrations were low and often non-detectable.
- Only 8.3% of hourly average readings indicated a VOC concentration. That's only 269 hours of the total 3257 hours of Site 1 monitoring time.
- Overnight and early morning hours were the most prevalent time periods for VOCs. One possible explanation could be the heating of residences during cold nights.
- Spikes and higher concentrations of VOCs, when present, were usually short-lived ranging from under 5 minutes to a few hours.
- No definitive correlation could be determined if local or regional sources caused the spikes in observed VOC concentrations.
- Our highest 24-hour average for VOCs was 27.0 ug/m3 on March 13, 2025, equivalent to a high code yellow moderate day.
- Our highest one-hour average for VOCs was 154.8 ug/m3 on March 7, 2025 at 3 PM. Using the EPA NowCast algorithm, March 7 would have experienced an unhealthy code red during the late afternoon. There was a five-minute period where PM2.5 levels were over 300 ug/m3, which would have triggered hazardous air quality if sustained for much of the hour.
- Not surprising, local prescribed burns in the area deteriorated the local air quality. Prescribed burns most likely were the main contributor to high PM levels on March 7 and 13, as well as other days not highlighted here.
- When localized events occur, such as prescribed burns or industrial fires, communities without air monitors do not have access to reliable air quality data. For example, the March 7, 2025 particulate matter spike was shown by our BEAST but was not indicated by existing regional agency monitors.
- A brief spike on March 9 led to the highest PM 10 one-minute readings at Site 1. The highest PM 10 concentration was an extremely high level of 2739 ug/m3, indicating hazardous air quality for a brief period – less than 5 minutes.
- PM 10 concentrations were relatively even no matter which day of the week. The lowest average concentration was 12.2 ug/m3 on Sundays and the highest average concentration was 15.5 ug/m3 on Thursdays.

- Only 12 - or 0.36% - of Nitric Oxide hourly averages were of concentrations of at least 5 ppb or greater.
- 3 of our top 4 hourly averages of NO occurred on one day – January 25 from 6 AM – 8:59 AM.
- Only 3 hourly averages of NO during our Site 1 monitoring had average concentrations over 10 ppb.
- NO2 and NOx levels were lower during the daytime when compared to overnight, early morning and evening hours.
- NO2 levels were lower on Sundays with Fridays experiencing the highest concentrations.
- There were only 21 hours during our Site 1 monitoring when the NO2 levels were 10 ppb or greater.
- Regional agency air monitors were located 30 to 85 miles from where the BEAST gathered data. We screened three PM 2.5 monitors, two NO2 monitors, and one PM 10 monitor.
- One of the six agency monitors screened with similar results as the BEAST. Over 83% of the Chesterfield PM 2.5 monitor's daily 24-hour averages were within 2 ug/m3 of the BEAST measurements. The W Owen PM 10 monitor's daily 24-hour averages were within 2 ug/m3 of the BEAST only about 59% of the time.
- Our BEAST NO2 measurements indicated lower concentrations when screened with the nearest agency monitors.

Recommendations

- Prescribed burns must not be conducted when mid to high moderate days of PM are forecast as the additional air pollution could lead to unhealthy air quality.
- When prescribed burns will cover a large area, mobile air monitors with real-time access to data should be located in communities to alert people who may be more sensitive to bad air quality.

C2: Limitations

- BREDL is limited to 4 to 4.5 months of monitoring at our locations. Pollution levels may vary depending on the time of year.
- While limitations will exist for an annual set of data, the short-term data will still provide insight on impacts to air quality issues. It will help to identify trends.
- Facility emissions may be higher or lower depending on seasonal operations.
- VOC data is limited to total VOCs, which does not include all types of VOCs.
- There are limitations of both funding and technical requirements that restrict how much air monitoring equipment we can utilize during this project. Our EPA grant funding only covers the air monitoring equipment that was approved by EPA. However, there may additional equipment needs in the future.
- BREDL's Air Monitoring Project utilizes FRM, FEM and "near reference" level equipment. However, our project's purpose and objectives are not tied to the EPA Air Now or NAAQS air monitoring network. BREDL is gathering data for screening levels and identifying trends for NO2, PM, and VOCs. Regulatory requirements for EPA's Air Now and NAAQS air monitoring network, such as annual performance audits and recommended procedures, are not deemed necessary for the successful completion of the CARE-4-Air project. Therefore, these more stringent requirements and recommendations are not listed in our QAPP requirements.
- While we strive to have the best possible site for the trailer, there are many limitations: willing site host, proximity to sources, proximity to interference, availability of power, and availability of cellular service.
- For protection of site host privacy, BREDL will not be publishing the exact location of our BEAST sites. This will limit some of our data presentations. For example, we will not publish pollution roses indicating the exact location of our BEAST showing the pollution concentrations in relation to wind direction.

C3: Challenges

These are the main challenges we encountered at our first site.

1: PM Mass Monitor Pump PWM

In December 2024, our PM Mass Monitor internal pump displayed readings indicating the pump was failing. Pump readings, which are normally at 40%, were approaching 95%. We were able to get the replacement pump installed before the pump completely failed. The new pump was installed on December 30, 2024 with no issues. Readings returned to lower part of normal range at 40%. The pump was under warranty and was replaced at no cost.

2: PM Mass Monitor Leak Check – DFU filter

While doing scheduled monthly maintenance on January 23, 2025, Ops Manager was unable to get a proper leak check reading of 0.0 for particulates. Wilbur Technical Services said that the manufacturer had sent out a technical notice that the DFU filter needed to be replaced. WTS sent us a new one prior to the next scheduled maintenance. Both the old and new filters were tested. The tests indicated the leak check issue was with the DFU filter and not the unit. Therefore, all data was verified as okay.

3: PM Mass Monitor Span Deviation

Daily check of PM Span Deviation parameter indicated a higher than normal reading on January 25, 2025 and March 15, 2025. The Ops Manager, checked the manual, which indicated readings are okay unless they reach +/- 3 over an “inordinate period”. The Span Deviation parameter returned to lower readings within the next couple of days, with no maintenance intervention needed.

4: NO/NO2/NOx Analyzer Calibrations

On February 17, 2025, our regularly scheduled NO2 monitor calibration failed. The Ops Manager notified WTS Tech Support. WTS checked instrument, diagnostics and temperature. All were okay. WTS ran a manual calibration, then re-ran the auto sequence. NO2 calibration passed.

On February 24, 2025, the next regularly scheduled NO2 monitor calibration failed -again. The Ops Manager notified WTS. WTS had the Ops Manager adjust Zero Air pressure to 30 during his monthly onsite visit. WTS re-ran calibration.

On March 3, 2025, the regularly scheduled NO2 monitor calibration failed a third time. WTS manually re-ran on March 5, 2025. WTS got a successful calibration on March 7, 2025. WTS checked their sources on possible causes/issues.

Another calibration failure occurred on March 10, 2025.

As of March 17, 2025, WTS seems to have resolved the automatic calibration run issue with the NO2 monitor, as the calibrations have returned to weekly passes.

5: Wind Speed and Max Wind Speed Unit of Measurement

Wind speed and Max wind speed data in the on board DAS computer was labelled as being in the unit of mph (miles per hour). However, the data was in the unit m/s (meters per second). We opted to change the data in the DAS to present weather data in mph by multiplying the existing m/s data by 2.237. The DAS columns of data were changed on Feb. 28, 2025 at 11:12 AM by Thomas Wilbur of WTS. Therefore, for the data files stored on the DAS the wind speed and max wind speed data will reflect m/s up to Feb. 28, 2025 11:12 AM. DAS data after Feb. 28, 2025 at 11:12 AM will reflect mph. BREDL QC spreadsheets have been corrected from our collocation data (11/14/2024) through Feb. 28, 2025 at 11:11 AM to reflect the unit of mph. Data from Feb. 28, 2025 at 11:12 AM moving forward were not adjusted as that data will correctly reflect mph.

6: AQS-1 VOC Data timestamp

The AQS-1 VOC Data Timestamp was set to change with the time change on March 9, 2025 to daylight saving time. We discovered the issue on April 7, 2025 when we were shutting down the trailer for relocation. WTS changed the time setting to Eastern Standard Time on April 9, 2025 when the trailer was not collecting data. BREDL adjusted the VOC data to reflect Eastern Standard Time from March 9, 2025 at 2 AM through April 7, 2025 at 11 AM when data collection at Site 1 was completed. WTS said EPA policy is to use eastern standard time– even during daylight saving time. All of our QC spreadsheets are correct. QC reflects eastern standard time for all of our data.

D1: Data

Quality Control Data was gathered beginning at 6 PM on November 22, 2024 and concluding at 11 AM on April 7, 2025.

We take a reading for each pollutant and weather parameter every minute. Thus, we collect 60 data readings per hour, 1440 per day.

The hour average time reflects the start of collection for the period. For Example, a 10:00 PM reading reflects the average of minute readings from 10:00 PM – 10:59 PM.

All times reflect eastern standard time. In keeping with EPA policy[11], times during daylight saving time are not adjusted for the time change – times will still reflect eastern standard time.

[11] AIRS User's Guide Volume AQ2: Air Quality Data Coding, EPA-454/B-94-006, February 1994, section 7.2.3, page 7-19

D2: Data – Volatile Organic Compounds

Our Aeroqual VOC module contains a PID (Photoionization Detector) sensor. This PID sensor detects a very wide range of VOCs, including aromatic hydrocarbons; however, it does not detect formaldehyde, methane, ethane, propane, and low molecular weight alcohols (such as ethanol, propanol, and butanol). The detected VOCs are measured as total VOCs.

VOCs Findings

- Overall, VOCs concentrations were low and often non-detectable.
- Overnight and early morning hours were the most prevalent time periods for VOCs. One possible explanation could be the heating of residences during cold nights.
- Spikes and higher concentrations of VOCs, when present, were usually short-lived ranging from under 5 minutes to a few hours.
- No definitive correlation could be determined if local or regional sources caused the spikes in observed VOCs concentrations.
- Only 8.3% of hourly average readings indicated a VOC concentration. That's only 269 hours of 3257 hours of Site 1 monitoring time.

Data Presentations

BREDL data presentations for VOCs include hour averages (the average of 60 one-minute readings). Wind and pollution roses use the one minute readings (1440 per day).

Time of day bar graphs are used to examine time periods of the day. For example, is there one part of the day where the pollution registered higher or lower? We also examined pollution levels by day of the week. Was there a particular day where the pollution was higher or lower?

Figures D2-1 – D2-7 plot hour averages for the entire collection period and for each month. These averages take the 60 one-minute readings for each hour and average them for the hour average.

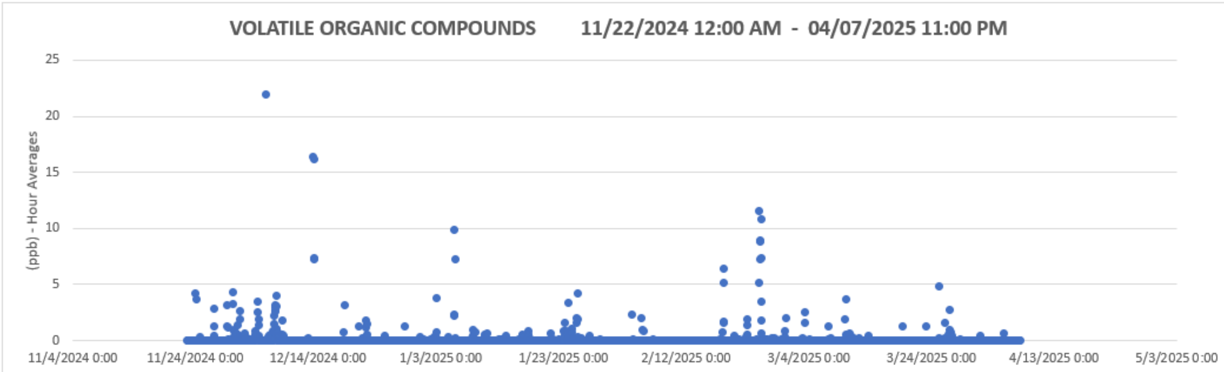


Figure D2-1: VOCs Hour Averages – Entire Collection Period

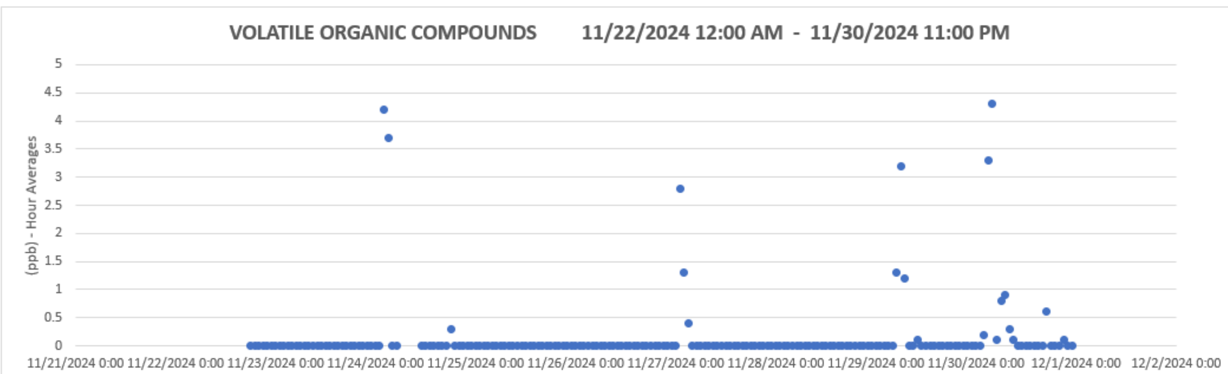


Figure D2-2: VOCs Hour Averages – November

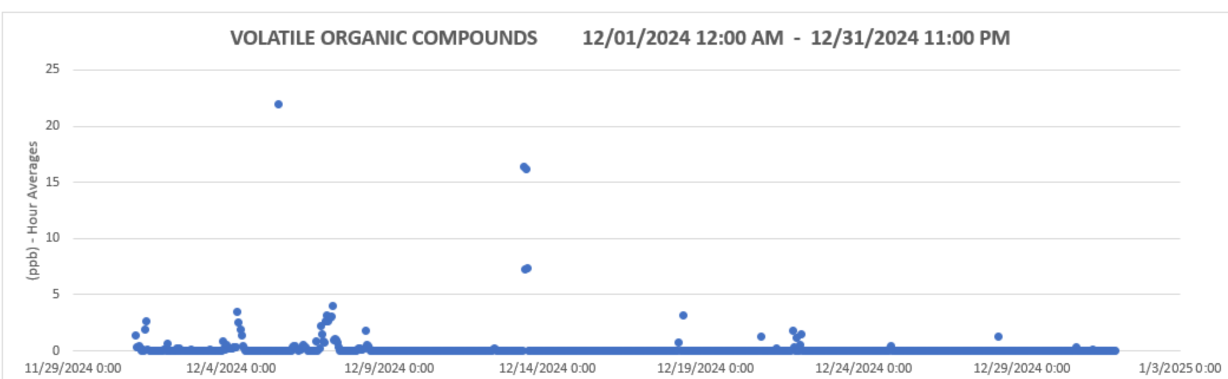


Figure D2-3: VOCs Hour Averages – December

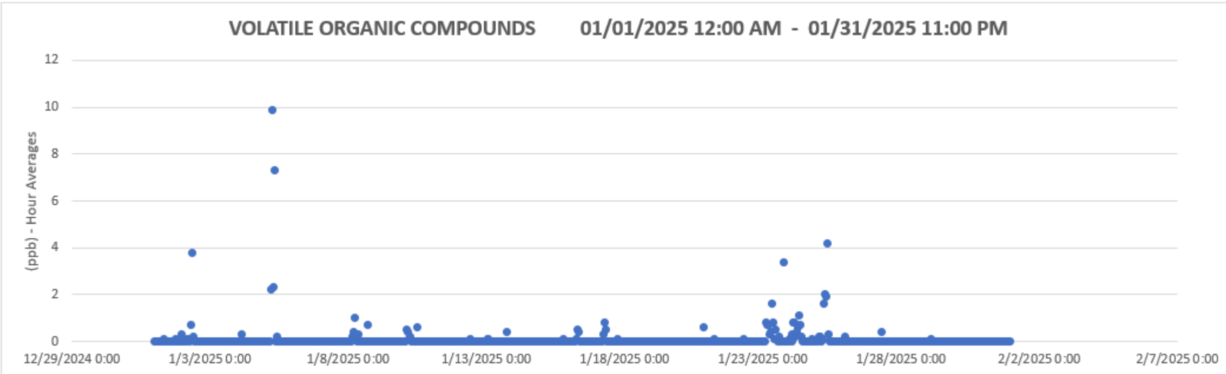


Figure D2-4: VOCs Hour Averages – January

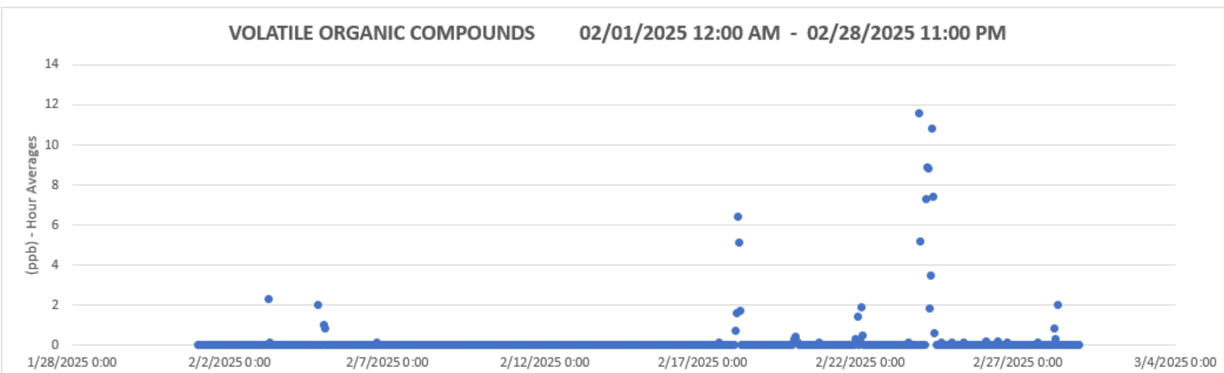


Figure D2-5: VOCs Hour Averages – February

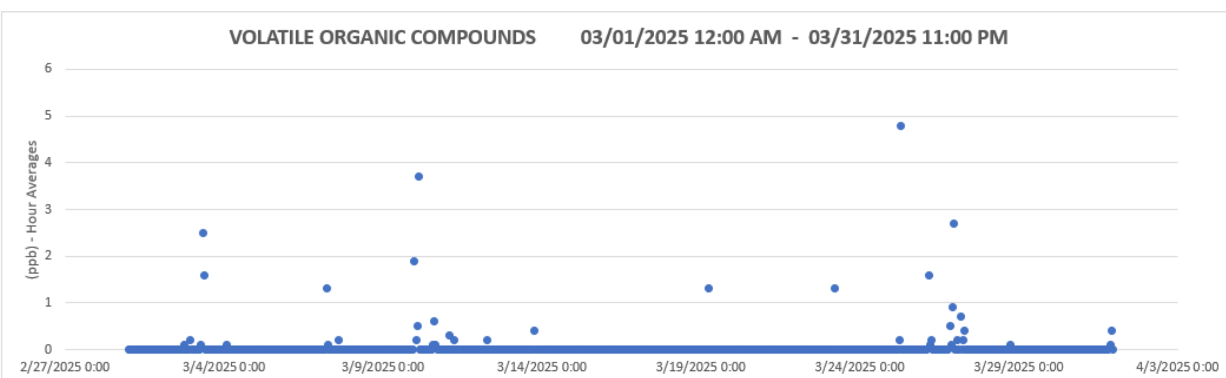


Figure D2-6: VOCs Hour Averages – March

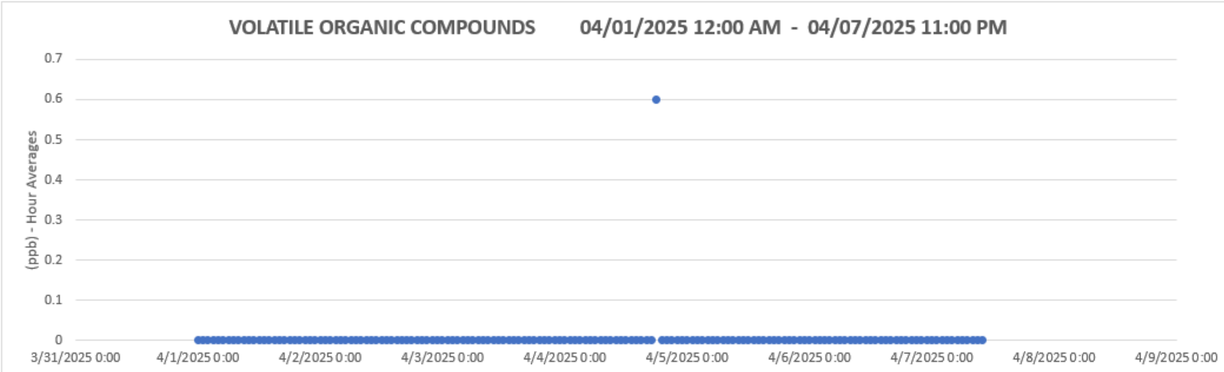


Figure D2-7: VOCs Hour Averages – April

Figures D2-8 – D2-14 plot averages based on the time of day for the entire collection period and for each month. During our collection period, VOCs were more present in the overnight and early morning hours, which indicate the VOCs are not from vehicular traffic.

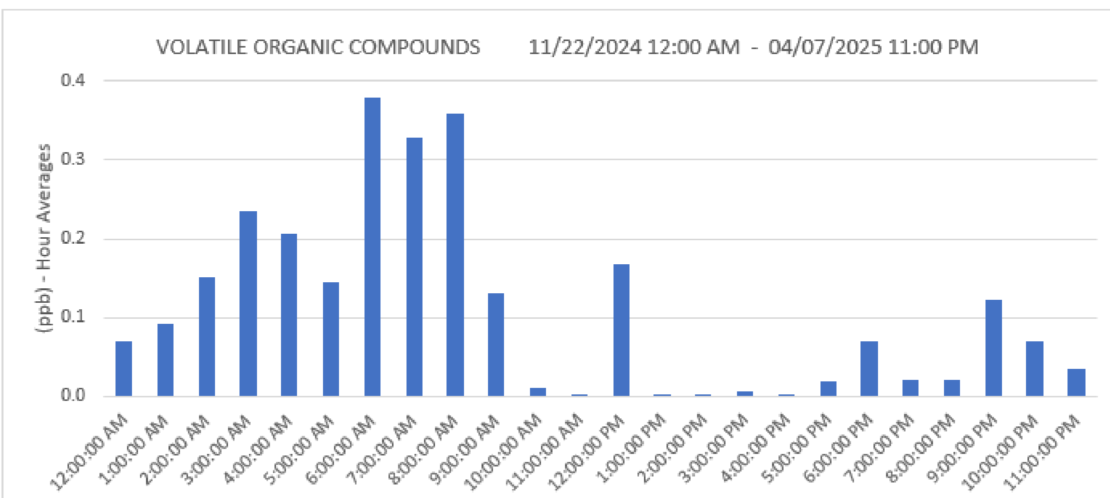


Figure D2-8: VOCs Hour Averages – Based on Time of Day for Collection Period

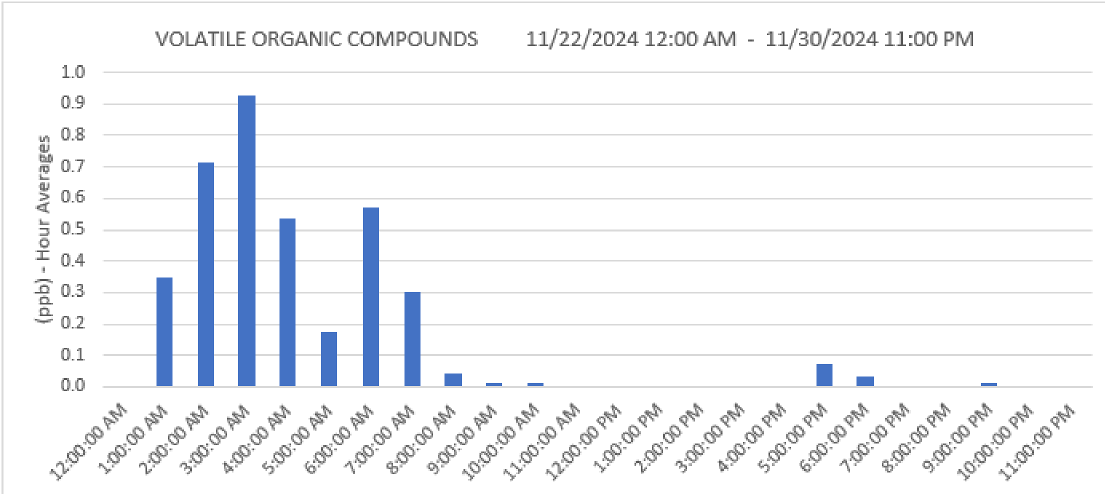


Figure D2-9: VOCs Hour Averages – Based on Time of Day for November

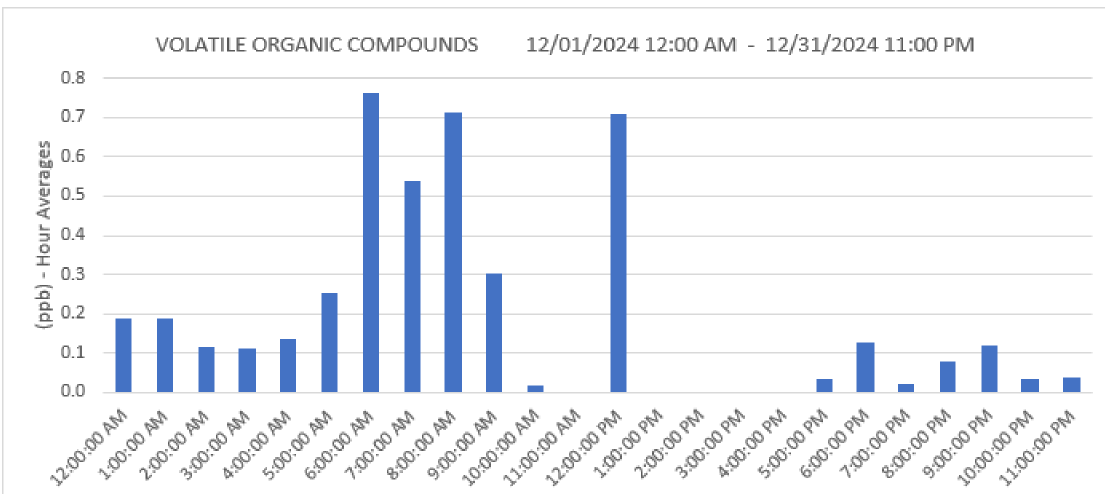


Figure D2-10: VOCs Hour Averages – Based on Time of Day for December

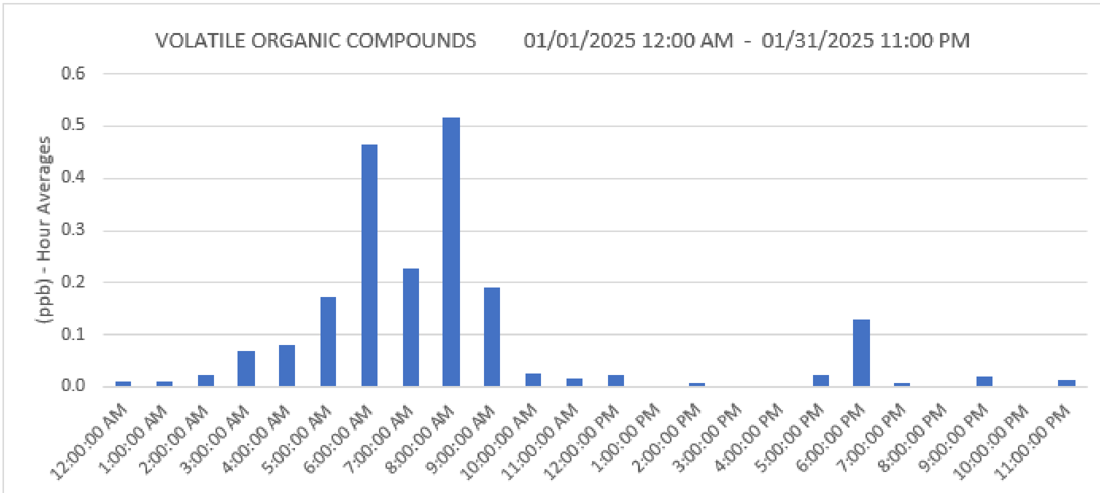


Figure D2-11: VOCs Hour Averages – Based on Time of Day for January

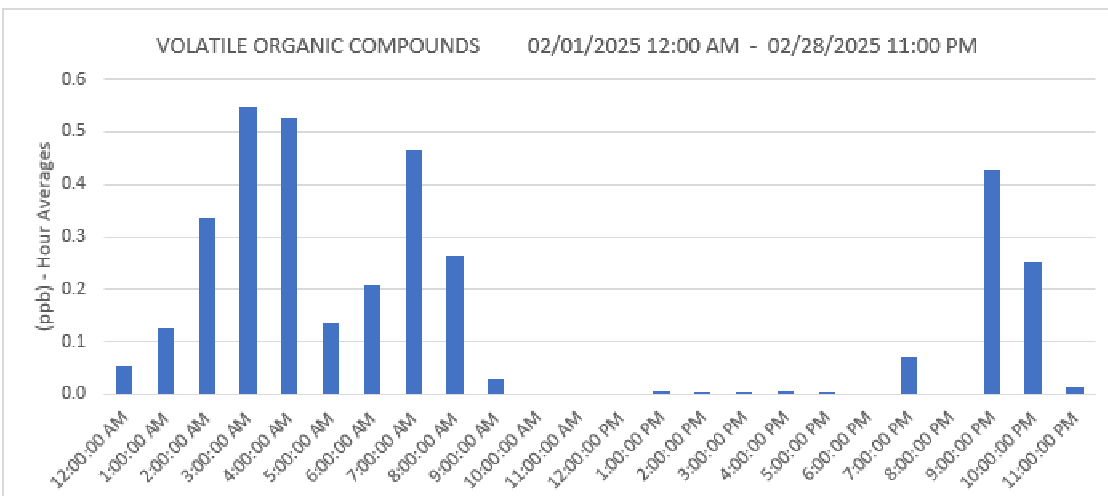


Figure D2-12: VOCs Hour Averages – Based on Time of Day for February

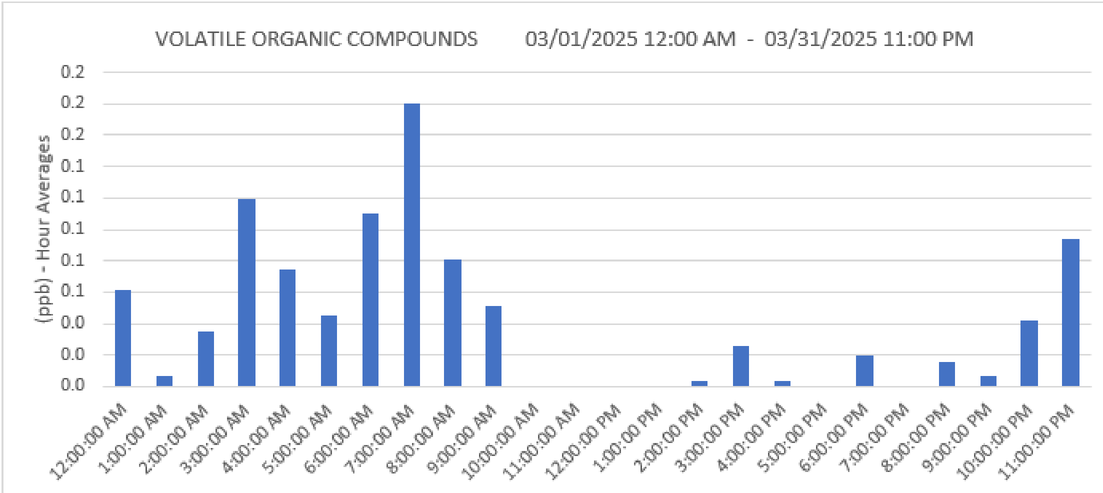


Figure D2-13: VOCs Hour Averages – Based on Time of Day for March

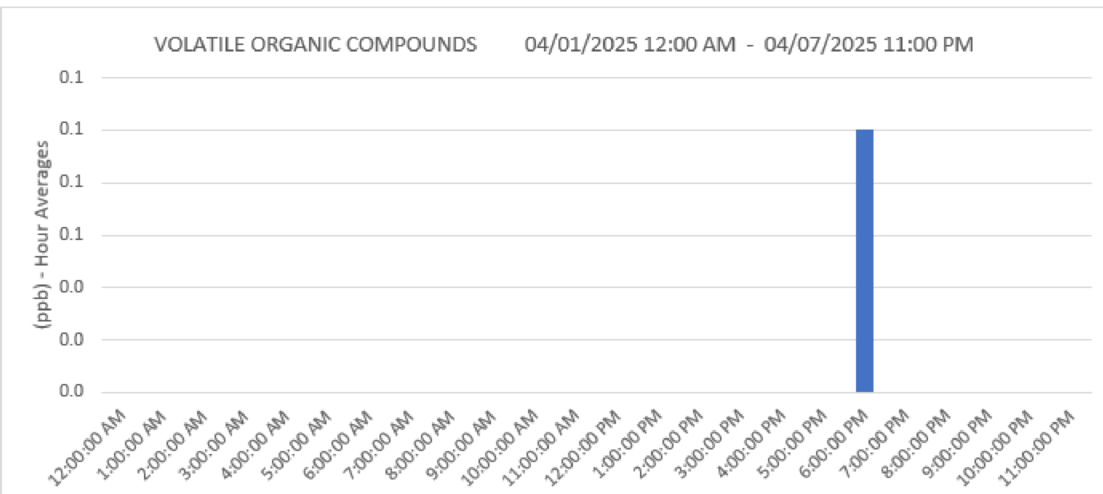


Figure D2-14: VOCs Hour Averages – Based on Time of Day for April

VOLATILE ORGANIC COMPOUNDS Top 25 Concentrations (ppb) - Hour Averages 11/22/2024 12:00 AM - 04/07/2025 11:00 PM		
Rank	Concentration	Date & Time
1	22.0	12/5/2024 12:00 PM
2	16.4	12/13/2024 6:00 AM
3	16.2	12/13/2024 8:00 AM
4	11.6	2/23/2025 9:00 PM
5	10.8	2/24/2025 7:00 AM
6	9.9	1/5/2025 6:00 AM
7	8.9	2/24/2025 3:00 AM
8	8.8	2/24/2025 4:00 AM
9	7.4	2/24/2025 8:00 AM
10	7.4	12/13/2024 9:00 AM
11	7.3	2/24/2025 2:00 AM
12	7.3	1/5/2025 8:00 AM
13	7.3	12/13/2024 7:00 AM
14	6.4	2/18/2025 3:00 AM
15	5.2	2/23/2025 10:00 PM
16	5.1	2/18/2025 4:00 AM
17	4.8	3/25/2025 7:00 AM
18	4.3	11/30/2024 4:00 AM
19	4.2	1/25/2025 8:00 AM
20	4.2	11/24/2024 2:00 AM
21	4.0	12/7/2024 5:00 AM
22	3.8	1/2/2025 9:00 AM
23	3.7	3/10/2025 3:00 AM
24	3.7	11/24/2024 3:00 AM
25	3.5	2/24/2025 6:00 AM

Figure D2-15: VOCs Hour Averages – Top 25 Concentrations

Figures D2:16 and D2:17 pollution roses display the pollutant concentration based on wind direction, which can indicate the direction of the pollution source.

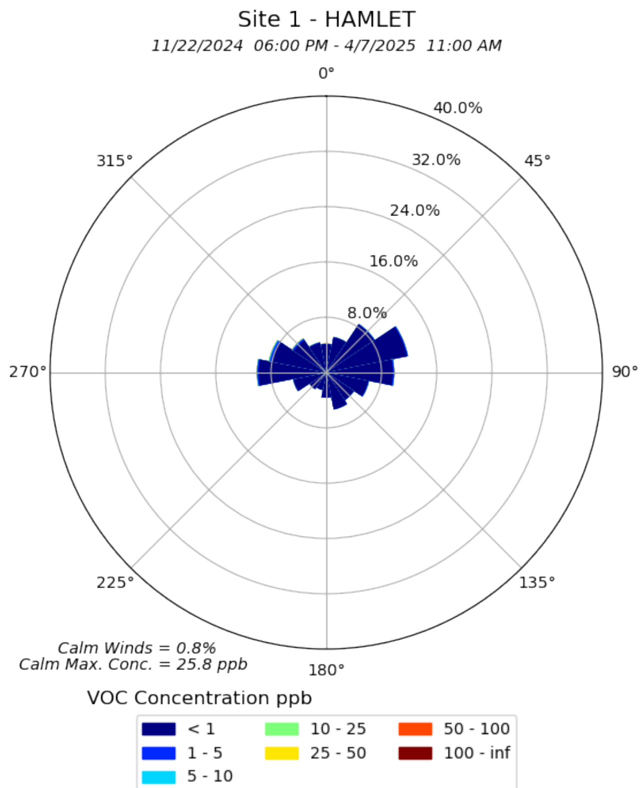


Figure D2-16: Pollution Rose

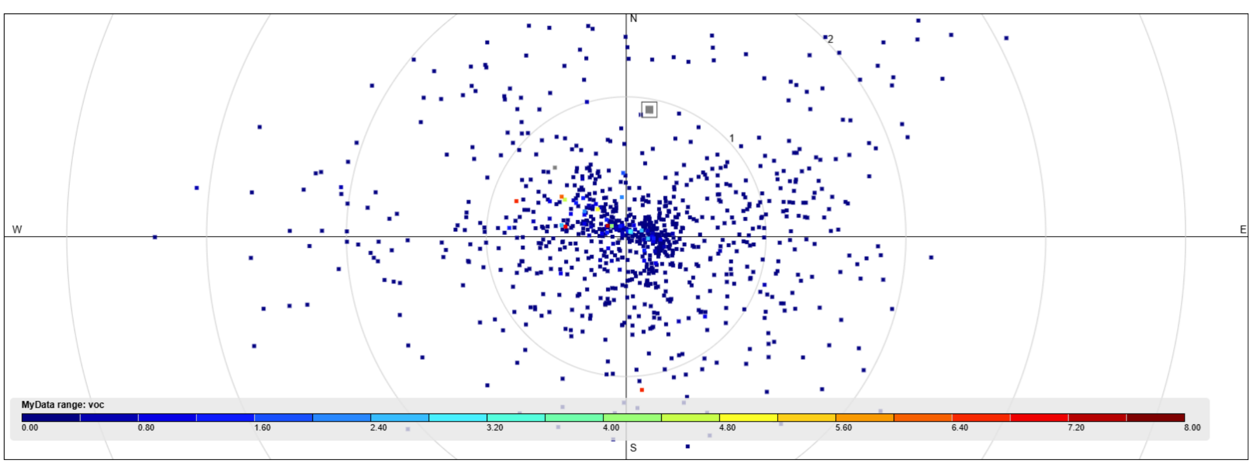


Figure D2-17: EPA RETIGO Pollution Rose 11/22/2024 - 4/7/2025

We separated the VOC minute concentrations of at least 25 ppb and plotted those on a pollution rose for a better visual representation of the direction of the highest concentrations.

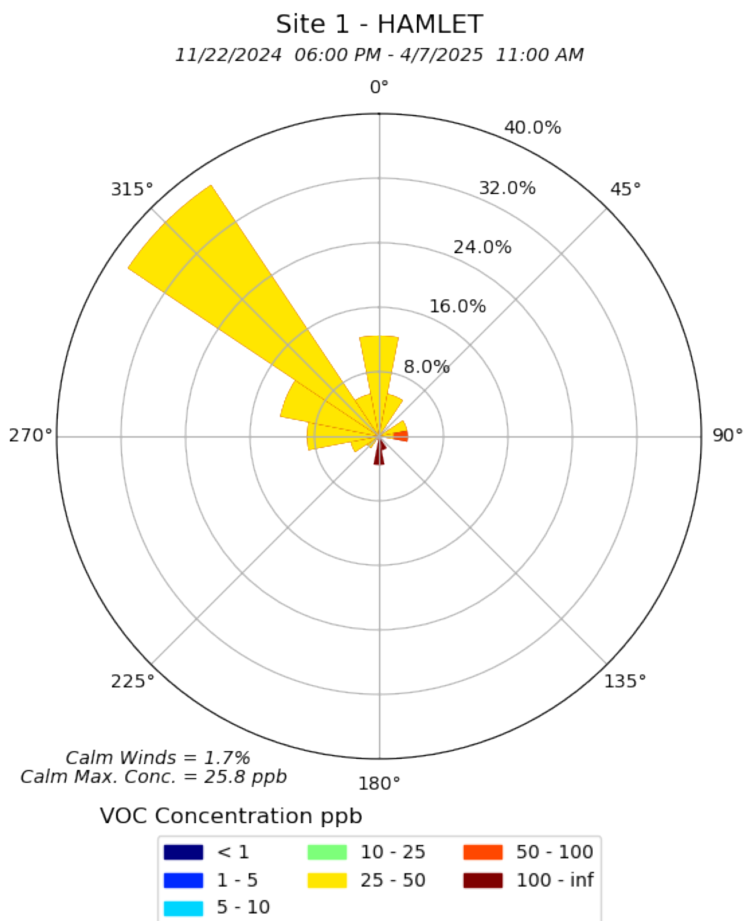


Figure D2-18: Pollution Rose displaying VOC concentrations of at least 25 ppb.

VOC Spikes

There were a few notable spikes of VOC data during our monitoring period. The spikes may have drifted in from outside the local area or originated from localized sources such as industrial and railyard emissions. Spikes would exist for just under 5 minutes up to over an hour.

December 5, 2024 Spike

- Spike lasted only 3 minutes with a high concentration of 814 ppb. This was the highest VOC concentration that we measured at our Site 1 location.
- Outside those 3 minutes from 12:41 PM – 12:43 PM, concentrations were very low to non-detectable for the remainder of the day.
- There are no stationary emission sources in close proximity of the BEAST based on the wind direction for this spike.
- Wind direction was the same direction 15 minutes prior and 15 minutes after spike.
- Possibility that this VOC pollution wave originated from within the region and not locally.
- No definitive explanation available.

VOLATILE ORGANIC COMPOUNDS Top 25 Concentrations (ppb) Minute Readings 12/05/2024 12:00 AM - 12/05/2024 11:59 PM		
Rank	Concentration	Time
1	814.0	12:42:00 PM
2	265.4	12:43:00 PM
3	241.9	12:41:00 PM
4	1.6	11:14:00 PM
5	1.5	11:00:00 PM
6	1.4	11:15:00 PM
7	1.2	11:13:00 PM
8	1.2	11:12:00 PM
9	1.1	11:40:00 PM
10	0.9	11:38:00 PM
11	0.9	11:20:00 PM
12	0.9	11:11:00 PM
13	0.8	11:43:00 PM
14	0.8	11:42:00 PM
15	0.8	11:41:00 PM
16	0.8	11:23:00 PM
17	0.7	11:44:00 PM
18	0.6	11:24:00 PM
19	0.6	9:51:00 PM
20	0.5	11:45:00 PM
21	0.5	11:22:00 PM
22	0.5	11:19:00 PM
23	0.5	11:02:00 PM
24	0.5	11:01:00 PM
25	0.4	11:39:00 PM

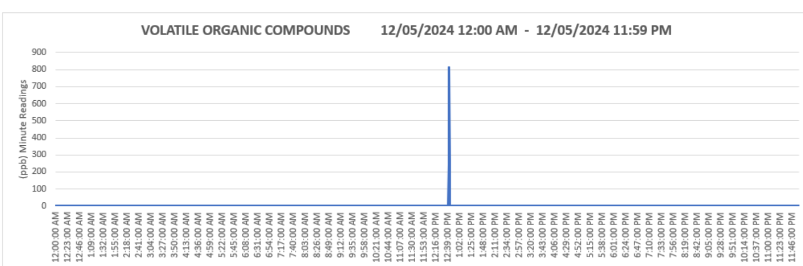


Figure D2-19: Graph displaying spike and Table of Top 25 Concentrations for Dec. 5

December 13, 2024 Spike

- Site Host reported a pine scent around 8 AM on Dec. 13, 2024.
- All monitored pollutants showed an increase around the 8:15 AM time period.
- Time period from 6 AM – 9:59 AM indicated VOCs concentrations; whereas, remainder of the day's hourly averages measured 0.0 ppb, non-detectable.
- The hourly averages during this spike were the second and third highest concentrations of VOCs measured at Site 1. Three of the top ten hourly averages at Site 1 were during this spike.
- Possible sources could have been from railyard and local industrial sources, although wind was not directly blowing from industrial sources. Wind direction was at least 45 degrees from local major industrial sources.

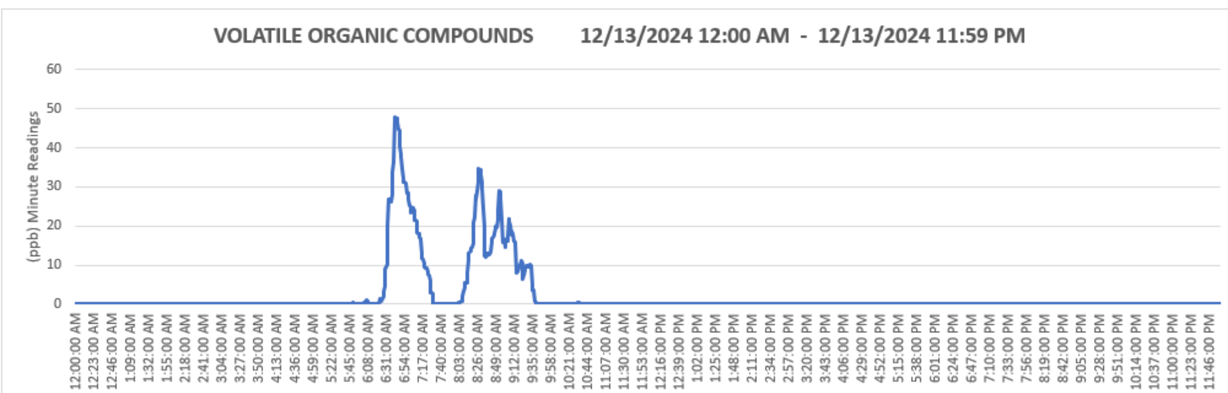


Figure D2-20: Graph displaying spikes

VOLATILE ORGANIC COMPOUNDS Top 25 Concentrations (ppb) Minute Readings 12/13/2024 12:00 AM - 12/13/2024 11:59 PM		
Rank	Concentration	Time
1	48.0	6:42:00 AM
2	47.7	6:43:00 AM
3	47.6	6:44:00 AM
4	46.8	6:41:00 AM
5	46.5	6:45:00 AM
6	44.8	6:46:00 AM
7	44.4	6:47:00 AM
8	40.4	6:48:00 AM
9	38.5	6:49:00 AM
10	37.7	6:50:00 AM
11	36.4	6:40:00 AM
12	34.6	8:27:00 AM
13	34.6	6:51:00 AM
14	34.4	8:29:00 AM
15	33.6	6:39:00 AM
16	33.2	8:28:00 AM
17	33.1	8:30:00 AM
18	32.2	6:52:00 AM
19	31.3	8:31:00 AM
20	31.3	8:26:00 AM
21	31.2	6:54:00 AM
22	31.2	6:53:00 AM
23	31.0	6:55:00 AM
24	30.8	6:56:00 AM
25	29.6	8:32:00 AM

VOLATILE ORGANIC COMPOUNDS Hour Averages Ranked by Highest (ppb) Hour Averages 12/13/2024 12:00 AM - 12/13/2024 11:59 PM		
Rank	Concentration	Time
1	16.4	6:00:00 AM
2	16.2	8:00:00 AM
3	7.4	9:00:00 AM
4	7.3	7:00:00 AM
5	0.0	11:00:00 PM
6	0.0	10:00:00 PM
7	0.0	9:00:00 PM
8	0.0	8:00:00 PM
9	0.0	7:00:00 PM
10	0.0	6:00:00 PM
11	0.0	5:00:00 PM
12	0.0	4:00:00 PM
13	0.0	3:00:00 PM
14	0.0	2:00:00 PM
15	0.0	1:00:00 PM
16	0.0	12:00:00 PM
17	0.0	11:00:00 AM
18	0.0	10:00:00 AM
19	0.0	5:00:00 AM
20	0.0	4:00:00 AM
21	0.0	3:00:00 AM
22	0.0	2:00:00 AM
23	0.0	1:00:00 AM
24	0.0	12:00:00 AM

Figure D2-21: Tables displaying Top 25 Concentrations and Hourly Averages Ranked

D3: Data – Particulate Matter 2.5

PM2.5 Findings

- There were no 24-hour exceedances of the EPA health standard (35 ug/m3) for PM 2.5 during our Site 1 data collection.
- Our highest 24-hour average was 27.0 ug/m3 on March 13, 2025, equivalent to a high code yellow moderate day.
- Our highest one-hour average was 154.8 ug/m3 on March 7, 2025 at 3 PM. Using the EPA NowCast algorithm, March 7 would have experienced an unhealthy code red during the late afternoon. There was a five-minute period where PM2.5 levels were over 300 ug/m3, which would have triggered hazardous air quality if sustained for much of the hour.
- Not surprising, local prescribed burns deteriorated the local air quality. Prescribed burns most likely were the main contributor to high PM levels on March 7 and 13, as well as other days not highlighted here.
- When localized events occur, such as prescribed burns or industrial fires, communities without air monitors do not have access to reliable air quality data. For example, the March 7, 2025 particulate matter spike was shown by our BEAST but was not indicated by existing regional agency monitors.

PM2.5 Recommendations

- Prescribed burns must not be conducted when mid to high moderate days of PM are forecast as the additional air pollution could lead to unhealthy air quality.
- When prescribed burns will cover a large area, mobile air monitors with real-time access to data should be located in communities to alert people who may be more sensitive to bad air quality.

Data Presentations

BREDL data presentations for PM 2.5 include hour averages (the average of 60 one-minute readings) and 24-hour daily averages (the average of 24 one-hour readings). Wind and pollution roses use the one minute readings (1440 per day).

Time of day bar graphs are used to examine time periods of the day. For example, is there one part of the day where the pollution registered higher or lower? We also examined pollution levels by day of the week. Was there a particular day where the pollution was higher or lower?

Figures D3-1 – D3-15 plot hour averages for the entire collection period and for each month. The hour averages take the 60 one-minute readings for each hour and average them for the hour average. The day (24-hour) averages take the 24 one-hour averages and average them.

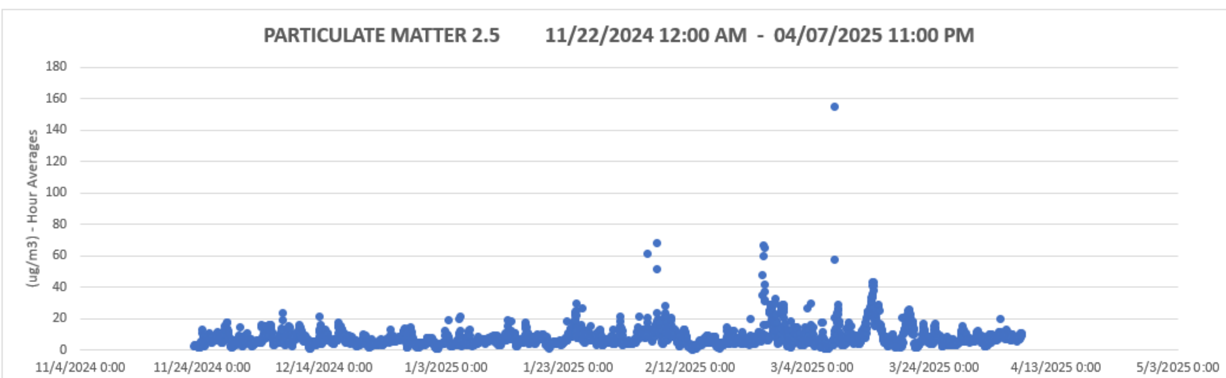


Figure D3-1: PM2.5 Hour Averages – Entire Collection Period

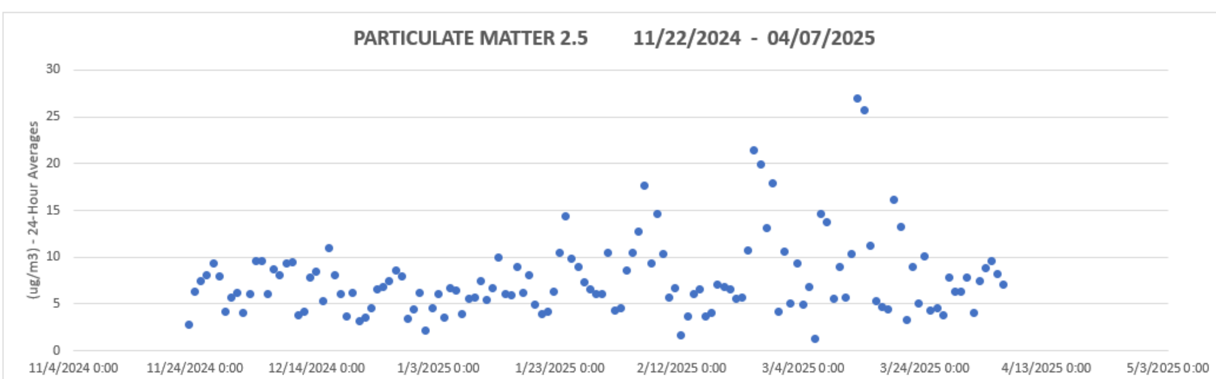


Figure D3-2: PM2.5 Day (24-Hour) Averages – Entire Collection Period

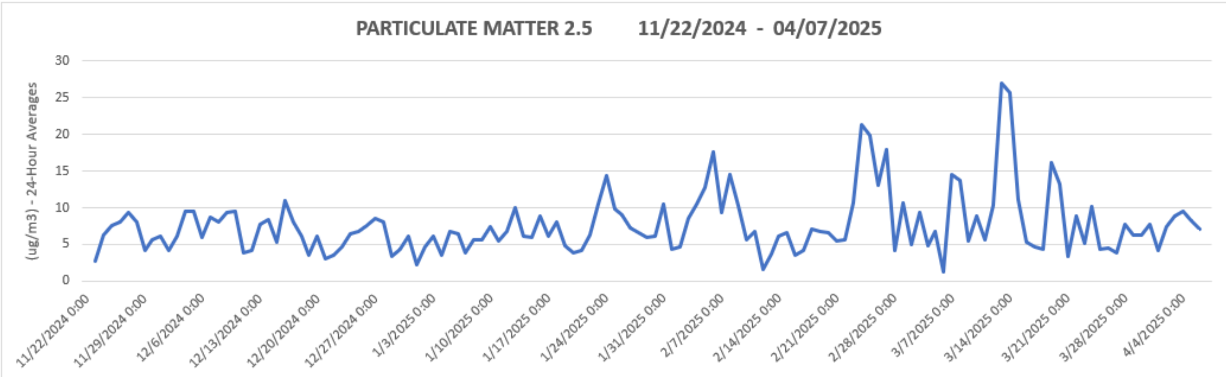


Figure D3-3: PM2.5 Day (24-Hour) Averages – Entire Collection Period

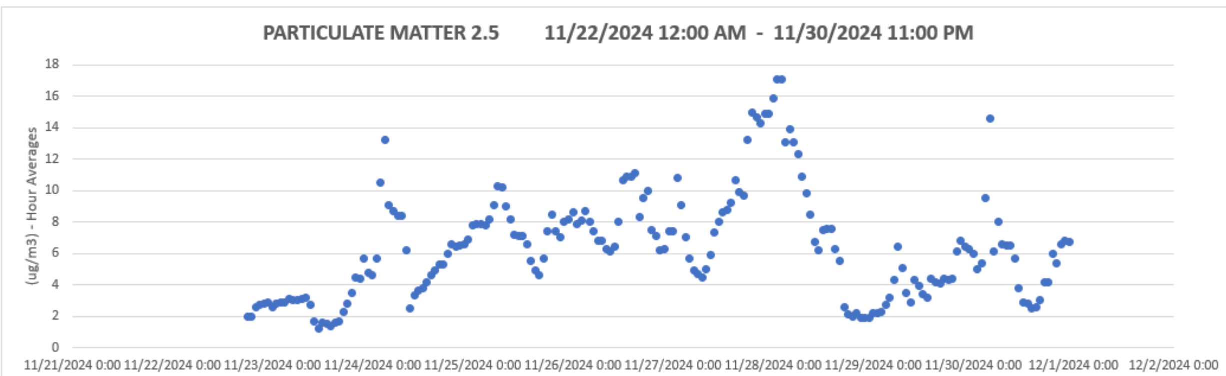


Figure D3-4: PM2.5 Hour Averages –November

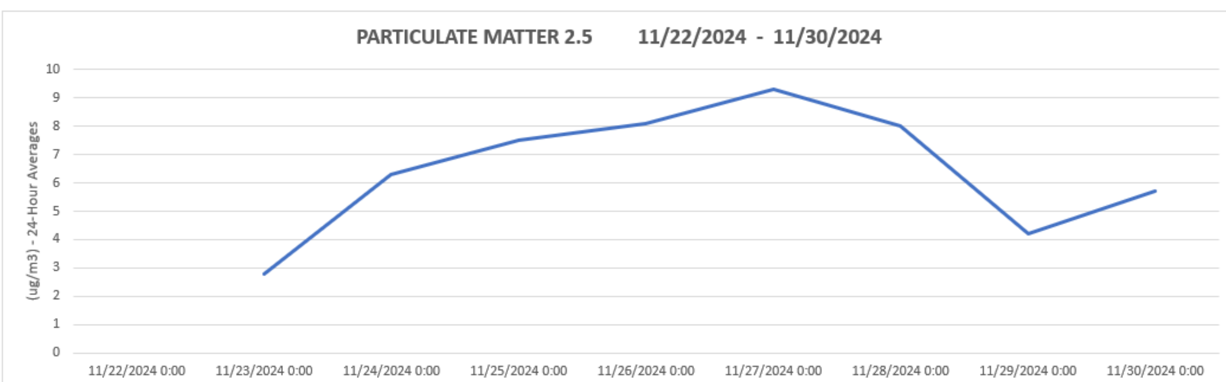


Figure D3-5: PM2.5 Day (24-Hour) Averages –November

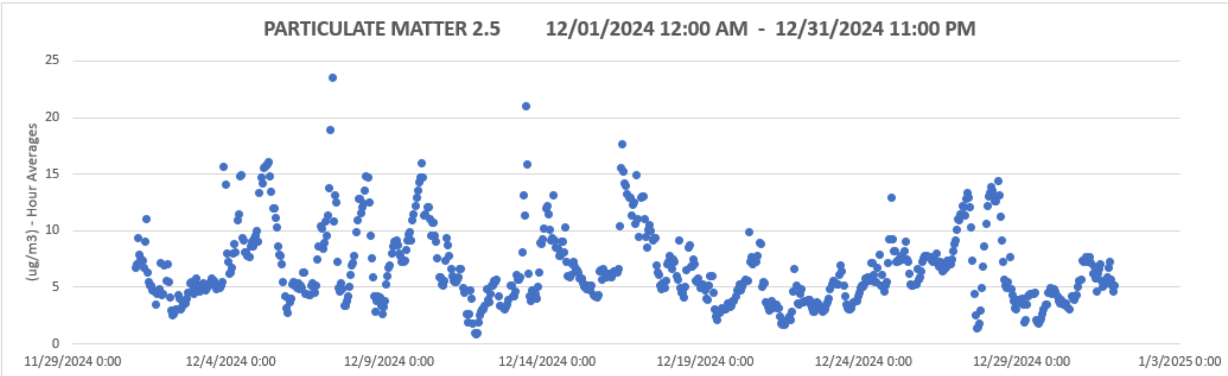


Figure D3-6: PM2.5 Hour Averages –December

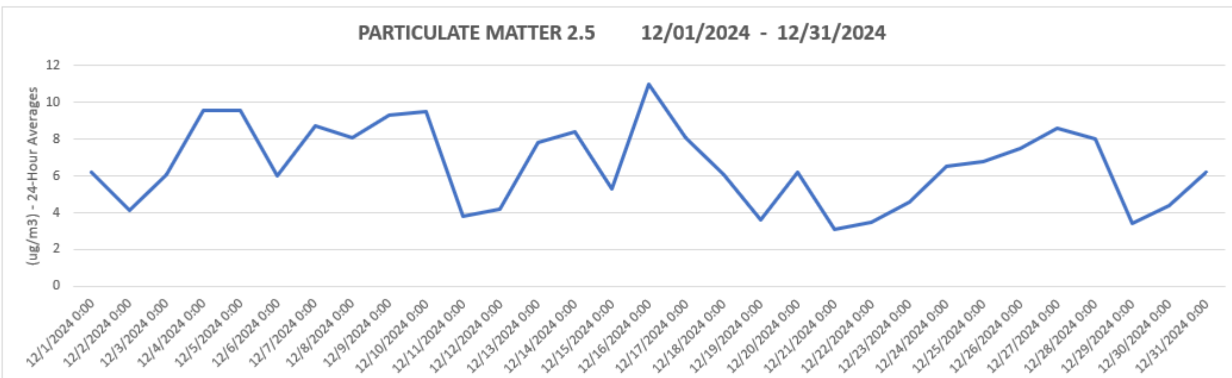


Figure D3-7: PM2.5 Day (24-Hour) Averages – December

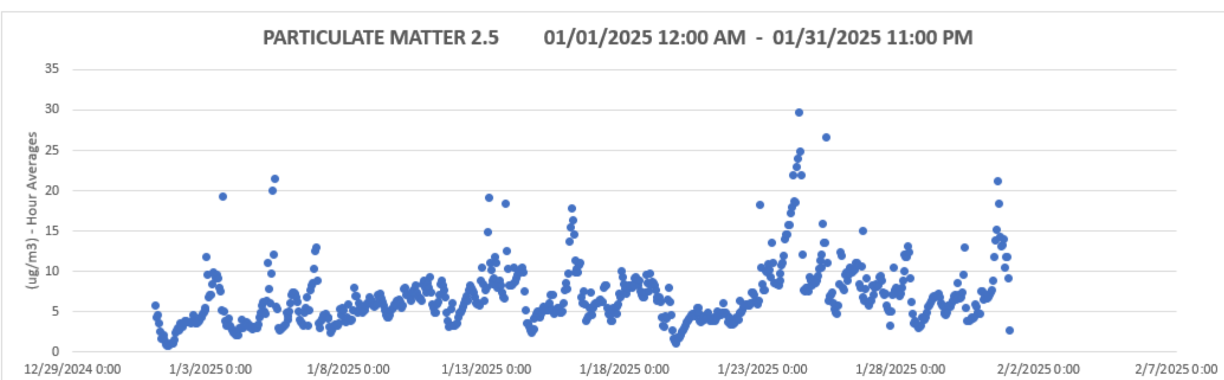


Figure D3-8: PM2.5 Hour Averages –January

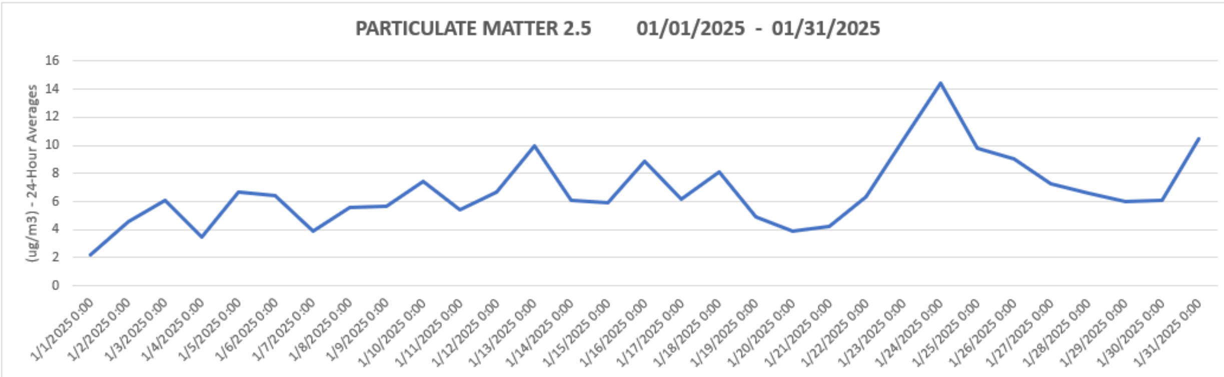


Figure D3-9: PM2.5 Day (24-Hour) Averages – January

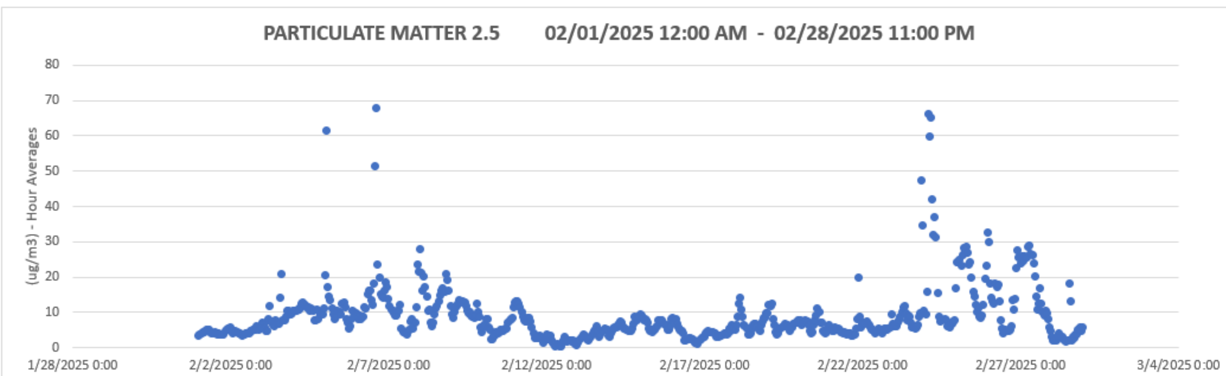


Figure D3-10: PM2.5 Hour Averages –February

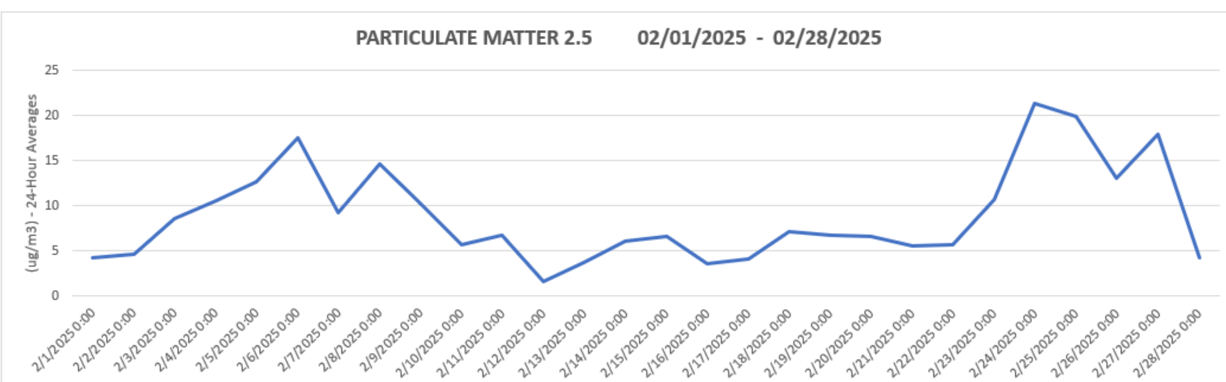


Figure D3-11: PM2.5 Day (24-Hour) Averages – February

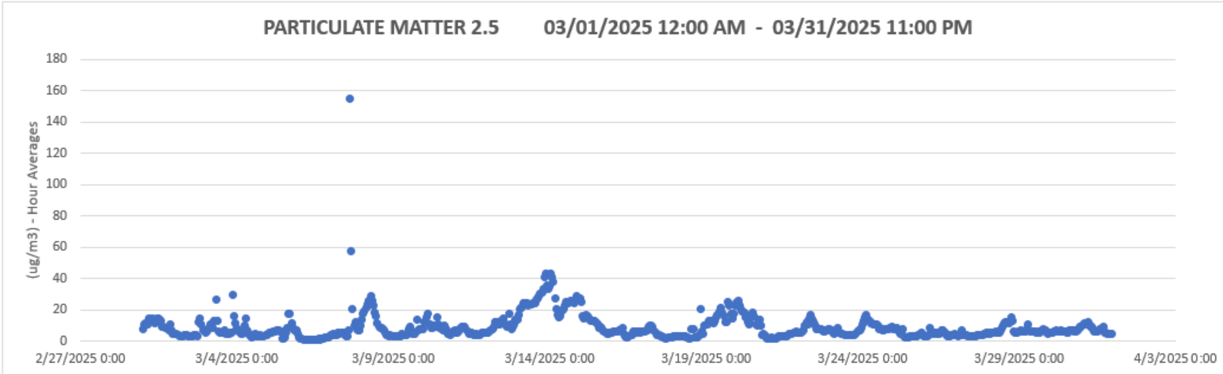


Figure D3-12: PM2.5 Hour Averages –March

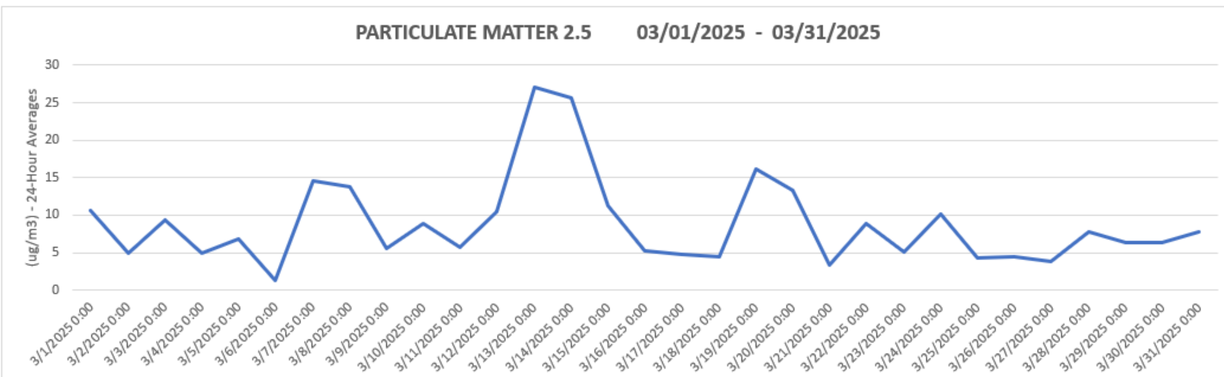


Figure D3-13: PM2.5 Day (24-Hour) Averages – March

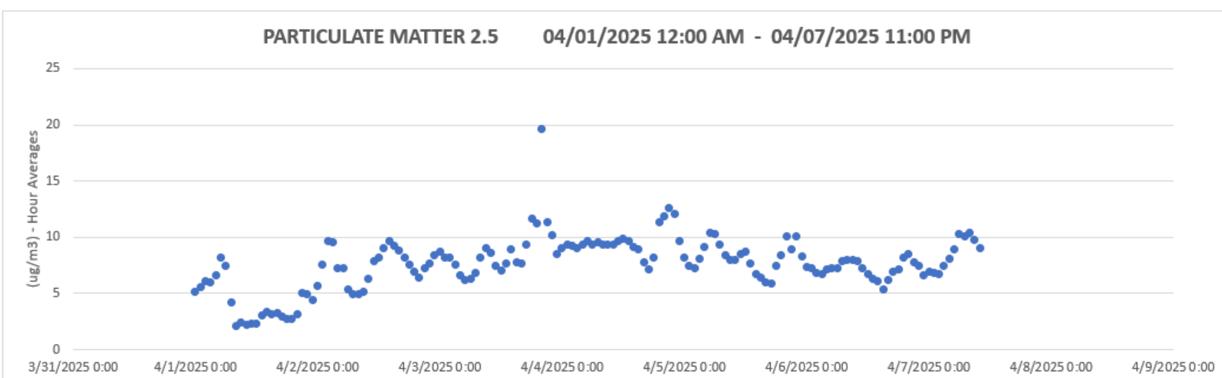


Figure D3-14: PM2.5 Hour Averages –April

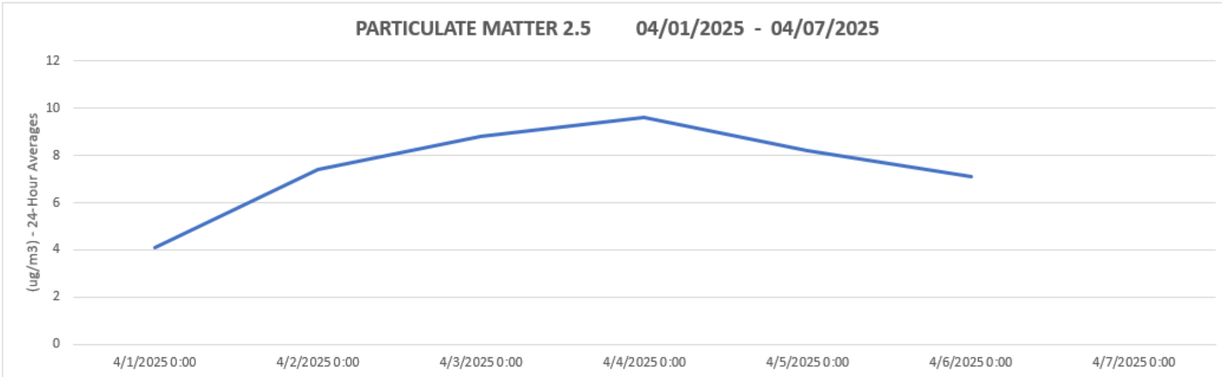


Figure D3-15: PM2.5 Day (24-Hour) Averages – April

Figures D3-16 – D3-22 plot averages based on the time of day for the entire collection period and for each month.

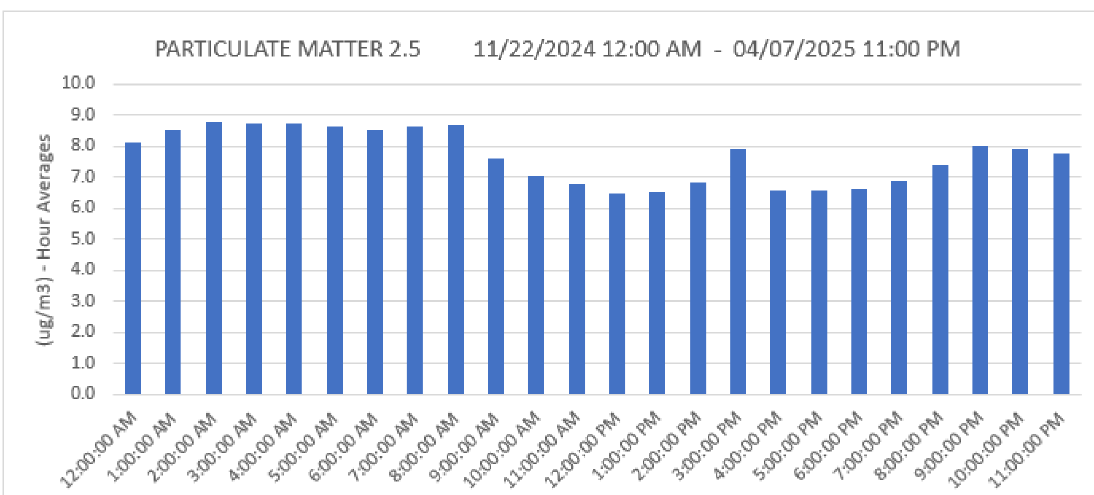


Figure D3-16: PM2.5 Hour Averages – Based on Time of Day for Collection Period

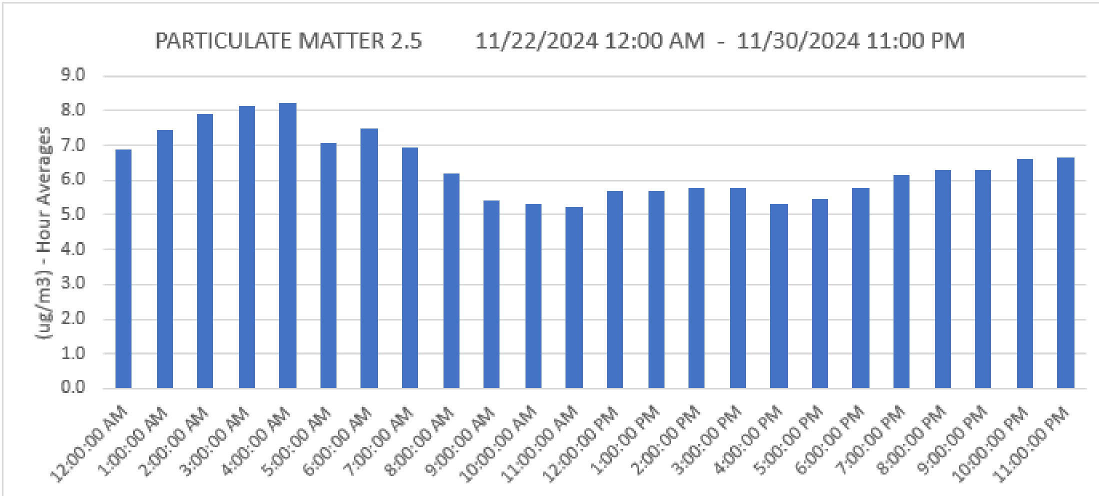


Figure D3-17: PM2.5 Hour Averages – Based on Time of Day for November

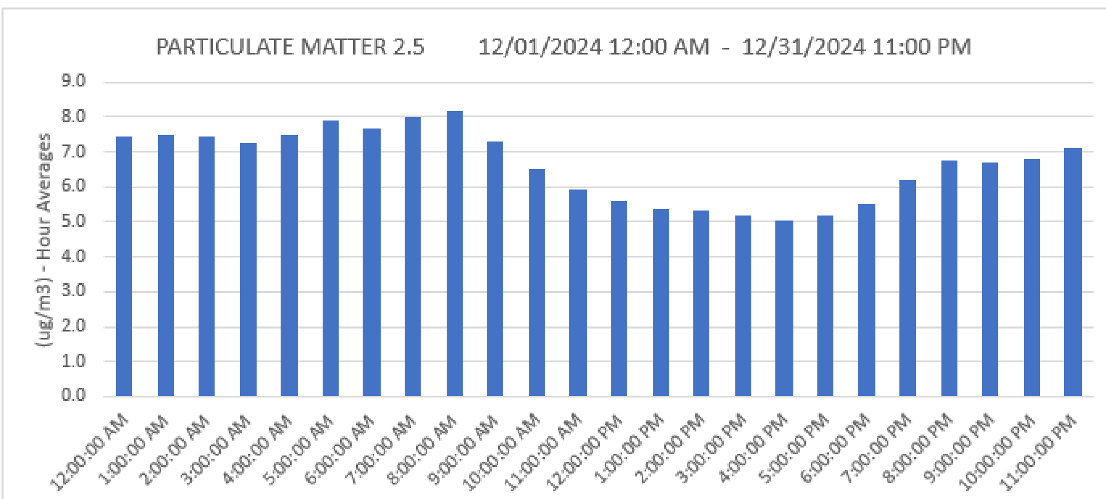


Figure D3-18: PM2.5 Hour Averages – Based on Time of Day for December

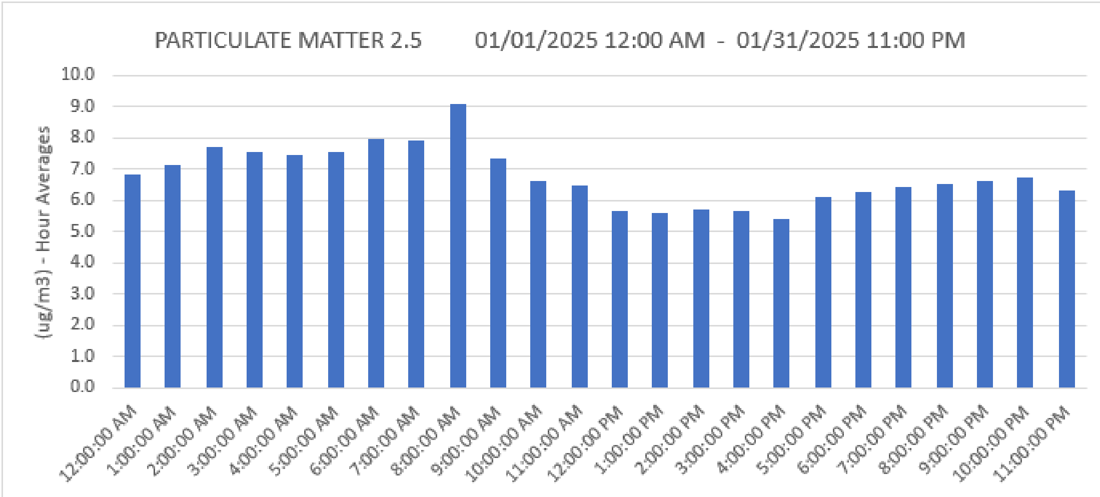


Figure D3-19: PM2.5 Hour Averages – Based on Time of Day for January

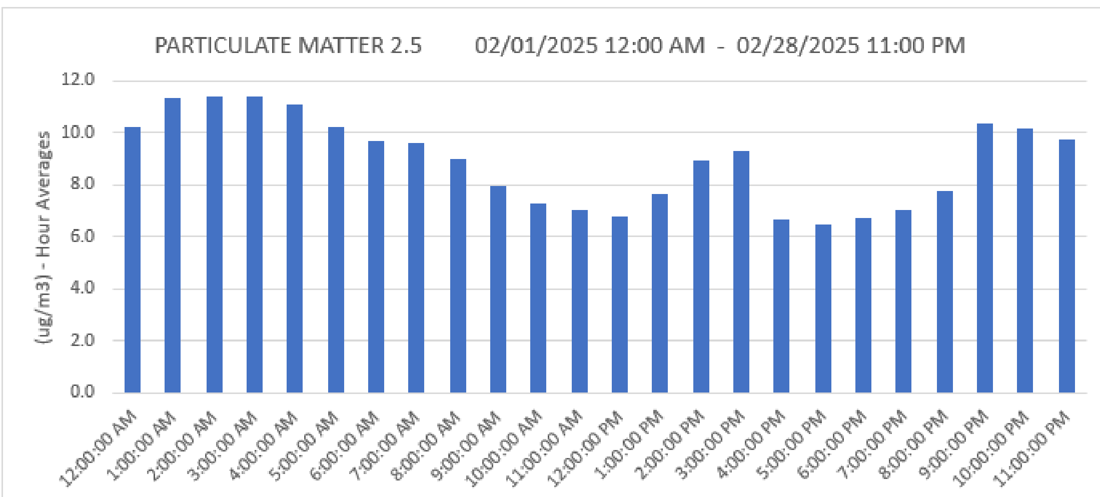


Figure D3-20: PM2.5 Hour Averages – Based on Time of Day for February

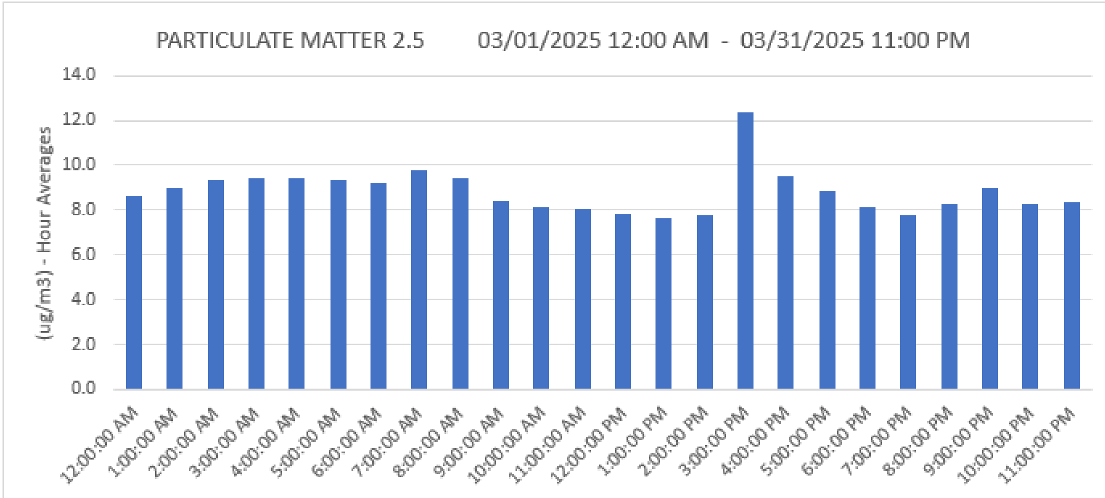


Figure D3-21: PM2.5 Hour Averages – Based on Time of Day for March

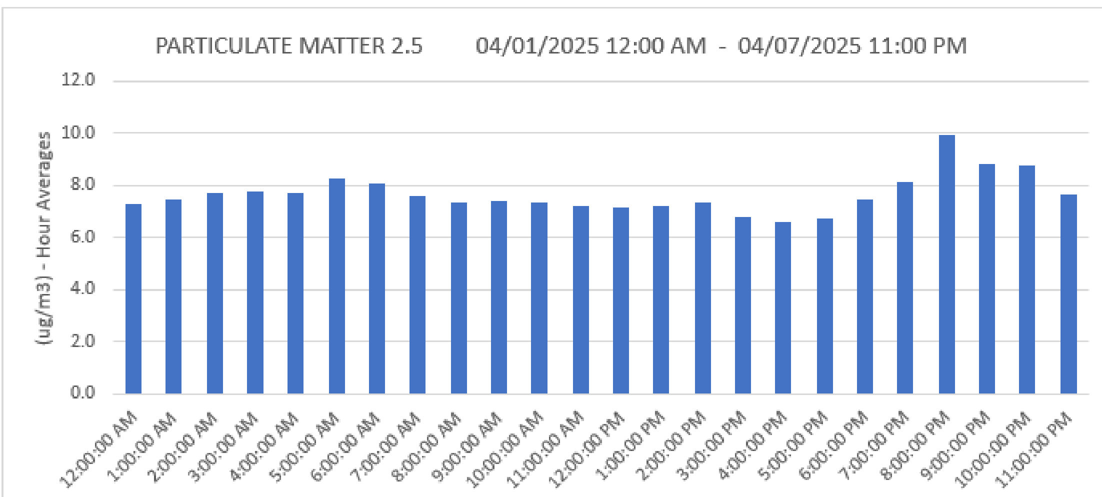


Figure D3-22: PM2.5 Hour Averages – Based on Time of Day for April

Figure D3-23 plot day averages based on the day of the week for the entire collection period.

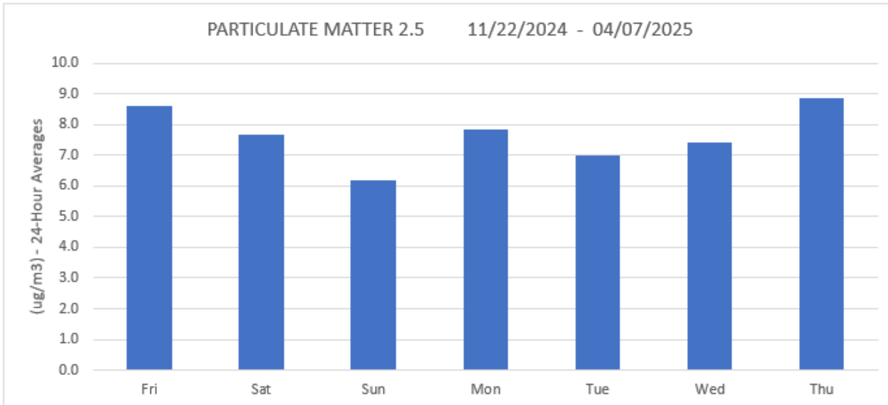


Figure D3-23: PM2.5 Day (24-Hour) Averages – Based on Day of the Week

PARTICULATE MATTER 2.5 Top 25 Concentrations (ug/m3) - Hour Averages 11/22/2024 12:00 AM - 04/07/2025 11:00 PM		
Rank	Concentration	Date & Time
1	154.8	3/7/2025 3:00 PM
2	68.0	2/6/2025 3:00 PM
3	66.3	2/24/2025 2:00 AM
4	65.3	2/24/2025 4:00 AM
5	61.5	2/5/2025 1:00 AM
6	59.7	2/24/2025 3:00 AM
7	57.2	3/7/2025 4:00 PM
8	51.3	2/6/2025 2:00 PM
9	47.4	2/23/2025 9:00 PM
10	43.4	3/13/2025 9:00 PM
11	42.8	3/14/2025 1:00 AM
12	41.9	2/24/2025 5:00 AM
13	41.0	3/14/2025 2:00 AM
14	40.7	3/13/2025 8:00 PM
15	38.2	3/14/2025 3:00 AM
16	36.9	2/24/2025 7:00 AM
17	35.6	3/13/2025 10:00 PM
18	34.8	3/14/2025 12:00 AM
19	34.6	2/23/2025 10:00 PM
20	33.5	3/13/2025 7:00 PM
21	33.4	3/13/2025 11:00 PM
22	32.6	2/25/2025 11:00 PM
23	31.8	2/24/2025 6:00 AM
24	31.4	2/24/2025 8:00 AM
25	31.1	3/13/2025 6:00 PM

PARTICULATE MATTER 2.5 Top 25 Concentrations (ug/m3) - 24-Hour Averages 11/22/2024 - 04/07/2025		
Rank	Concentration	Date
1	27.0	3/13/2025
2	25.7	3/14/2025
3	21.4	2/24/2025
4	19.9	2/25/2025
5	17.9	2/27/2025
6	17.6	2/6/2025
7	16.1	3/19/2025
8	14.6	3/7/2025
9	14.6	2/8/2025
10	14.4	1/24/2025
11	13.8	3/8/2025
12	13.3	3/20/2025
13	13.1	2/26/2025
14	12.7	2/5/2025
15	11.2	3/15/2025
16	11.0	12/16/2024
17	10.7	2/23/2025
18	10.6	3/1/2025
19	10.5	2/4/2025
20	10.5	1/31/2025
21	10.5	1/23/2025
22	10.4	3/12/2025
23	10.3	2/9/2025
24	10.1	3/24/2025
25	10.0	1/13/2025

Figure D3-24: PM2.5 Top 25 Concentrations for Hour Averages and 24-Hour Averages

Figures D3:25 and D3:26 pollution roses display the pollutant concentration based on wind direction, which can indicate the direction of the pollution source.

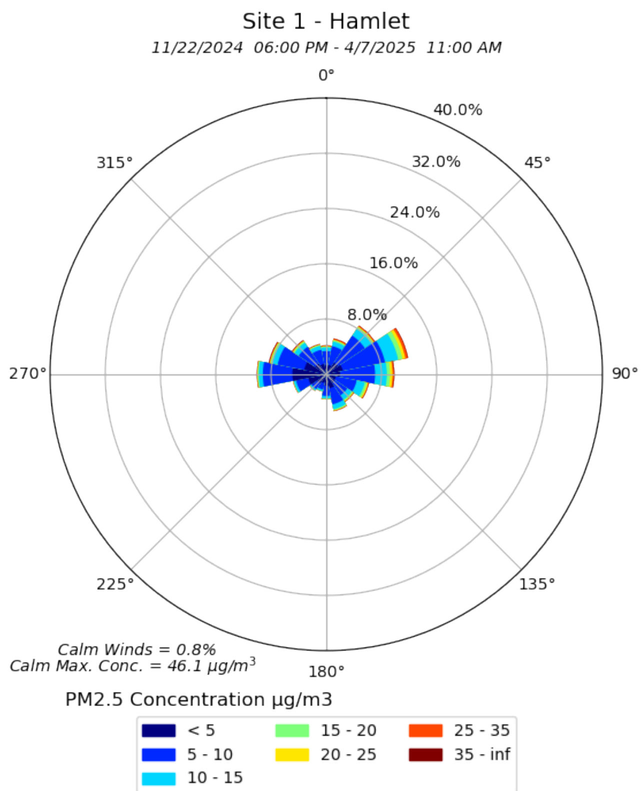


Figure D3-25: Pollution Rose

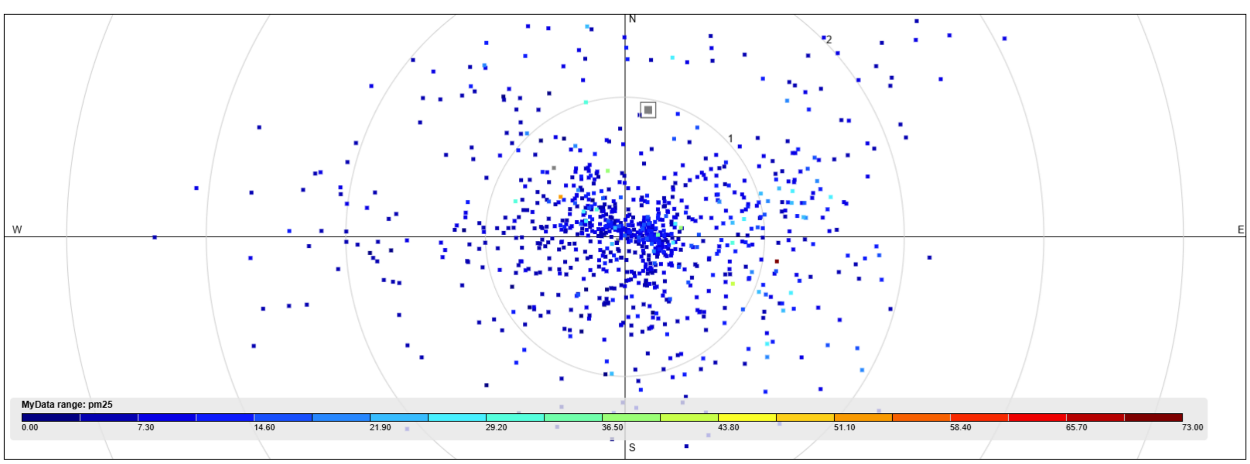


Figure D3-26: EPA RETIGO Pollution Rose 11/22/2024 - 4/7/2025

We separated the PM2.5 minute concentrations of at least 35 ug/m3 and plotted those on a pollution rose for a better visual representation of the direction of the highest concentrations.

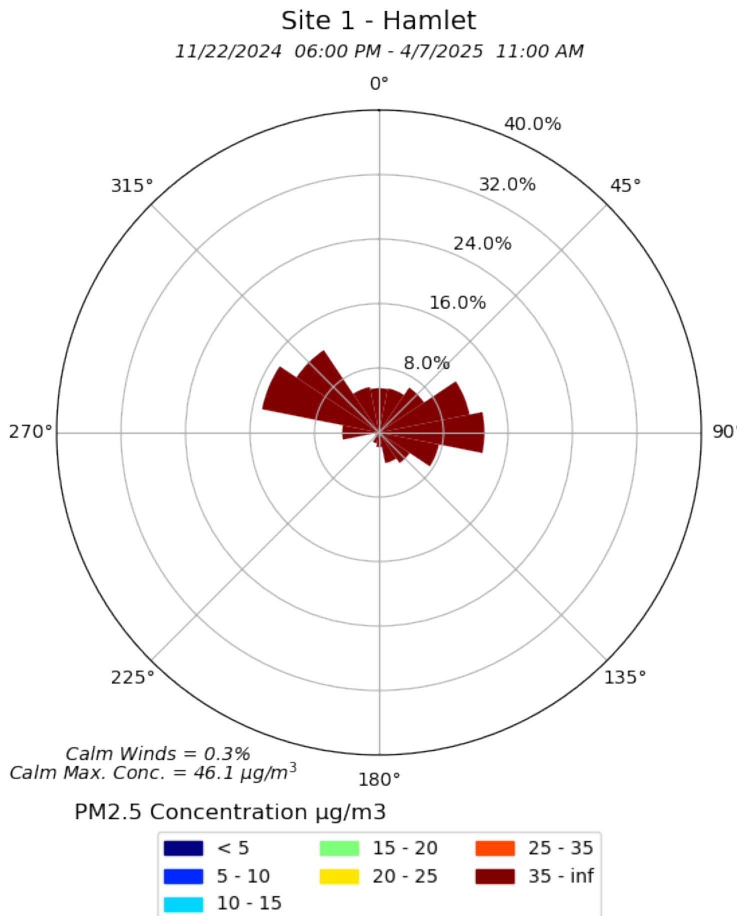


Figure D3-27: Pollution Rose displaying PM2.5 concentrations of at least 35 ug/m3.

PM2.5 Spikes

There were several spikes in particulate matter during our Site 1 monitoring. We will provide additional data for the top two. The March 7 spike is a good example of a localized spike; whereas, the March 13 spike (more like a day-long event than a spike) was regional.

March 7, 2025 Spike

- The top 24 highest minute readings during our Site 1 monitoring occurred on March 7, all during the 3 PM hour.
- March 7, 2025 experienced the highest one-hour average at 3 PM with an average of 154.8 ug/m3.
- NowCast calculation shows air quality in the Red AQI – Unhealthy health standard for 4 and 5 PM hours.
- The 24-hour Average of 14.6 ug/m3 for PM 2.5 was at the lower end of the Yellow, Moderate AQI range with an AQI of 61.
- The EPA AQI mapping for the day indicated correctly that the BEAST area fell just inside the Yellow, Moderate AQI for PM. It was just on the edge.
- When the BEAST was screened with regional agency monitors during the spike period, the agency monitors did not indicate any spikes. This indicates the high probability of a localized source.
- There was a cluster of fires (most likely prescribed fires) within one mile of the BEAST. Wind direction was not exactly in the direction of the fires – for the most part, but within roughly 45 degrees.
- Wind direction for the pollutants was from East-Northeast to Southeast with most coming from East to East-Southeast. Fire cluster was in the direction of Southeast to South-Southeast.

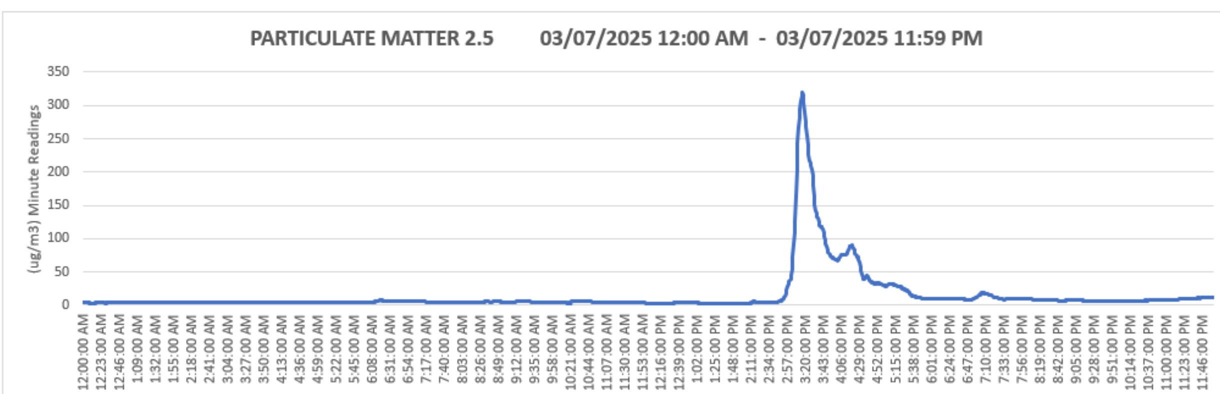


Figure D3-28: PM2.5 spike during the afternoon of March 7, 2025.

PARTICULATE MATTER 2.5 Top 25 Concentrations (ug/m3) Minute Readings 03/07/2025 12:00 AM - 03/07/2025 11:59 PM		
Rank	**Concentration**	**Time**
1	319.1	3:16:00 PM
2	315.6	3:17:00 PM
3	314.7	3:15:00 PM
4	306.6	3:14:00 PM
5	304.9	3:18:00 PM
6	294.9	3:13:00 PM
7	290.8	3:19:00 PM
8	281.2	3:12:00 PM
9	276.1	3:20:00 PM
10	267.8	3:21:00 PM
11	266.4	3:11:00 PM
12	254.7	3:22:00 PM
13	242.0	3:10:00 PM
14	241.0	3:23:00 PM
15	226.4	3:24:00 PM
16	216.1	3:25:00 PM
17	212.6	3:26:00 PM
18	210.6	3:27:00 PM
19	204.7	3:28:00 PM
20	201.8	3:09:00 PM
21	195.2	3:29:00 PM
22	179.5	3:30:00 PM
23	164.3	3:31:00 PM
24	162.6	3:08:00 PM
25	151.1	3:32:00 PM

PARTICULATE MATTER 2.5 Hour Averages Ranked by Highest (ug/m3) Hour Averages 03/07/2025 12:00 AM - 03/07/2025 11:59 PM		
Rank	**Concentration**	**Time**
1	154.8	3:00:00 PM
2	57.2	4:00:00 PM
3	20.6	5:00:00 PM
4	12.1	7:00:00 PM
5	9.9	11:00:00 PM
6	9.6	6:00:00 PM
7	7.7	8:00:00 PM
8	7.0	10:00:00 PM
9	6.5	9:00:00 PM
10	6.5	2:00:00 PM
11	5.6	6:00:00 AM
12	5.4	10:00:00 AM
13	5.1	8:00:00 AM
14	5.0	9:00:00 AM
15	4.8	7:00:00 AM
16	4.3	2:00:00 AM
17	4.2	11:00:00 AM
18	4.1	4:00:00 AM
19	4.0	3:00:00 AM
20	4.0	1:00:00 AM
21	3.9	5:00:00 AM
22	3.6	12:00:00 AM
23	3.4	12:00:00 PM
24	3.1	1:00:00 PM

Figure D3-29: Tables displaying the top 25 minute readings and ranks the hour averages for March 7.

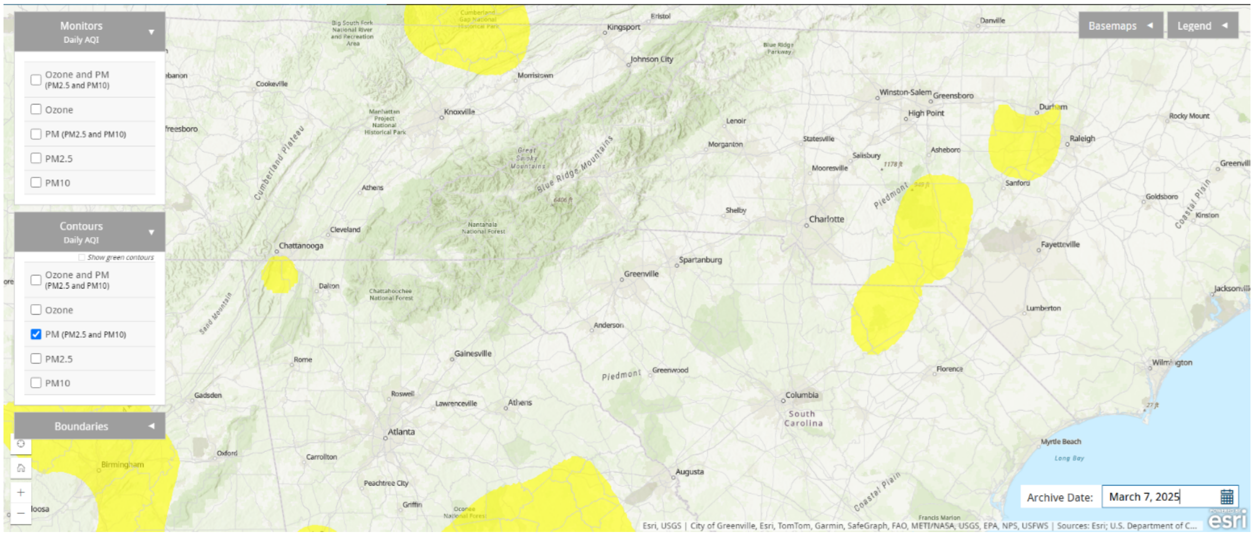


Figure D3-30: March 7 EPA Map showing BEAST was on the edge of the moderate AQI for PM 2.5

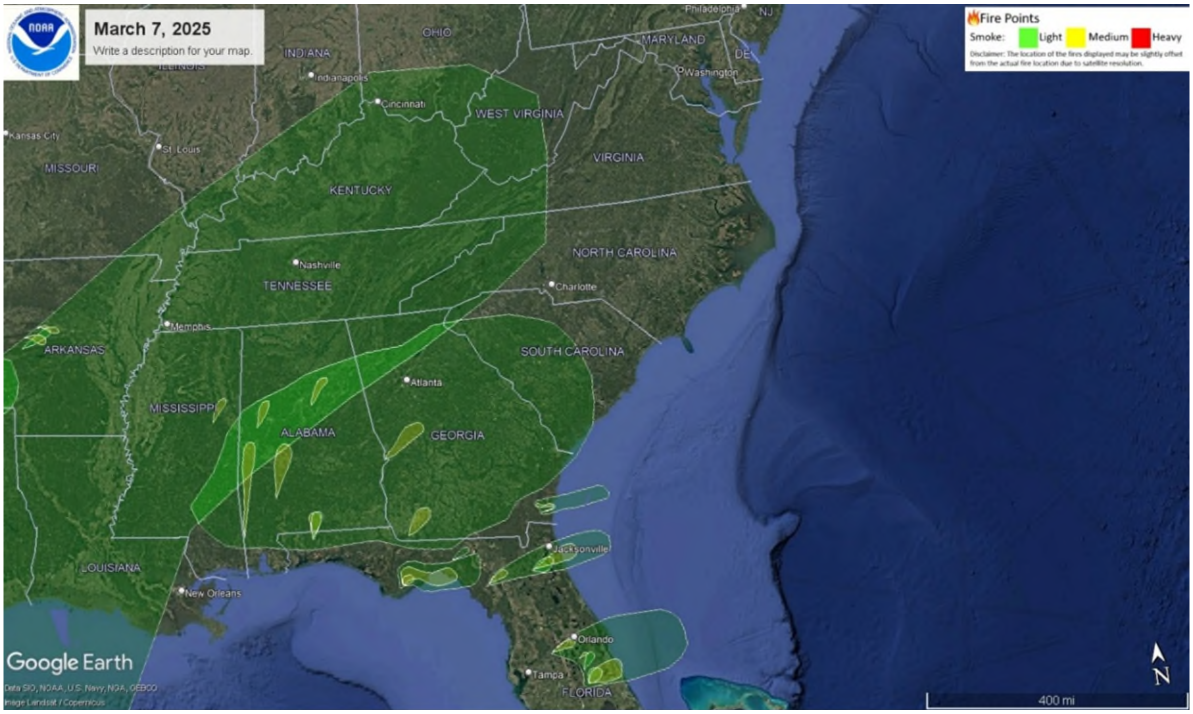


Figure D3-31: March 7 NOAA Map showing smoke impacts – none indicated in BEAST location

Figure D3-32: March 7 NOAA Map showing fire points – cluster (in circle) reported near BEAST location

Figure D3-33: Location of regional PM2.5 agency air monitors

The BEAST was screened with regional agency PM2.5 monitors for March 7, 2025. The BEAST was located within the Hamlet, North Carolina community.

Monitor	Concentration	AQI
BEAST	14.6	**61**
Candor	9.8	**52**
Chesterfield	9.3	**51**
W Owen	4.0	**22**

Figure D3-34: March 7, 2025 Daily 24-hour average PM2.5 concentrations

We used the EPA NowCast algorithm[12] to calculate the BEAST's NowCast as if it were on the EPA air monitoring network. Then, we screened the BEAST with the regional PM2.5 air monitors.

BEAST

March 7, 2025			
EPA NowCast Observed Time			
Time	PM 2.5	AQI	Data Ck.
12 Mid	2.7	15	OK
1:00 AM	3.1	17	OK
2:00 AM	3.5	19	OK
3:00 AM	3.9	22	OK
4:00 AM	3.9	22	OK
5:00 AM	4.0	22	OK
6:00 AM	3.9	22	OK
7:00 AM	4.7	26	OK
8:00 AM	4.7	26	OK
9:00 AM	4.9	27	OK
10:00 AM	4.9	27	OK
11:00 AM	5.1	28	OK
Noon	4.7	26	OK
1:00 PM	4.2	23	OK
2:00 PM	3.6	20	OK
3:00 PM	5.0	28	OK
4:00 PM	79.9	168	OK
5:00 PM	68.5	160	OK
6:00 PM	44.5	123	OK
7:00 PM	27.0	84	OK
8:00 PM	19.5	70	OK
9:00 PM	13.6	59	OK
10:00 PM	10.0	53	OK
11:00 PM	8.5	47	OK

Candor

March 7, 2025			
EPA NowCast Observed Time			
Time	PM 2.5	AQI	Data Ck.
12 Mid	1.0	6	OK
1:00 AM	1.0	6	OK
2:00 AM	2.0	11	OK
3:00 AM	2.5	14	OK
4:00 AM	0.7	4	OK
5:00 AM	2.3	13	OK
6:00 AM	5.1	28	OK
7:00 AM	5.0	28	OK
8:00 AM	6.5	36	OK
9:00 AM	8.7	48	OK
10:00 AM	11.3	55	OK
11:00 AM	13.6	59	OK
Noon	9.8	52	OK
1:00 PM	7.4	41	OK
2:00 PM	9.7	52	OK
3:00 PM	6.8	38	OK
4:00 PM	5.9	33	OK
5:00 PM	13.4	59	OK
6:00 PM	15.2	62	OK
7:00 PM	12.6	58	OK
8:00 PM	11.8	56	OK
9:00 PM	12.9	58	OK
10:00 PM	15.9	64	OK
11:00 PM	19.9	71	OK

Chesterfield

March 7, 2025			
EPA NowCast Observed Time			
Time	PM 2.5	AQI	Data Ck.
12 Mid	2.8	16	OK
1:00 AM	2.9	16	OK
2:00 AM	3.1	17	OK
3:00 AM	3.2	18	OK
4:00 AM	3.4	19	OK
5:00 AM	3.7	21	OK
6:00 AM	3.7	21	OK
7:00 AM	3.8	21	OK
8:00 AM	3.7	21	OK
9:00 AM	3.8	21	OK
10:00 AM	3.7	21	OK
11:00 AM	3.6	20	OK
Noon	3.6	20	OK
1:00 PM	8.5	47	OK
2:00 PM	10.5	54	OK
3:00 PM	6.8	38	OK
4:00 PM	6.0	33	OK
5:00 PM	22.2	75	OK
6:00 PM	15.9	64	OK
7:00 PM	12.3	57	OK
8:00 PM	17.2	66	OK
9:00 PM	22.0	75	OK
10:00 PM	19.0	69	OK
11:00 PM	15.7	63	OK

W Owen

March 7, 2025			
EPA NowCast Observed Time			
Time	PM 2.5	AQI	Data Ck.
12 Mid	1.5	8	OK
1:00 AM	2.2	12	OK
2:00 AM	3.6	20	OK
3:00 AM	3.8	21	OK
4:00 AM	5.4	30	OK
5:00 AM	3.2	18	OK
6:00 AM	2.6	14	OK
7:00 AM	2.3	13	OK
8:00 AM	4.1	23	OK
9:00 AM	4.5	25	OK
10:00 AM	4.7	26	OK
11:00 AM	4.3	24	OK
Noon	2.6	14	OK
1:00 PM	2.6	14	NO DATA
2:00 PM	-	-	NO DATA
3:00 PM	-	-	OK
4:00 PM	1.1	6	OK
5:00 PM	1.0	6	OK
6:00 PM	1.0	6	OK
7:00 PM	4.0	22	OK
8:00 PM	3.5	19	OK
9:00 PM	6.2	34	OK
10:00 PM	5.1	28	OK
11:00 PM	4.0	22	OK

Figure D3-35: NowCast calculations and AQI for March 7, 2025

[12] https://usepa.servicenowservices.com/airnow/en/how-is-the-nowcast-algorithm-used-to-report-current-air-quality?id=kb_article_view&sys_id=798ba26c1b1a5ed079ab0f67624bcb6d&spa=1

March 13, 2025 Spike

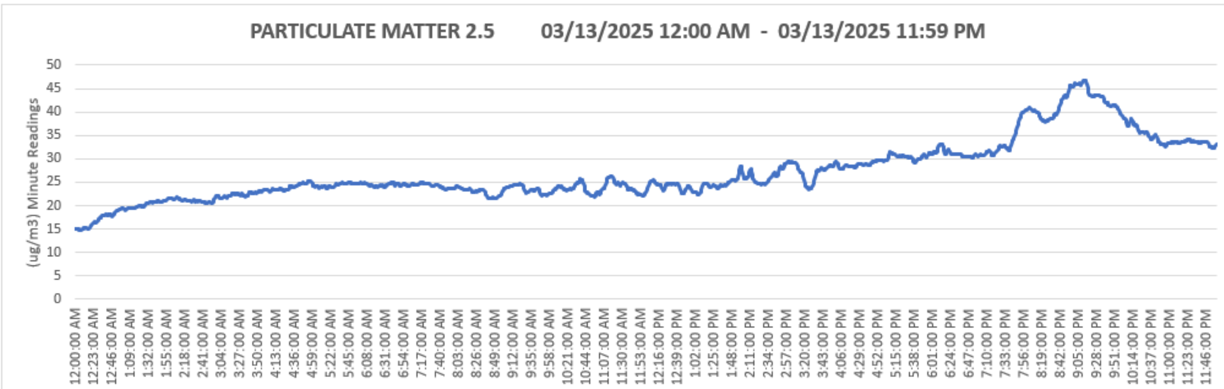


Figure D3-36: PM2.5 spike during the afternoon of March 13, 2025.

PARTICULATE MATTER 2.5 Top 25 Concentrations (ug/m3) Minute Readings 03/13/2025 12:00 AM - 03/13/2025 11:59 PM		
Rank	**Concentration**	**Time**
1	46.8	9:13:00 PM
2	46.8	9:12:00 PM
3	46.7	9:11:00 PM
4	46.6	9:14:00 PM
5	46.5	9:15:00 PM
6	46.2	9:10:00 PM
7	46.1	9:06:00 PM
8	46.1	9:01:00 PM
9	46.0	9:05:00 PM
10	46.0	9:02:00 PM
11	45.9	9:16:00 PM
12	45.9	9:04:00 PM
13	45.9	9:03:00 PM
14	45.9	9:00:00 PM
15	45.8	9:09:00 PM
16	45.8	9:07:00 PM
17	45.7	9:08:00 PM
18	45.7	8:56:00 PM
19	45.6	8:55:00 PM
20	45.5	8:59:00 PM
21	45.5	8:57:00 PM
22	45.4	8:58:00 PM
23	45.1	9:17:00 PM
24	45.1	8:54:00 PM
25	44.3	8:53:00 PM

PARTICULATE MATTER 2.5 Hour Averages Ranked by Highest (ug/m3) Hour Averages 03/13/2025 12:00 AM - 03/13/2025 11:59 PM		
Rank	**Concentration**	**Time**
1	43.4	9:00:00 PM
2	40.7	8:00:00 PM
3	35.6	10:00:00 PM
4	33.5	7:00:00 PM
5	33.4	11:00:00 PM
6	31.1	6:00:00 PM
7	30.4	5:00:00 PM
8	28.8	4:00:00 PM
9	27.2	3:00:00 PM
10	26.3	2:00:00 PM
11	24.4	1:00:00 PM
12	24.4	6:00:00 AM
13	24.3	5:00:00 AM
14	24.2	7:00:00 AM
15	24.1	12:00:00 PM
16	23.9	11:00:00 AM
17	23.9	4:00:00 AM
18	23.5	10:00:00 AM
19	23.4	9:00:00 AM
20	22.8	8:00:00 AM
21	22.3	3:00:00 AM
22	21.1	2:00:00 AM
23	20.2	1:00:00 AM
24	16.8	12:00:00 AM

Figure D3-37: Tables displaying the top 25 minute readings and rank the hour averages for March 13.

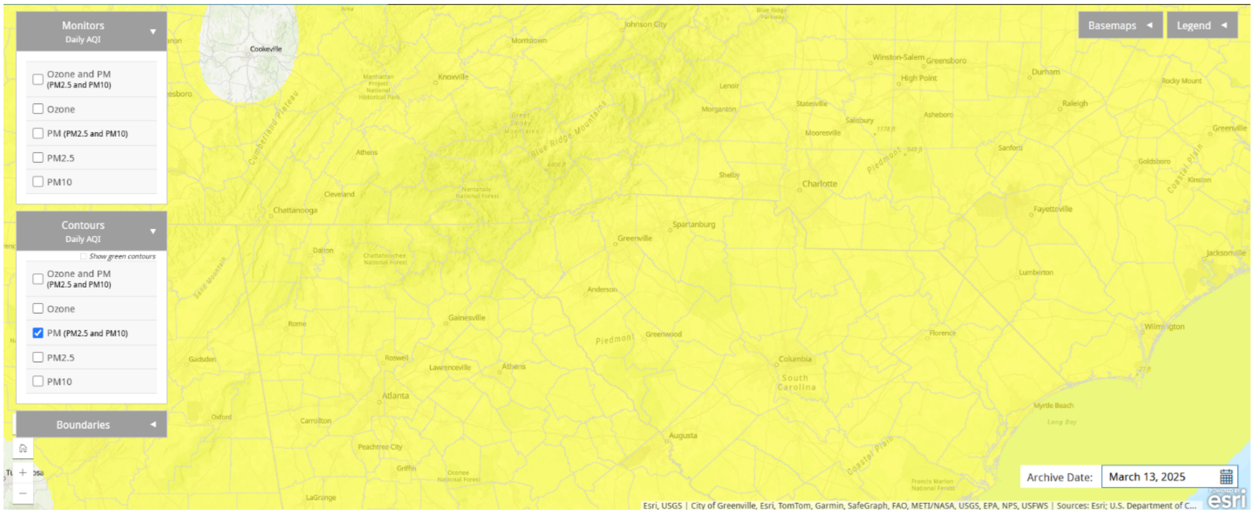


Figure D3-38: March 13 EPA Map showing BEAST was on the edge of the moderate AQI for PM 2.5

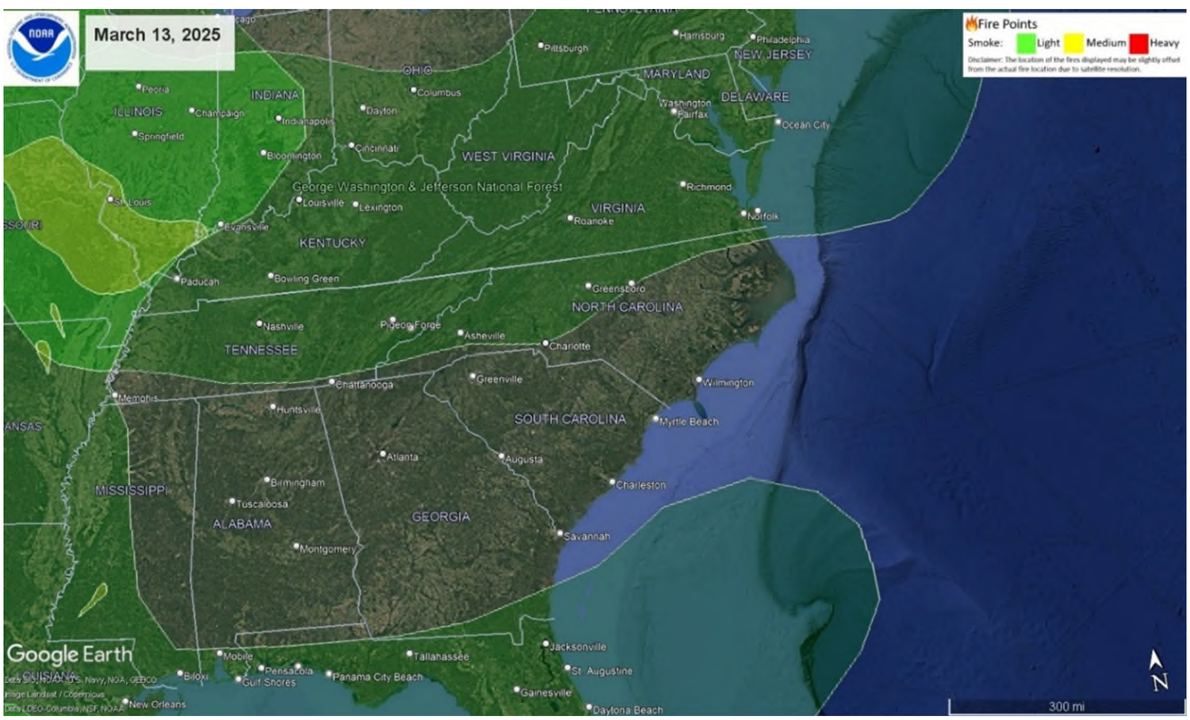


Figure D3-39: March 13 NOAA Map showing smoke impacts – none indicated in BEAST location

Figure D3-40: March 13 NOAA Map showing fire points in circle reported near BEAST location

The BEAST was screened with regional agency PM2.5 monitors for March 13, 2025. The BEAST was located within the Hamlet, North Carolina community.

Monitor	Concentration	AQI
BEAST	27.0	**84**
Candor	18.0	**68**
Chesterfield	30.1	**90**
W Owen	18.8	**69**

Figure D3-41: March 13, 2025 Daily 24-hour average PM2.5 concentrations

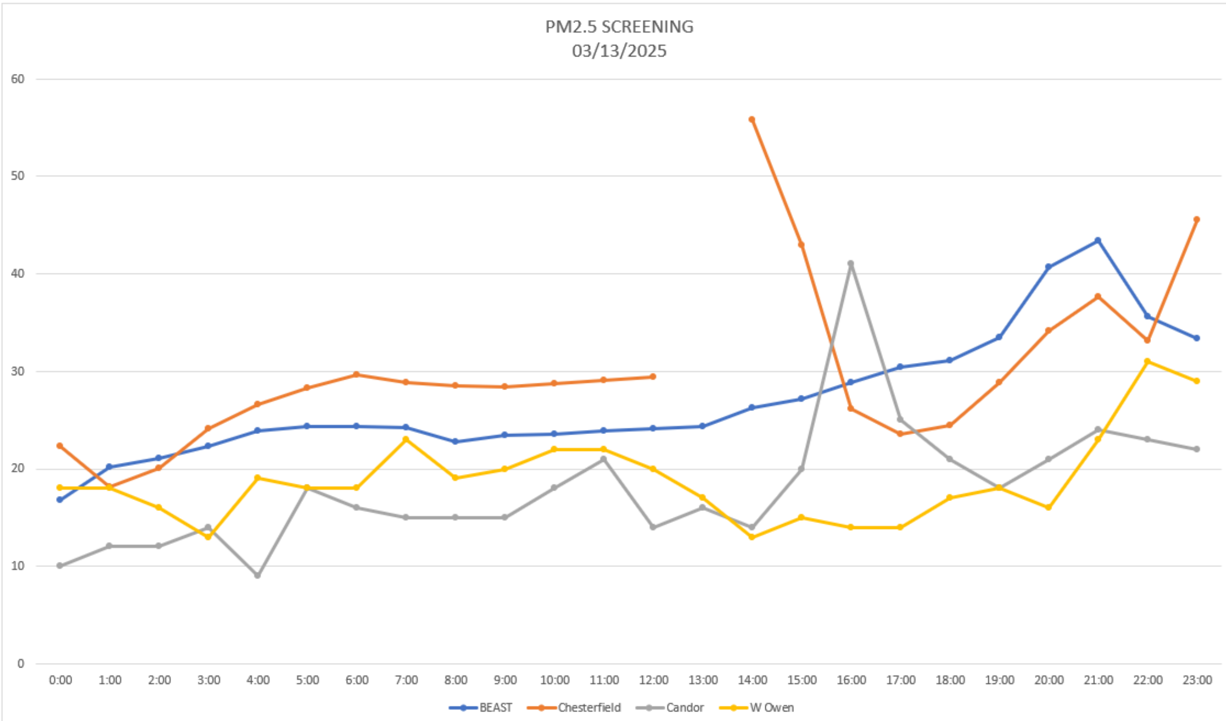


Figure D3-42: March 13, 2025 Hourly Concentrations for BEAST and Regional Monitors

We used the EPA NowCast algorithm[13] to calculate the BEAST's NowCast as if it were on the EPA air monitoring network.

March 13 fell into the code yellow moderate AQI category for most of the day. The last two hours of the day indicated code orange unhealthy for sensitive people AQI.

March 13, 2025			
EPA NowCast Observed Time			
Time	PM 2.5	AQI	Data Ck.
12 Mid	12.8	58	OK
1:00 AM	14.8	62	OK
2:00 AM	17.5	67	OK
3:00 AM	19.3	70	OK
4:00 AM	20.8	73	OK
5:00 AM	22.3	76	OK
6:00 AM	23.3	77	OK
7:00 AM	23.8	78	OK
8:00 AM	24.0	79	OK
9:00 AM	23.4	78	OK
10:00 AM	23.4	78	OK
11:00 AM	23.4	78	OK
Noon	23.5	78	OK
1:00 PM	23.5	78	OK
2:00 PM	23.7	78	OK
3:00 PM	24.2	79	OK
4:00 PM	24.8	80	OK
5:00 PM	25.9	82	OK
6:00 PM	27.2	85	OK
7:00 PM	28.4	87	OK
8:00 PM	30.3	90	OK
9:00 PM	35.2	100	OK
10:00 PM	39.2	110	OK
11:00 PM	37.5	106	OK

Figure D3-43: NowCast calculations and AQI for March 13, 2025

[13] https://usepa.servicenowservices.com/airnow/en/how-is-the-nowcast-algorithm-used-to-report-current-air-quality?id=kb_article_view&sys_id=798ba26c1b1a5ed079ab0f67624bcb6d&spa=1

D4: Data – Particulate Matter 10

PM10 Findings

- Daily 24-hour averages during our Site 1 data collection all fell within the code green good air quality for the day, as did the nearest agency PM 10 monitor.
- A brief spike on March 9 led to the highest PM 10 one-minute readings at Site 1. The highest PM 10 concentration was an extremely high level of 2739 ug/m3, indicating hazardous air quality for a brief period – less than 5 minutes.
- PM 10 concentrations were relatively even no matter which day of the week. The lowest average concentration was 12.2 ug/m3 on Sundays and the highest average concentration was 15.5 ug/m3 on Thursdays.

Data Presentations

BREDL data presentations for PM10 will include hour averages (the average of 60 one-minute readings) and 24-hour daily averages (the average of 24 one-hour readings). Wind and pollution roses use the one minute readings (1440 per day).

Time of day bar graphs are used to examine time periods of the day. For example, is there one part of the day where the pollution registered higher or lower? We also examined pollution levels by day of the week. Was there a particular day where the pollution was higher or lower?

Figures D4-1 – D4-15 plot hour averages for the entire collection period and for each month. The hour averages take the 60 one-minute readings for each hour and average them for the hour average. The day (24-hour) averages take the 24 one-hour averages and average them.

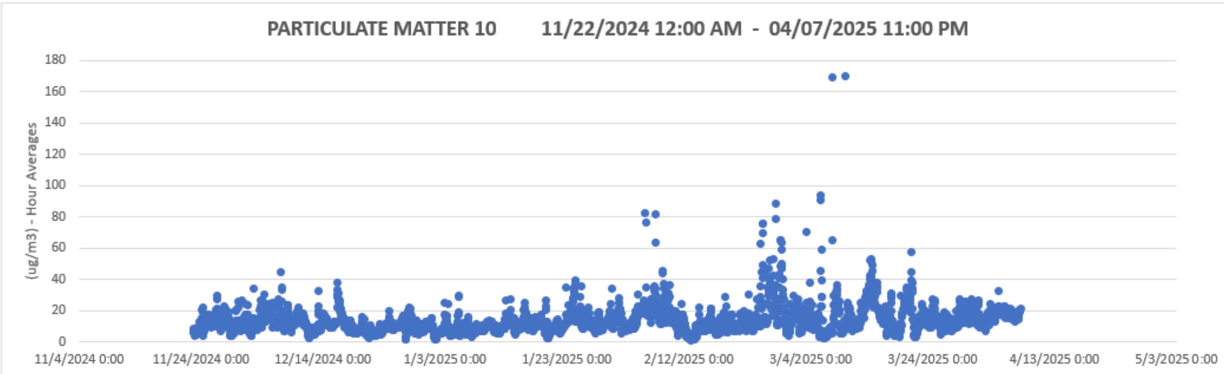


Figure D4-1: PM10 Hour Averages – Entire Collection Period

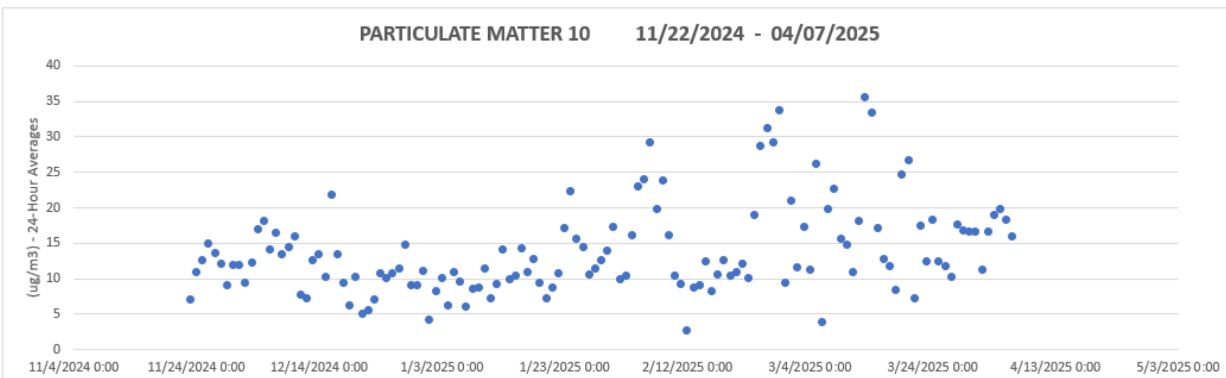


Figure D4-2: PM10 Day (24-Hour) Averages – Entire Collection Period

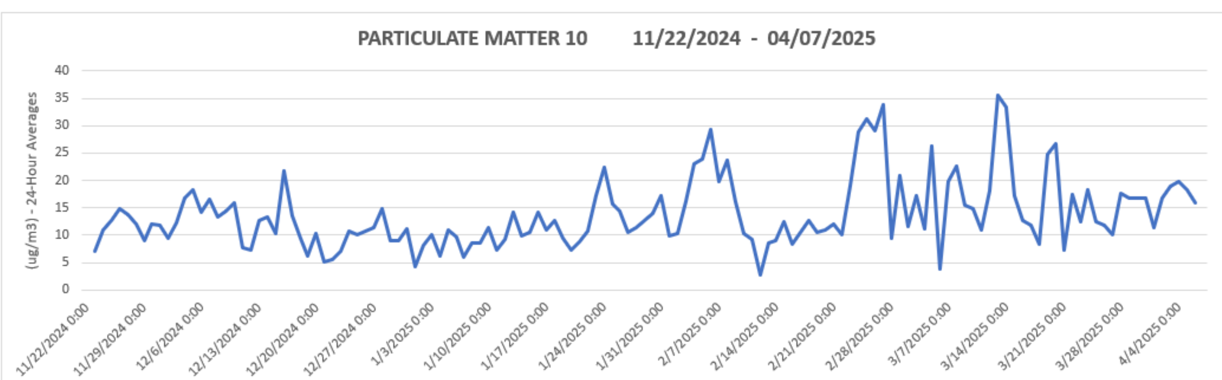


Figure D4-3: PM10 Day (24-Hour) Averages – Entire Collection Period

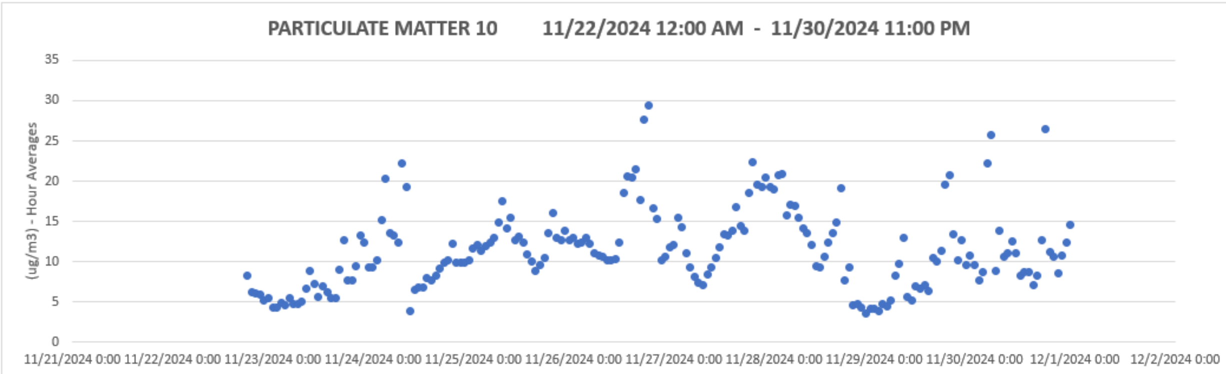


Figure D4-4: PM10 Hour Averages –November

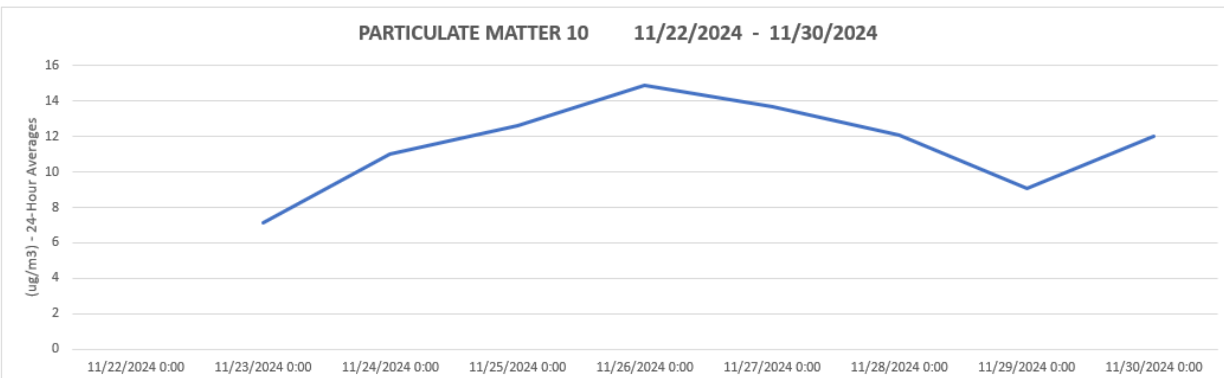


Figure D4-5: PM10 Day (24-Hour) Averages –November

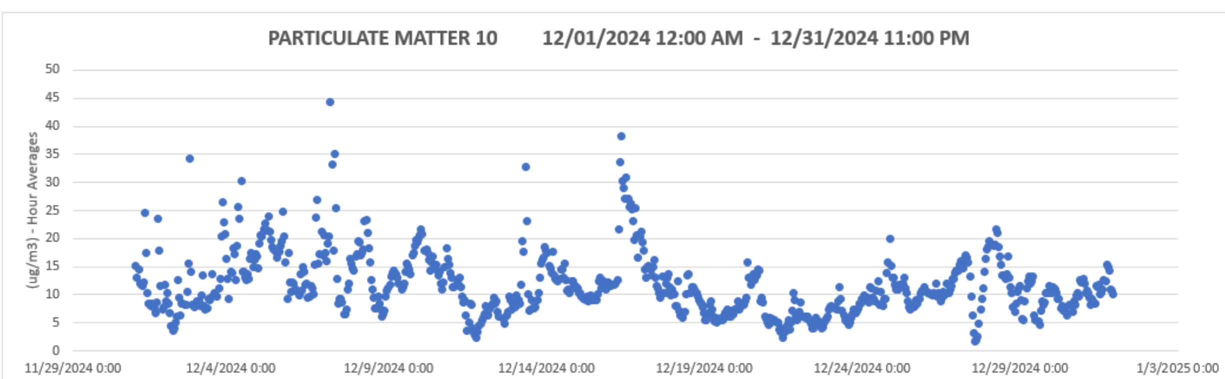


Figure D4-6: PM10 Hour Averages –December

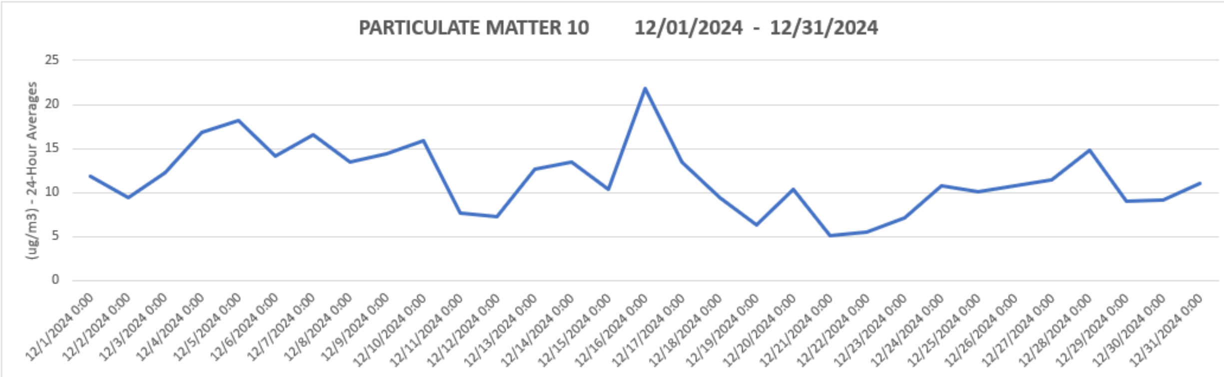


Figure D4-7: PM10 Day (24-Hour) Averages – December

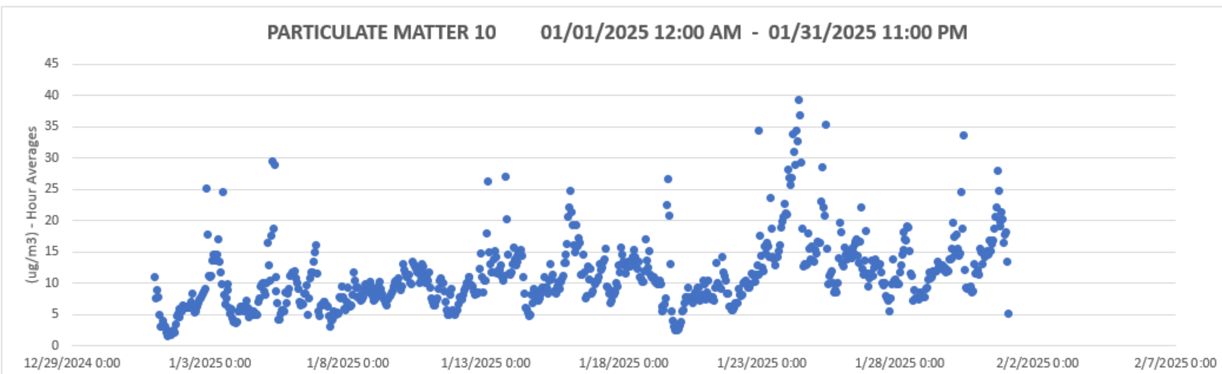


Figure D4-8: PM10 Hour Averages –January

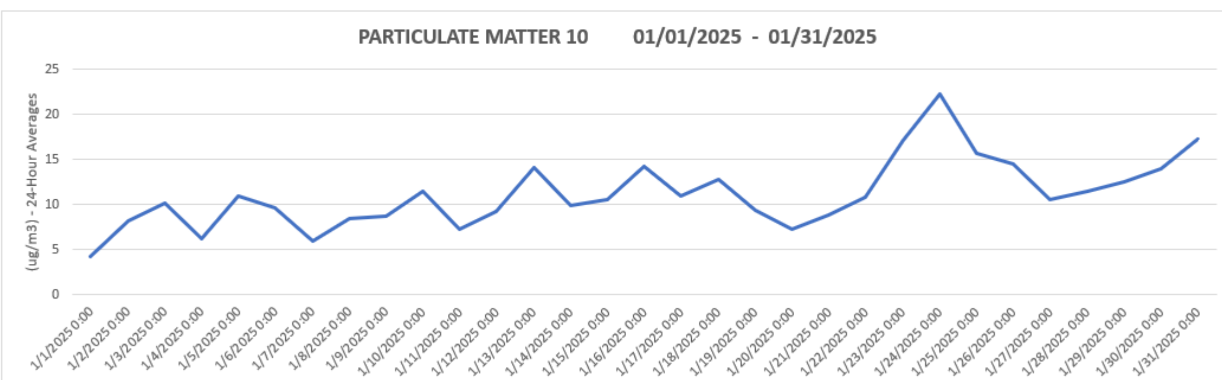


Figure D4-9: PM10 Day (24-Hour) Averages – January

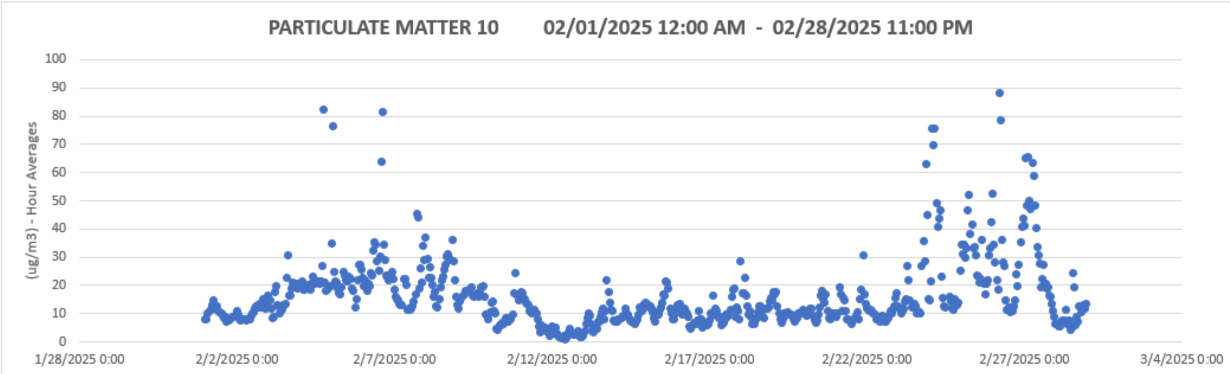


Figure D4-10: PM10 Hour Averages –February

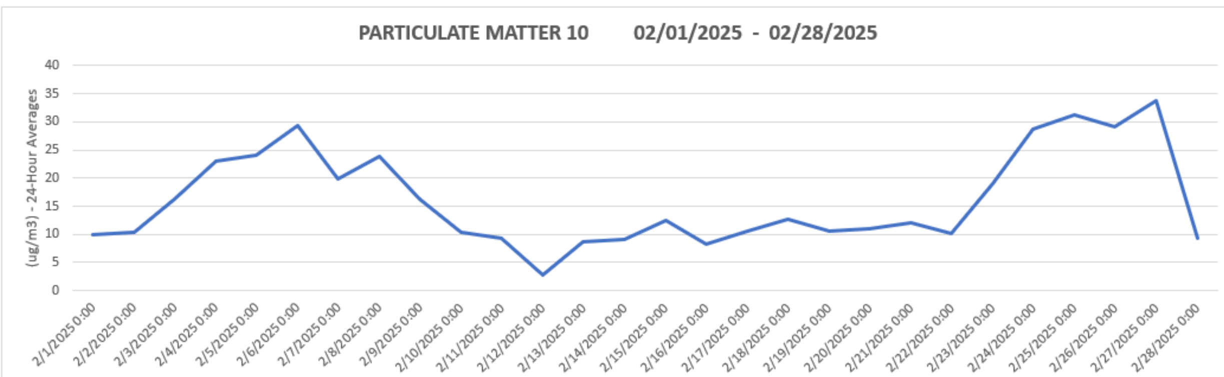


Figure D4-11: PM10 Day (24-Hour) Averages – February

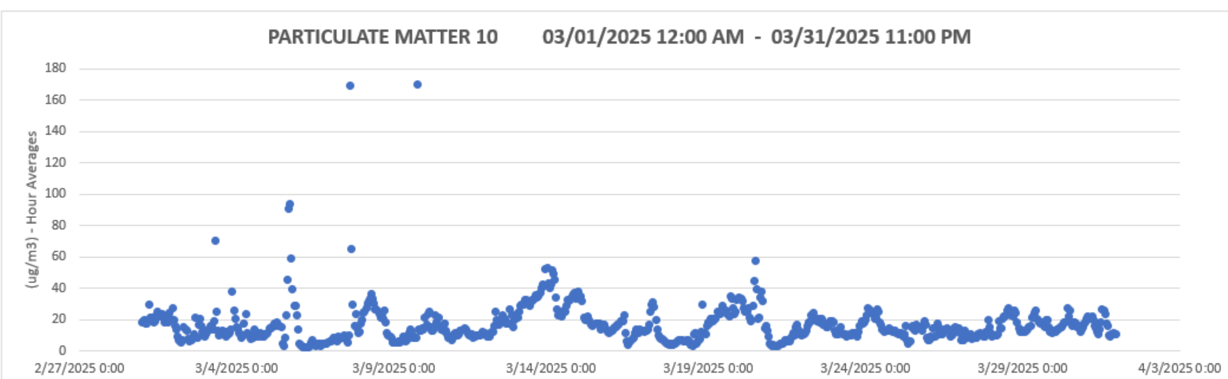


Figure D4-12: PM10 Hour Averages –March

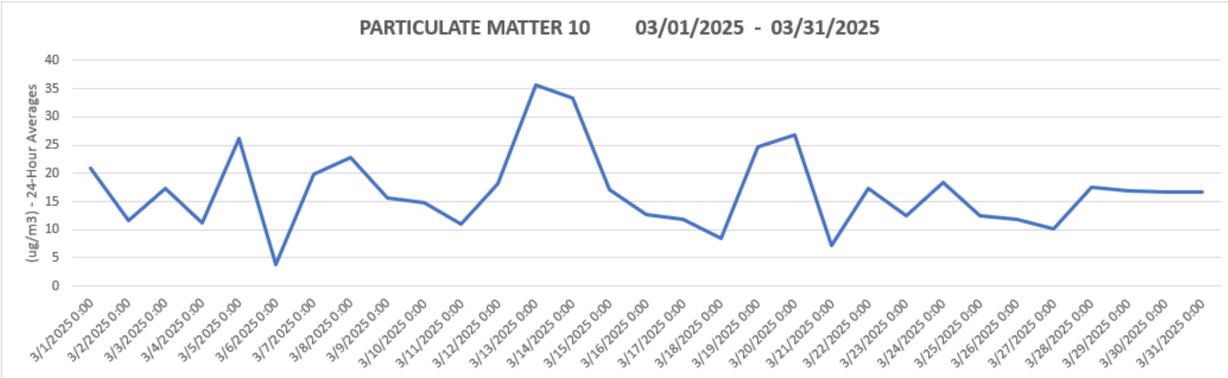


Figure D4-13: PM10 Day (24-Hour) Averages – March

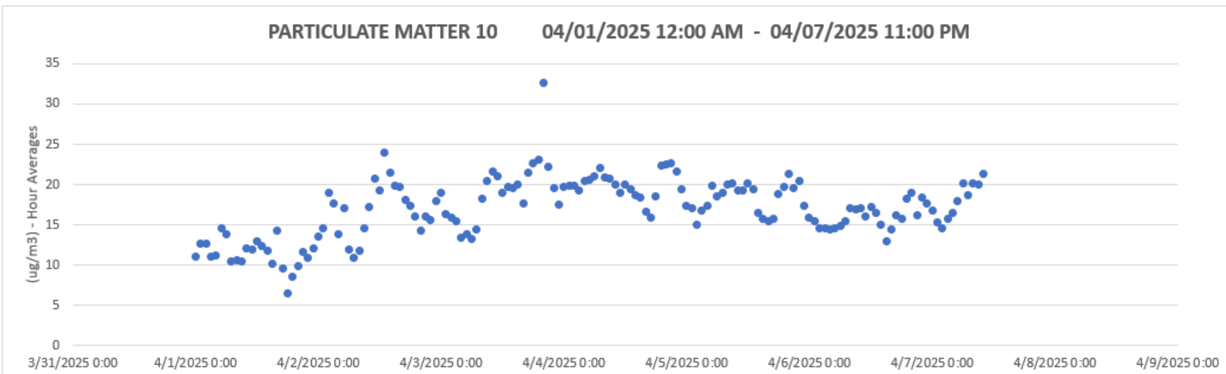


Figure D4-14: PM10 Hour Averages –April

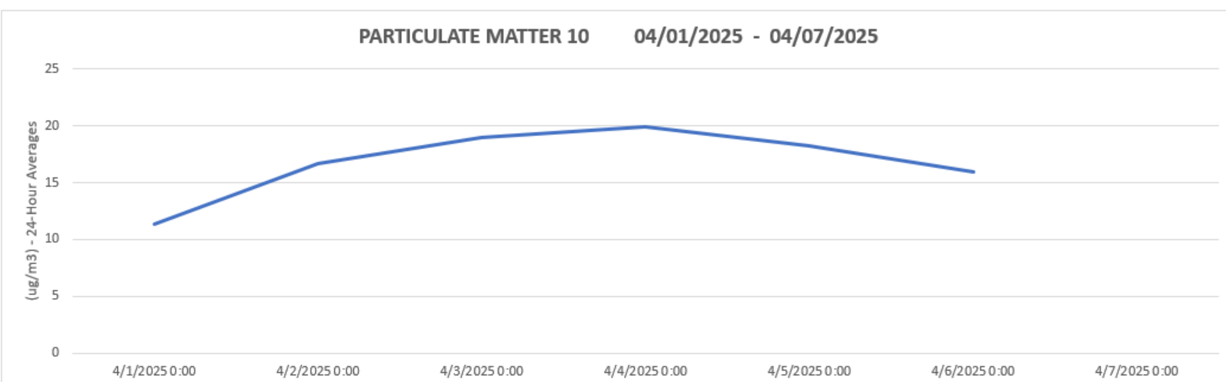


Figure D4-15: PM10 Day (24-Hour) Averages – April

Figures D4-16 – D4-22 plot averages based on the time of day for the entire collection period and for each month.

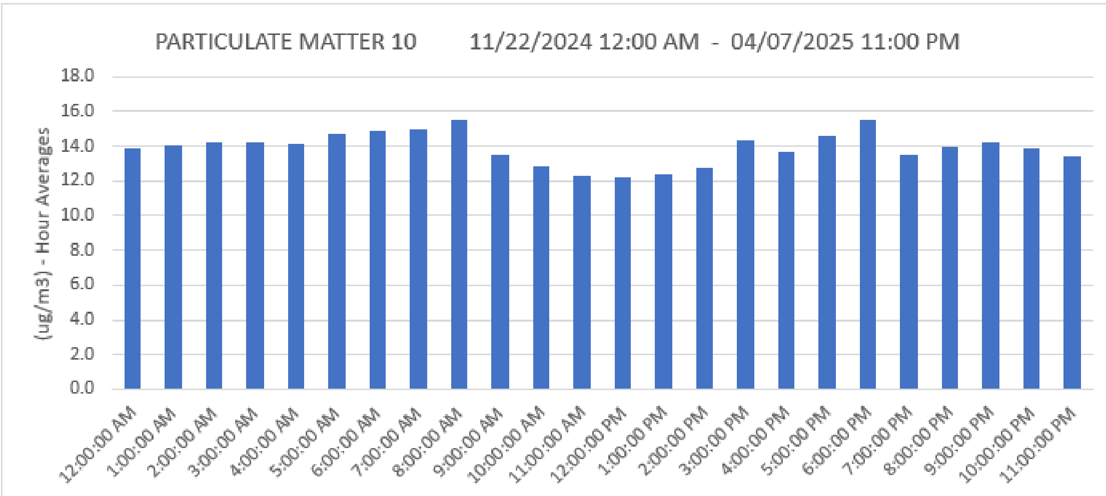


Figure D4-16: PM10 Hour Averages – Based on Time of Day for Collection Period

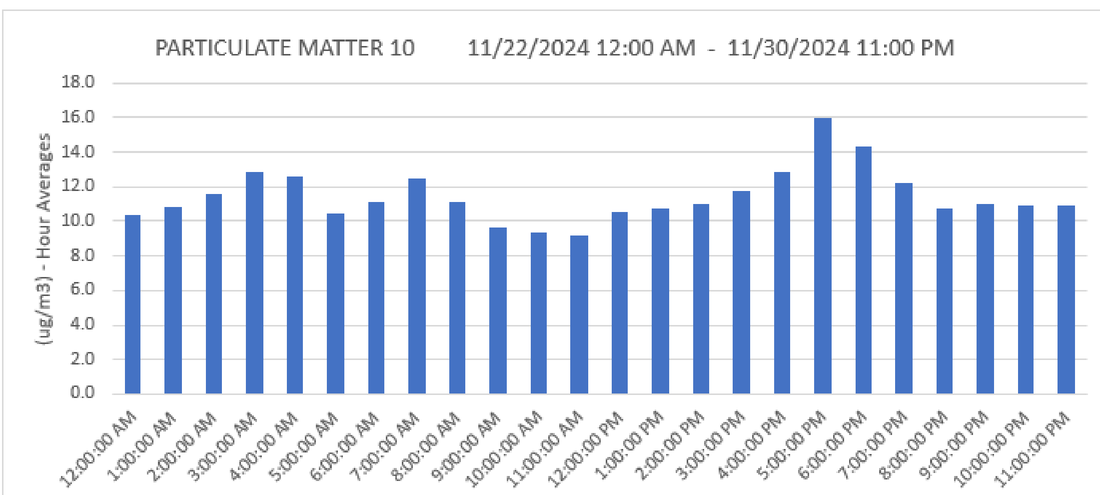


Figure D4-17: PM10 Hour Averages – Based on Time of Day for November

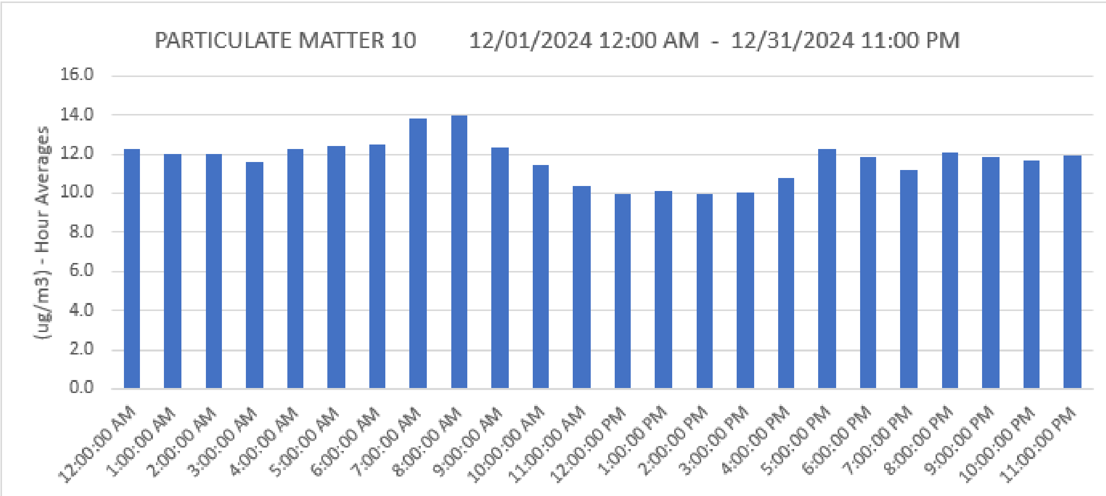


Figure D4-18: PM10 Hour Averages – Based on Time of Day for December

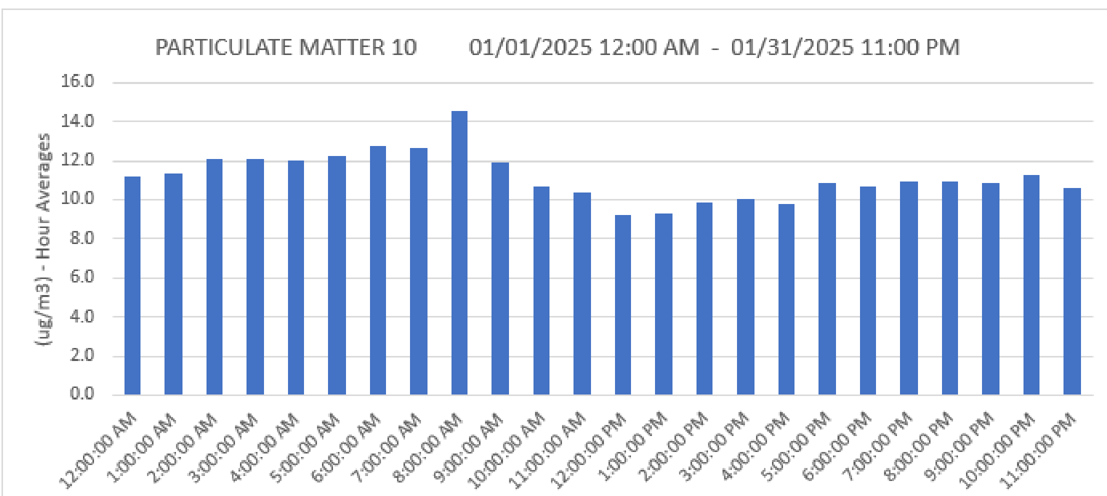


Figure D4-19: PM10 Hour Averages – Based on Time of Day for January

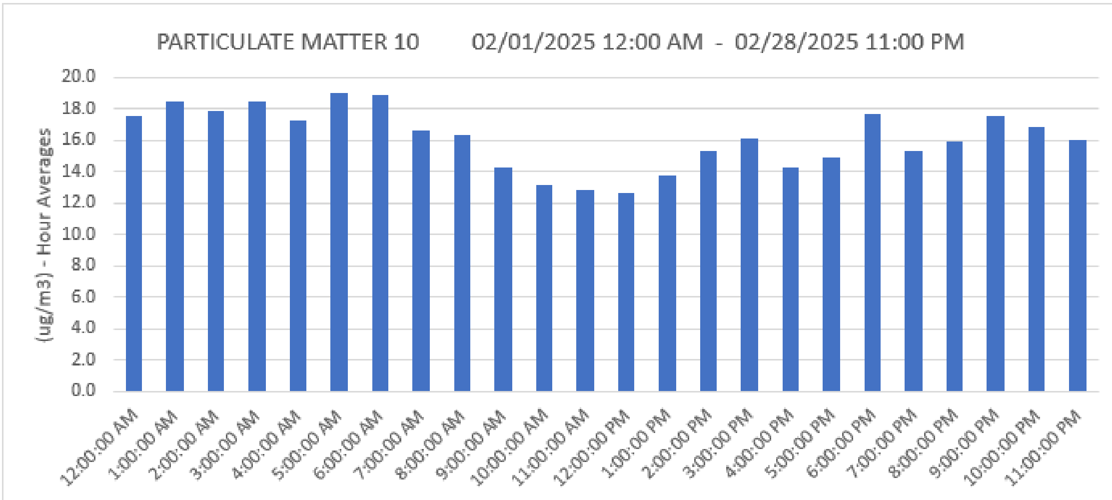


Figure D4-20: PM10 Hour Averages – Based on Time of Day for February

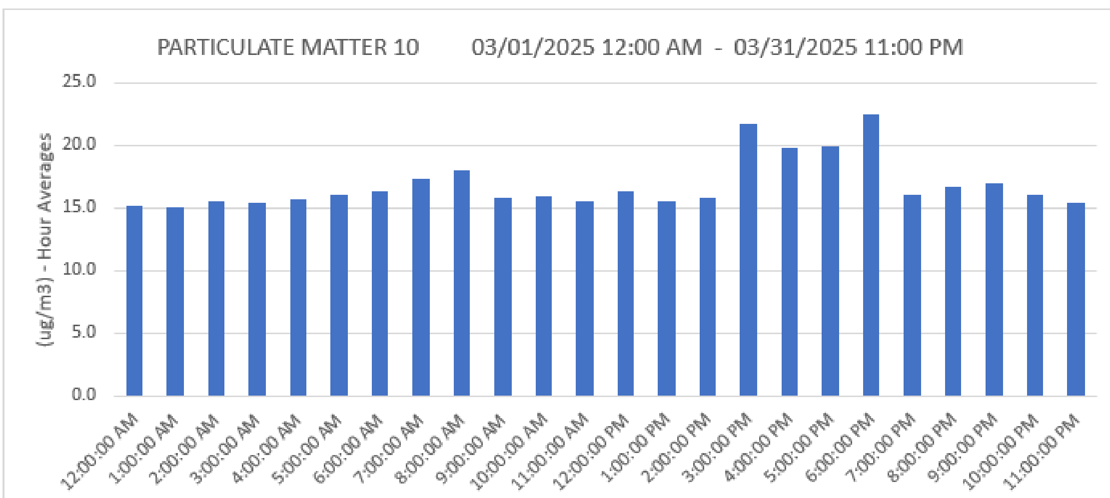


Figure D4-21: PM10 Hour Averages – Based on Time of Day for March

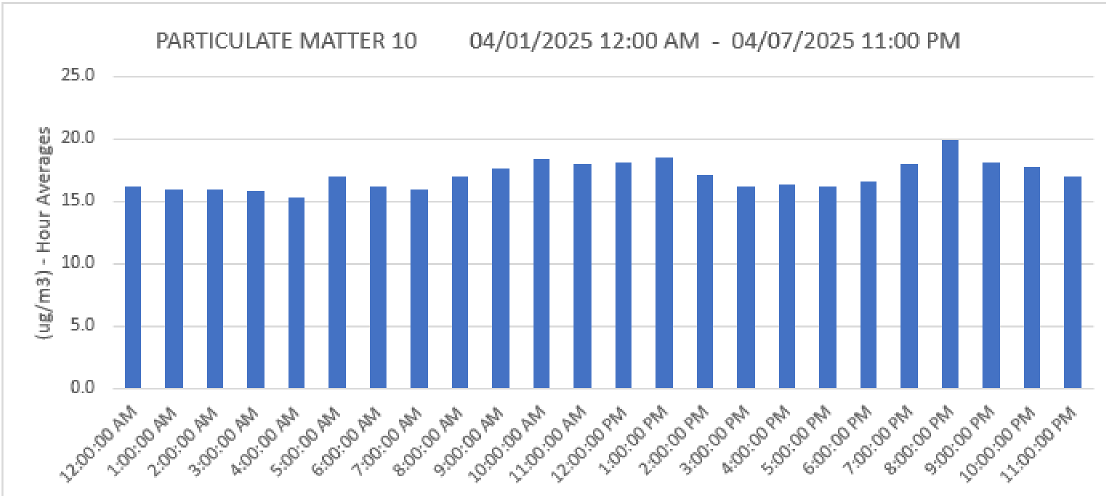


Figure D4-22: PM10 Hour Averages – Based on Time of Day for April

Figure D4-23 plot day averages based on the day of the week for the entire collection period.

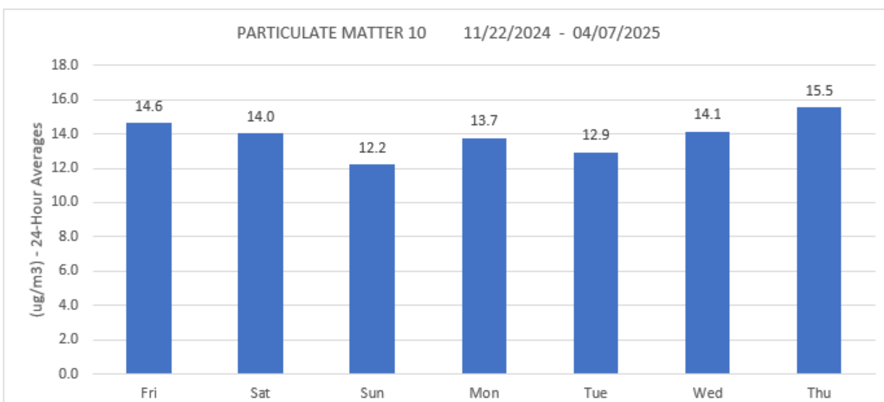


Figure D4-23: PM10 Day (24-Hour) Averages – Based on Day of the Week

PARTICULATE MATTER 10 Top 25 Concentrations (ug/m3) - Hour Averages 11/22/2024 12:00 AM - 04/07/2025 11:00 PM		
Rank	Concentration	Date & Time
1	170.5	3/9/2025 6:00 PM
2	169.7	3/7/2025 3:00 PM
3	94.1	3/5/2025 5:00 PM
4	90.5	3/5/2025 4:00 PM
5	88.4	2/26/2025 5:00 AM
6	82.4	2/4/2025 6:00 PM
7	81.6	2/6/2025 3:00 PM
8	78.5	2/26/2025 6:00 AM
9	76.4	2/5/2025 1:00 AM
10	75.8	2/24/2025 4:00 AM
11	75.7	2/24/2025 2:00 AM
12	70.7	3/3/2025 8:00 AM
13	69.9	2/24/2025 3:00 AM
14	65.4	2/27/2025 3:00 AM
15	65.3	3/7/2025 4:00 PM
16	65.2	2/27/2025 1:00 AM
17	63.7	2/6/2025 2:00 PM
18	63.5	2/27/2025 6:00 AM
19	62.9	2/23/2025 9:00 PM
20	59.1	3/5/2025 6:00 PM
21	58.7	2/27/2025 7:00 AM
22	57.7	3/20/2025 12:00 PM
23	52.8	3/13/2025 9:00 PM
24	52.7	2/26/2025 12:00 AM
25	52.0	3/13/2025 8:00 PM

PARTICULATE MATTER 10 Top 25 Concentrations (ug/m3) - 24-Hour Averages 11/22/2024 - 04/07/2025		
Rank	Concentration	Date
1	35.6	3/13/2025
2	33.8	2/27/2025
3	33.4	3/14/2025
4	31.3	2/25/2025
5	29.3	2/6/2025
6	29.2	2/26/2025
7	28.8	2/24/2025
8	26.8	3/20/2025
9	26.2	3/5/2025
10	24.7	3/19/2025
11	24.0	2/5/2025
12	23.8	2/8/2025
13	23.0	2/4/2025
14	22.7	3/8/2025
15	22.3	1/24/2025
16	21.8	12/16/2024
17	21.0	3/1/2025
18	19.9	4/4/2025
19	19.8	3/7/2025
20	19.8	2/7/2025
21	19.0	4/3/2025
22	19.0	2/23/2025
23	18.4	3/24/2025
24	18.3	4/5/2025
25	18.2	12/5/2024

Figure D4-24: PM10 Top 25 Concentrations for Hour Averages and 24-Hour Averages

Figures D4:25 and D4:26 pollution roses display the pollutant concentration based on wind direction, which can indicate the direction of the pollution source.

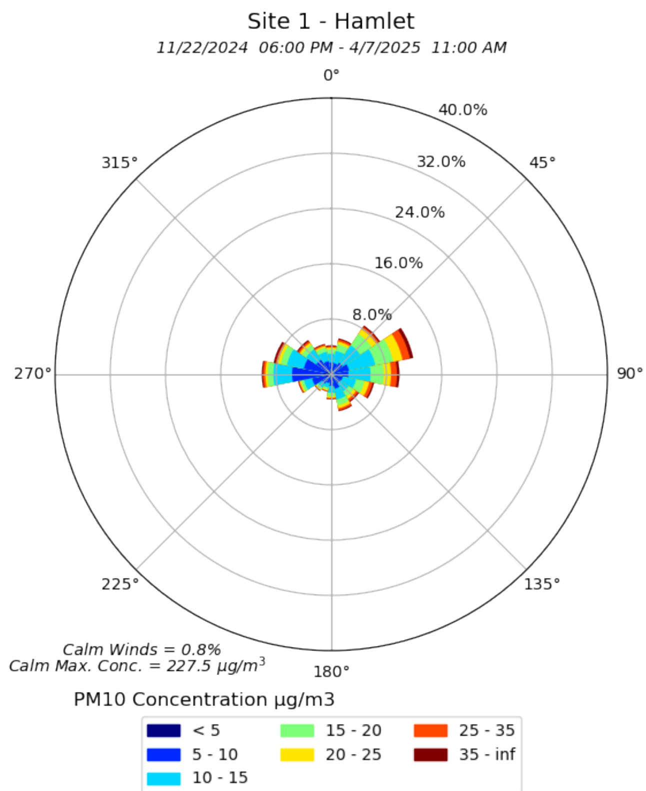


Figure D4-25: Pollution Rose

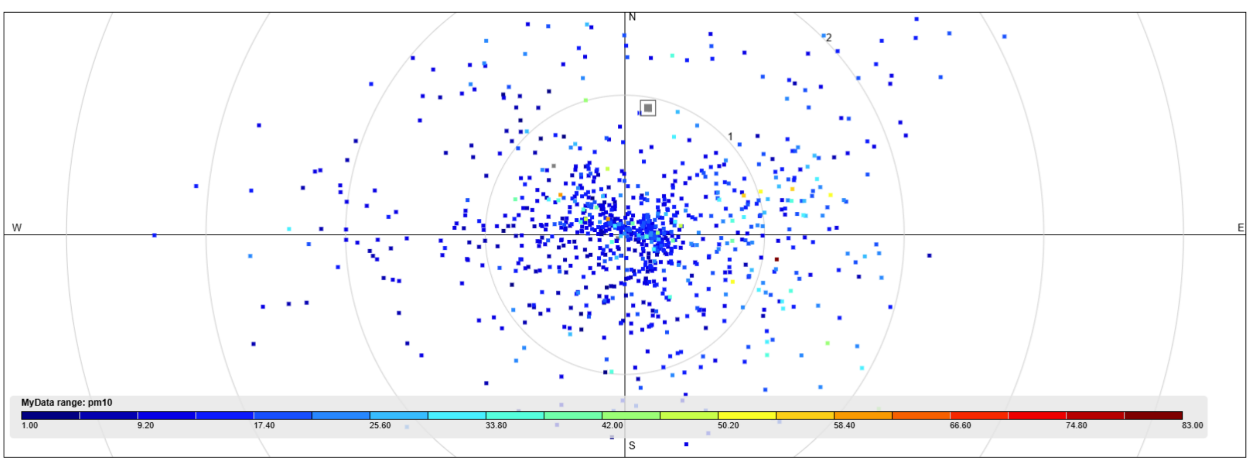


Figure D4-26: EPA RETIGO Pollution Rose 11/22/2024 - 4/7/2025

We separated the PM10 minute concentrations of at least 65 ug/m3 and plotted those on a pollution rose for a better visual representation of the direction of the highest concentrations.

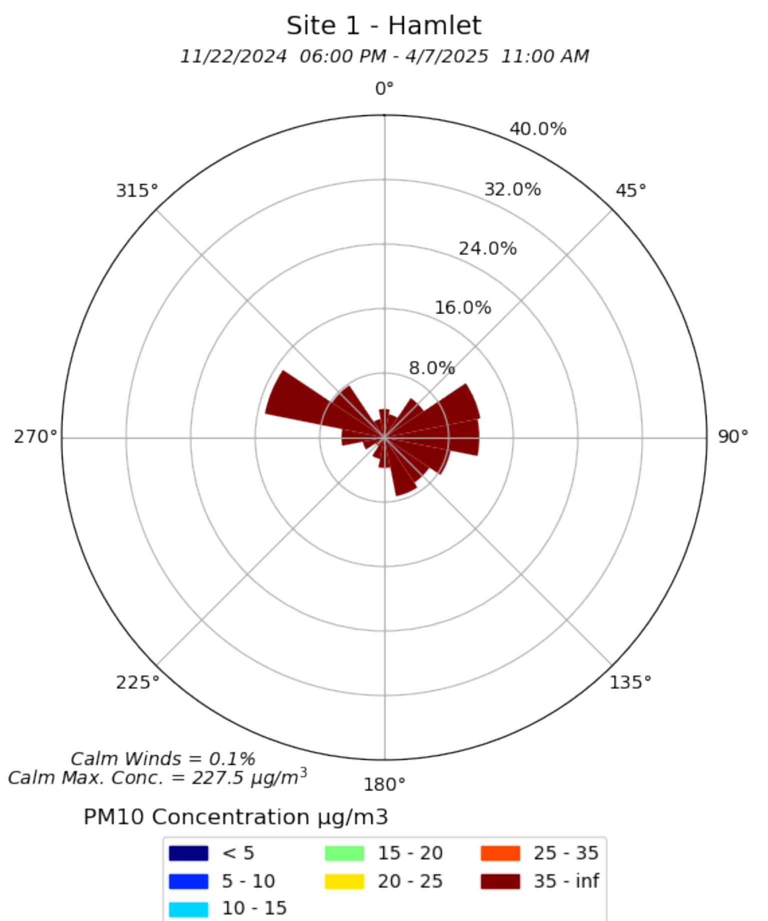


Figure D4-27: Pollution Rose displaying PM10 concentrations of at least 65 ug/m3.

PM10 Spikes

There were several spikes in particulate matter during our Site 1 monitoring. We will provide additional data for the top two. On March 9 there was a significant, albeit it brief, spike during the 6:40 PM – 6:46 PM time period. At 6:43 PM, the PM 10 one-minute sample was extremely high at 2739 ug/m3, indicating hazardous air quality. Fortunately, this extreme pollution spike was short-lived. The one-hour for 6 PM was 171 ug/m3, indicating an unhealthy for sensitive people condition. Despite these extreme readings during the 6 PM hour, the day's PM 10 average concentration of 16 ug/m3 was well within the good air quality category. The regional particulate matter for the day was in the good air quality range; however, there were some clusters of prescribed burns near the BEAST. Those burns probably led to the increased PM 10 readings.

While March 9 was a brief spike, March 13 experienced more of a day-long increase in PM 10 pollution. The entire region had a code yellow moderate AQI day for particulates. In addition, there was a nearby prescribed burn as indicated by the NOAA fire map. The 9 PM hour, with the day's high average of 53 ug/m3 was still within the green good air quality category with an AQI of 49. The day's PM 10 average concentration was 36 ug/m3.

March 9, 2025 Spike

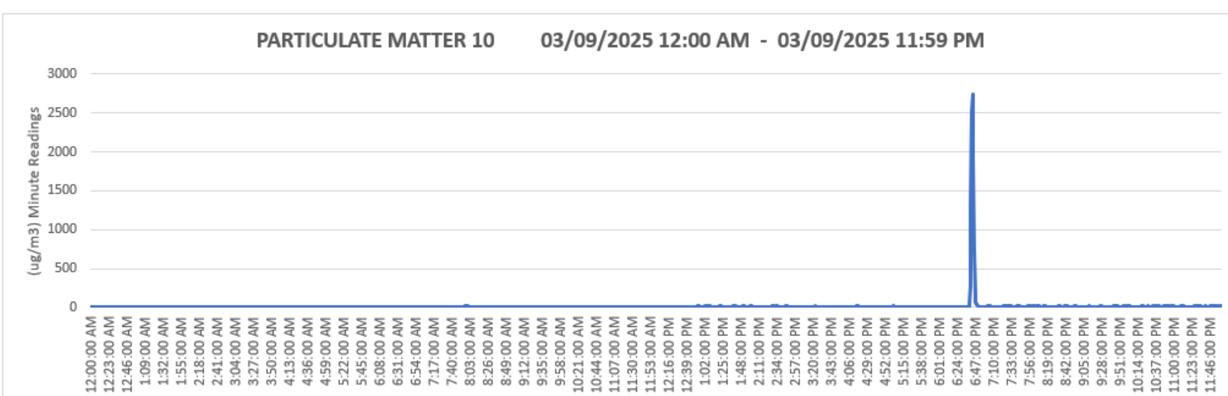


Figure D4-28: March 9, 2025 spike – Minute Data

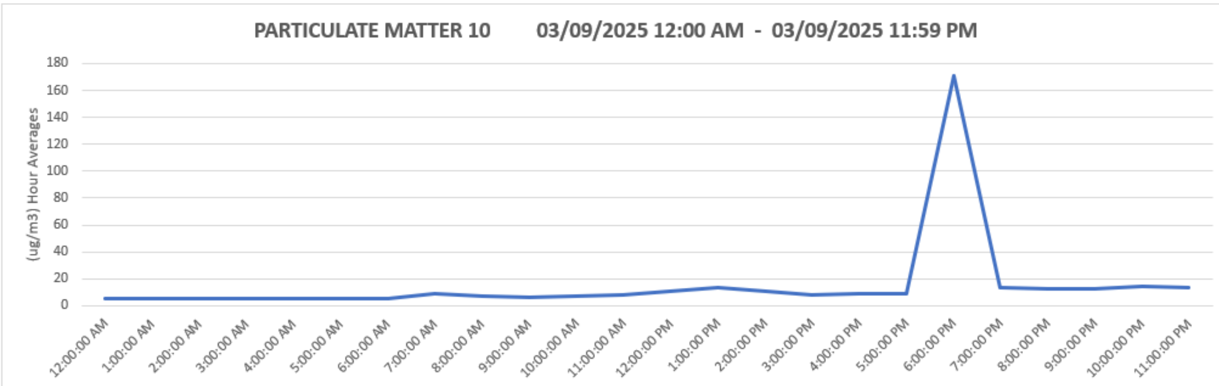


Figure D4-29: March 9, 2025 spike – Hour Data

Averaging Period	Concentration	AQI
One Minute Reading	2739	**2874**
One Minute Reading	1297	**1270**
Hour Average	171	**109**
24- Hour Average	16	**15**

Figure D4-30: March 9, 2025 spike – Extreme pollution spikes are not evident in longer averaging times. For brief one-minute readings, air quality was hazardous. Averaged over the hour, air quality was unhealthy for sensitive. The day's overall average indicated good air quality.

PARTICULATE MATTER 10 Top 25 Concentrations (ug/m3) Minute Readings 03/09/2025 12:00 AM - 03/09/2025 11:59 PM		
Rank	Concentration	Time
1	2739.2	6:43:00 PM
2	2522.8	6:42:00 PM
3	1905.3	6:44:00 PM
4	1296.5	6:41:00 PM
5	748.4	6:45:00 PM
6	265.9	6:40:00 PM
7	160.5	6:46:00 PM
8	72.8	6:47:00 PM
9	43.8	6:48:00 PM
10	24.4	6:49:00 PM
11	22.5	1:39:00 PM
12	21.6	1:40:00 PM
13	20.9	10:35:00 PM
14	20.3	10:36:00 PM
15	19.6	7:29:00 PM
16	19.5	7:28:00 PM
17	19.2	1:38:00 PM
18	19.0	10:34:00 PM
19	18.6	7:27:00 PM
20	18.5	11:59:00 PM
21	18.5	7:03:00 PM
22	18.3	10:50:00 PM
23	17.8	8:01:00 PM
24	17.8	7:04:00 PM
25	17.7	8:00:00 PM

PARTICULATE MATTER 10 Hour Averages Ranked by Highest (ug/m3) Hour Averages 03/09/2025 12:00 AM - 03/09/2025 11:59 PM		
Rank	Concentration	Time
1	170.5	6:00:00 PM
2	14.2	10:00:00 PM
3	13.5	11:00:00 PM
4	13.5	1:00:00 PM
5	13.4	7:00:00 PM
6	12.9	8:00:00 PM
7	12.6	9:00:00 PM
8	11.2	2:00:00 PM
9	11.2	12:00:00 PM
10	8.9	7:00:00 AM
11	8.7	4:00:00 PM
12	8.6	5:00:00 PM
13	8.5	3:00:00 PM
14	8.5	11:00:00 AM
15	7.0	8:00:00 AM
16	6.8	10:00:00 AM
17	6.4	9:00:00 AM
18	5.8	6:00:00 AM
19	5.8	4:00:00 AM
20	5.7	1:00:00 AM
21	5.5	2:00:00 AM
22	5.5	12:00:00 AM
23	5.3	5:00:00 AM
24	5.0	3:00:00 AM

Figure D4-31: Top 25 Concentrations for March 9, 2025. Left table indicates Top 25 one-minute readings. Right table ranks the day's hour from highest to lowest average concentration.

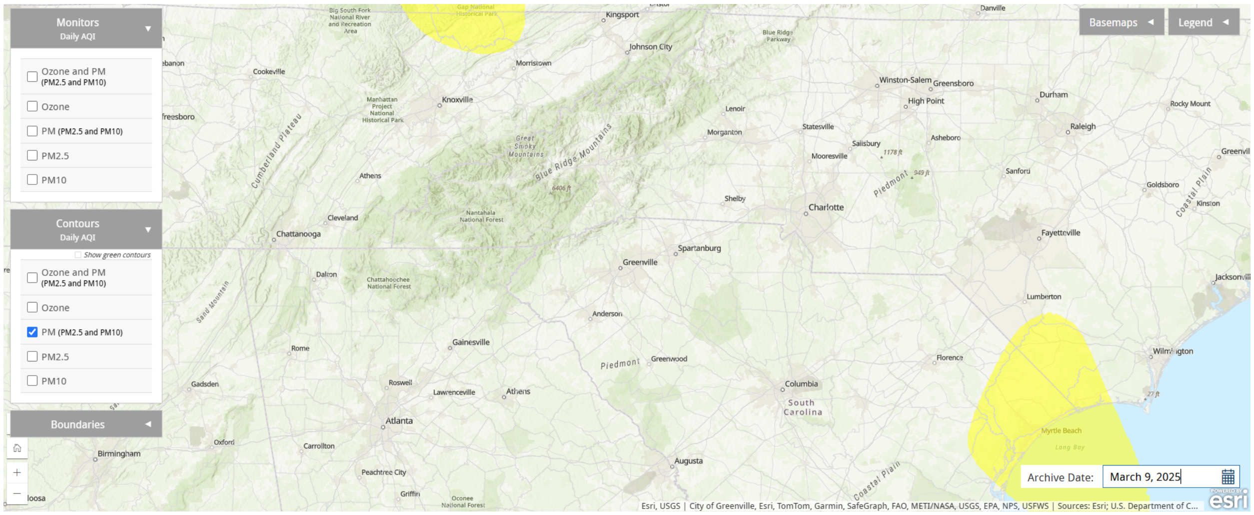


Figure D4-32: EPA March 9, 2025 AQI map for Particulate Matter

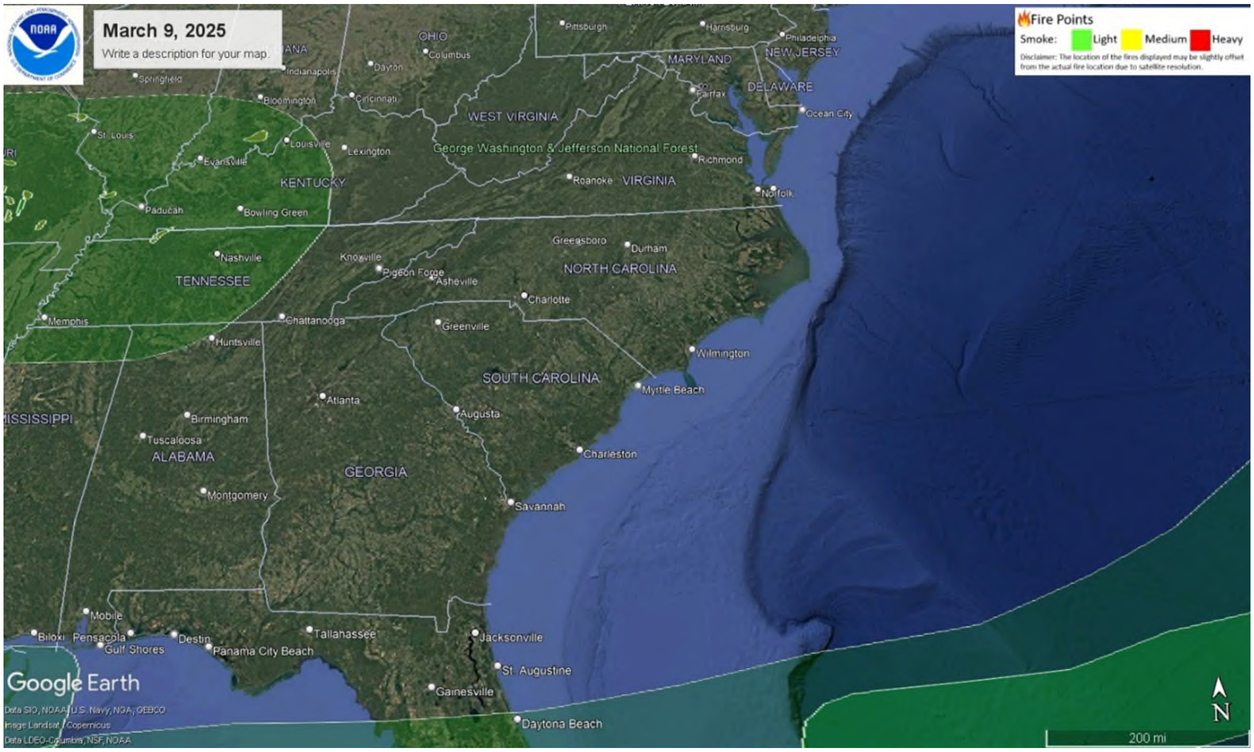


Figure D4-33: NOAA March 9, 2025 smoke map

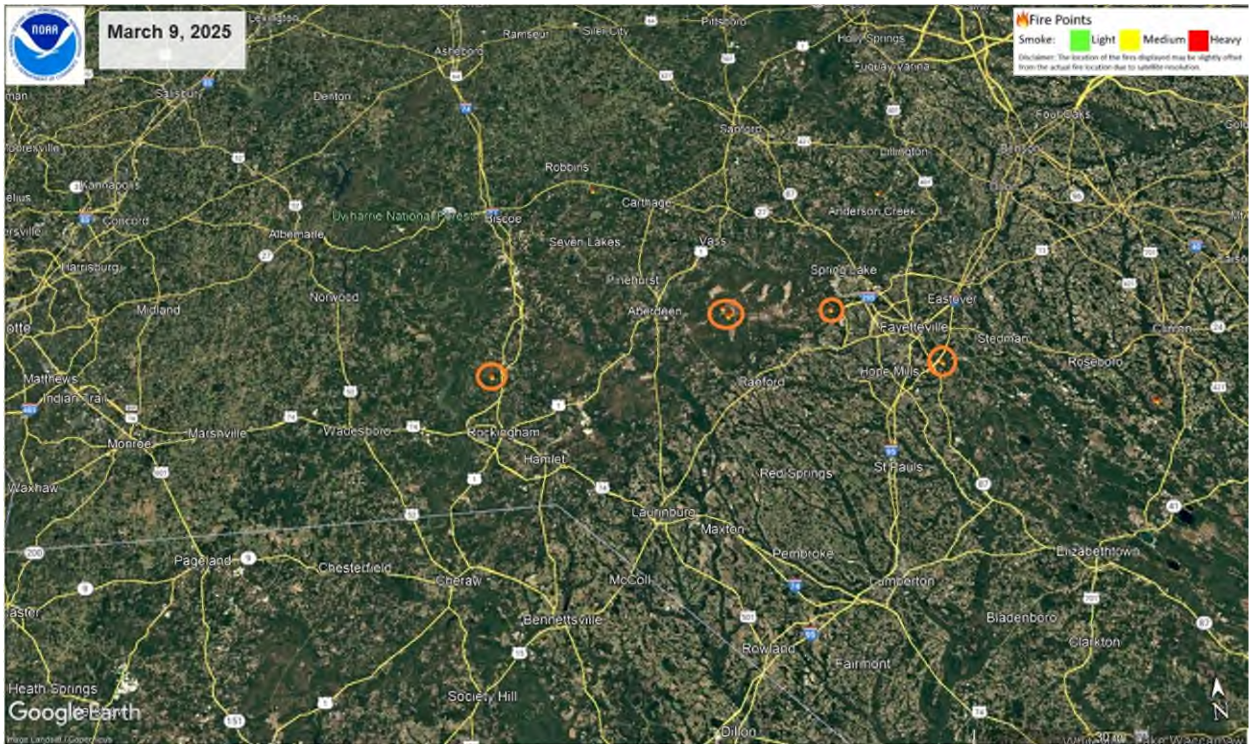


Figure D4-33: NOAA March 9, 2025 fire map showing nearby fires

March 13, 2025 Spike

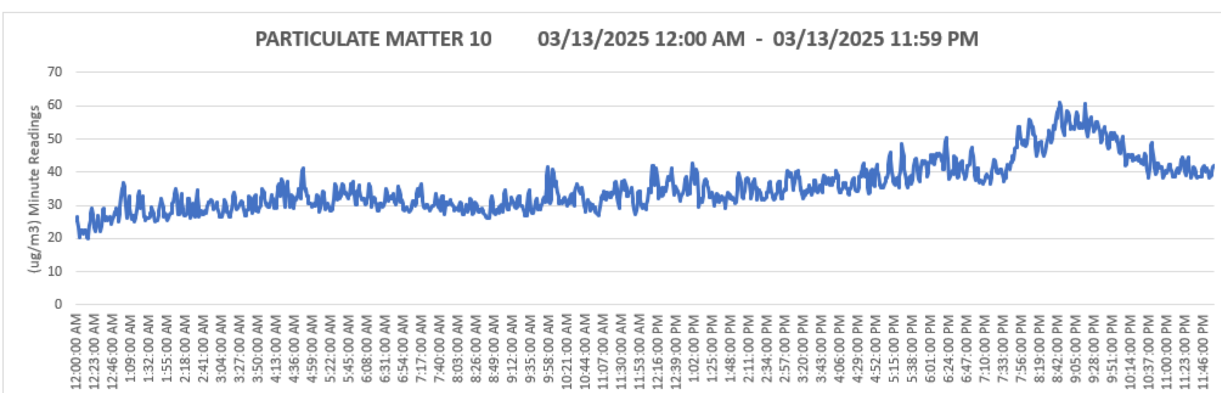


Figure D4-34: March 13 Minute Readings for PM10

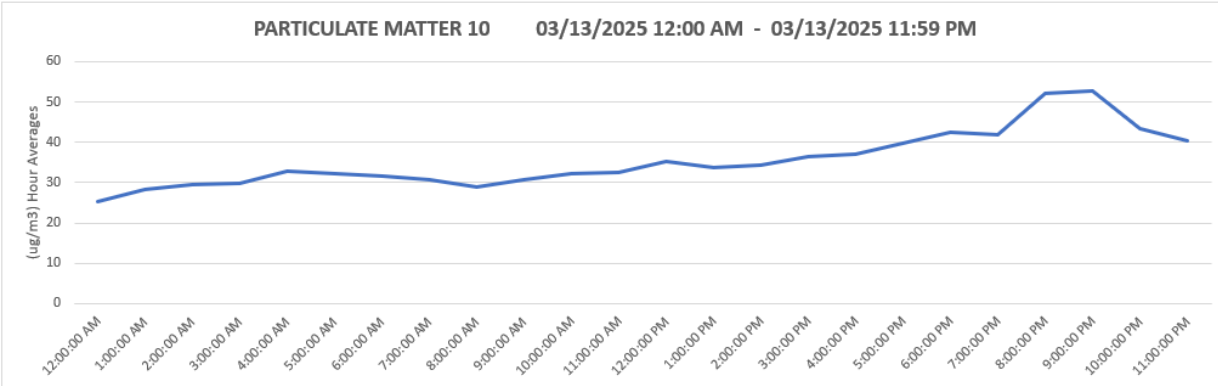


Figure D4-35: March 13 Hour Averages for PM10

PARTICULATE MATTER 10 Top 25 Concentrations (ug/m3) Minute Readings 03/13/2025 12:00 AM - 03/13/2025 11:59 PM		
Rank	Concentration	Time
1	60.9	8:45:00 PM
2	60.5	9:16:00 PM
3	59.9	8:46:00 PM
4	59.5	9:17:00 PM
5	59.1	8:43:00 PM
6	59.0	8:44:00 PM
7	58.4	8:53:00 PM
8	58.2	8:55:00 PM
9	58.2	8:54:00 PM
10	57.9	9:06:00 PM
11	57.9	8:41:00 PM
12	56.8	9:07:00 PM
13	56.8	8:56:00 PM
14	56.6	9:24:00 PM
15	56.3	8:42:00 PM
16	56.2	9:18:00 PM
17	56.0	9:25:00 PM
18	56.0	9:05:00 PM
19	55.8	9:23:00 PM
20	55.7	8:40:00 PM
21	55.7	8:06:00 PM
22	55.4	8:57:00 PM
23	55.4	8:08:00 PM
24	55.3	9:32:00 PM
25	55.3	9:08:00 PM

PARTICULATE MATTER 10 Hour Averages Ranked by Highest (ug/m3) Hour Averages 03/13/2025 12:00 AM - 03/13/2025 11:59 PM		
Rank	Concentration	Time
1	52.8	9:00:00 PM
2	52.0	8:00:00 PM
3	43.5	10:00:00 PM
4	42.5	6:00:00 PM
5	41.9	7:00:00 PM
6	40.4	11:00:00 PM
7	39.9	5:00:00 PM
8	37.2	4:00:00 PM
9	36.4	3:00:00 PM
10	35.4	12:00:00 PM
11	34.5	2:00:00 PM
12	33.8	1:00:00 PM
13	32.7	4:00:00 AM
14	32.5	11:00:00 AM
15	32.3	5:00:00 AM
16	32.2	10:00:00 AM
17	31.5	6:00:00 AM
18	30.7	9:00:00 AM
19	30.6	7:00:00 AM
20	29.7	3:00:00 AM
21	29.6	2:00:00 AM
22	28.8	8:00:00 AM
23	28.4	1:00:00 AM
24	25.3	12:00:00 AM

Figure D4-36: March 13 PM10 Top 25 Minute Readings and the day's hour averages ranked from highest to lowest concentration.

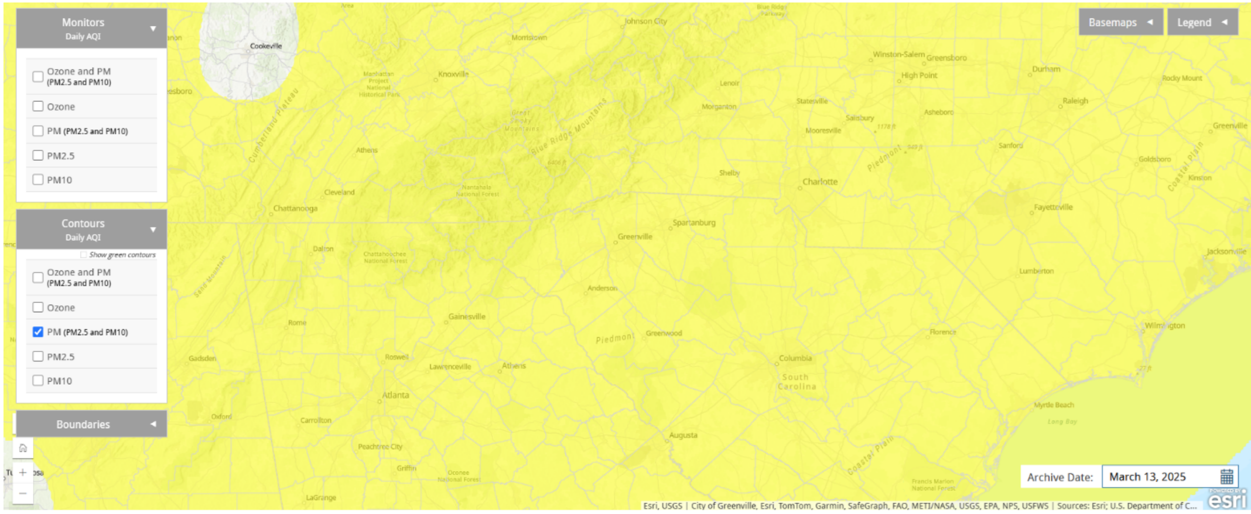


Figure D4-37: March 13 EPA AQI Map for Particulate Matter

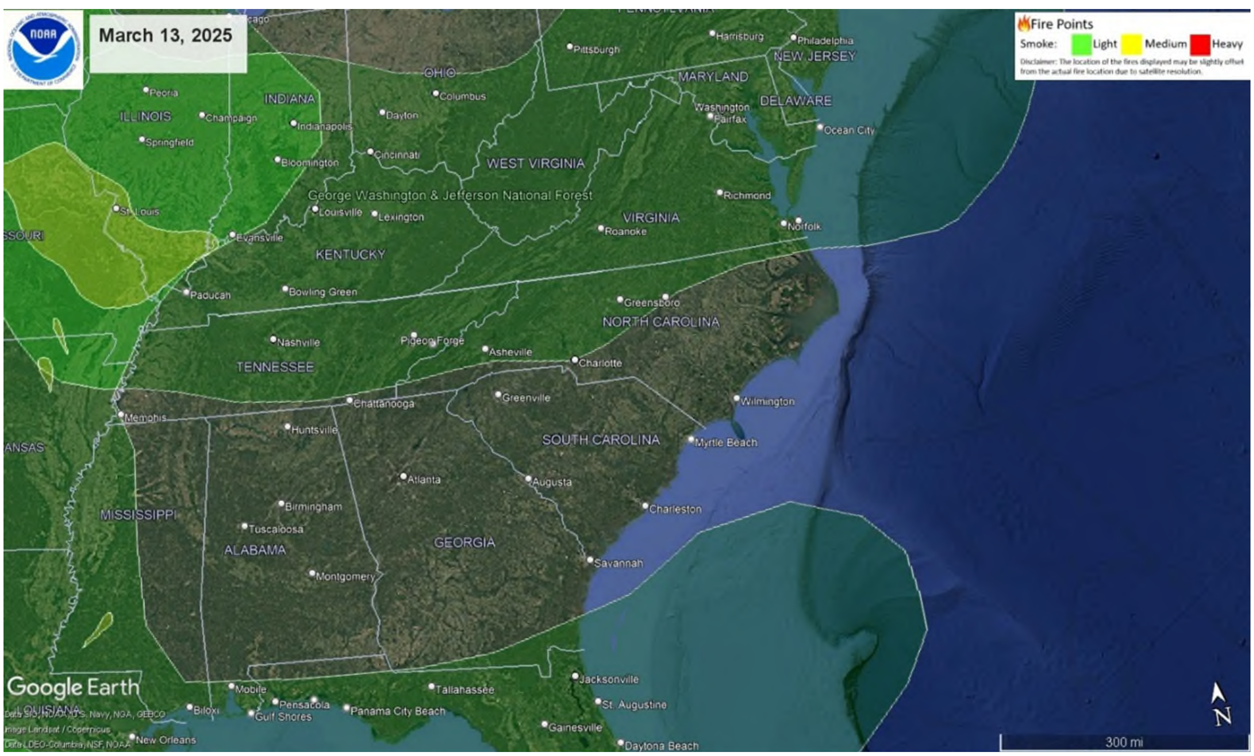


Figure D4-38: March 13 NOAA Smoke Map showing no detailed smoke over the BEAST area.

Figure D4-39: March 13 NOAA Fire Map showing cluster of prescribed burns near BEAST

D5: Data – Nitric Oxide

Nitric Oxide (NO) Findings

- Only 12 - or 0.36% - of Nitric Oxide hourly averages were of concentrations of at least 5 ppb or greater.
- 3 of our top 4 hourly averages occurred on one day – January 25 from 6 AM – 8:59 AM.
- Only 3 hourly averages during our Site 1 monitoring had average concentrations over 10 ppb.

Data Presentations

BREDL data presentations for NO will include hourly averages (the average of 60 one-minute readings). Wind and pollution roses use the one minute readings (1440 per day).

Time of day bar graphs are used to examine time periods of the day. For example, is there one part of the day where the pollution registered higher or lower?

Figures D5-1 – D5-7 plot hour averages for the entire collection period and for each month. These averages take the 60 one-minute readings for each hour and average them for the hour average.

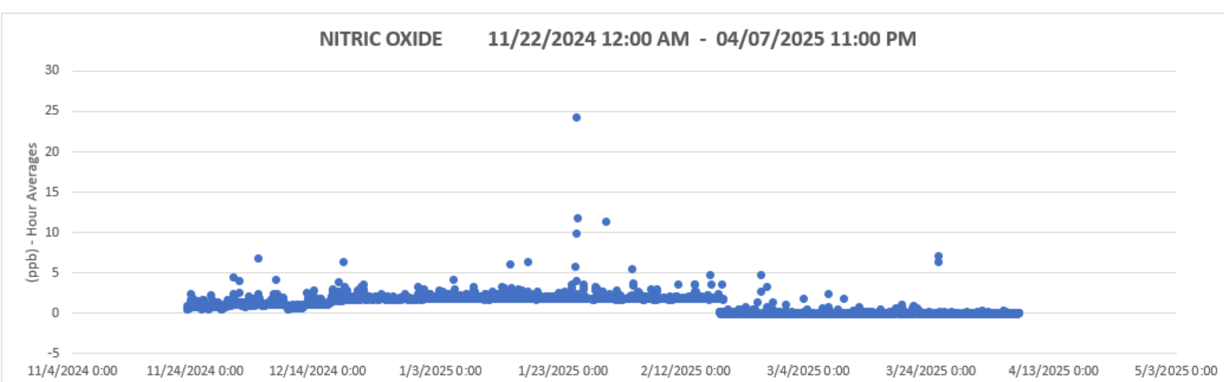


Figure D5-1: NO Hour Averages – Entire Collection Period

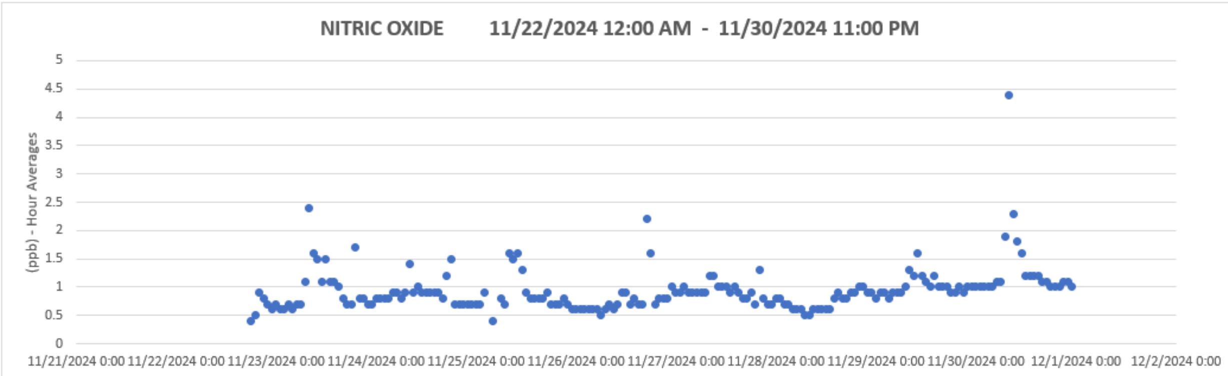


Figure D5-2: NO Hour Averages – November

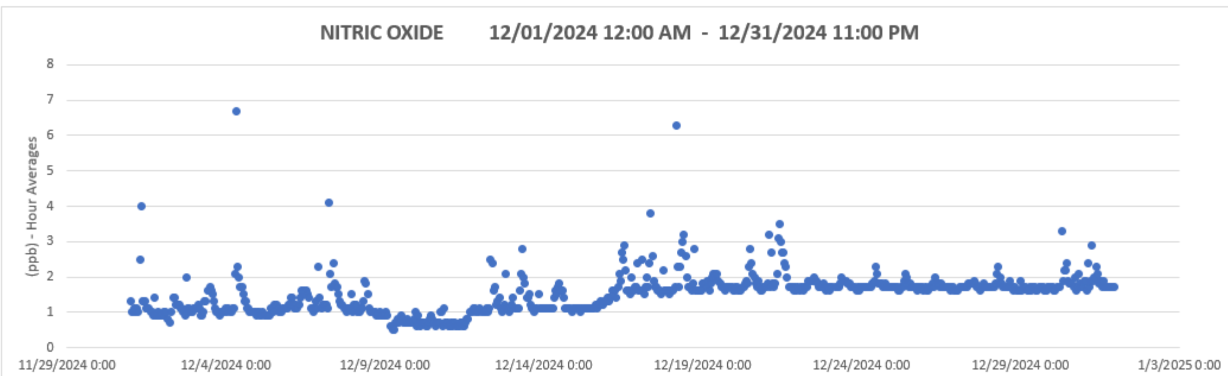


Figure D5-3: NO Hour Averages – December

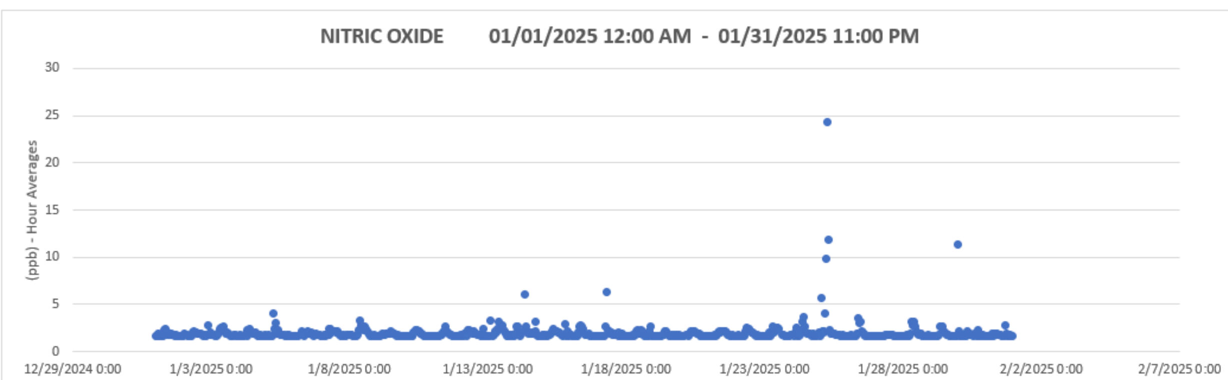


Figure D5-4: NO Hour Averages – January

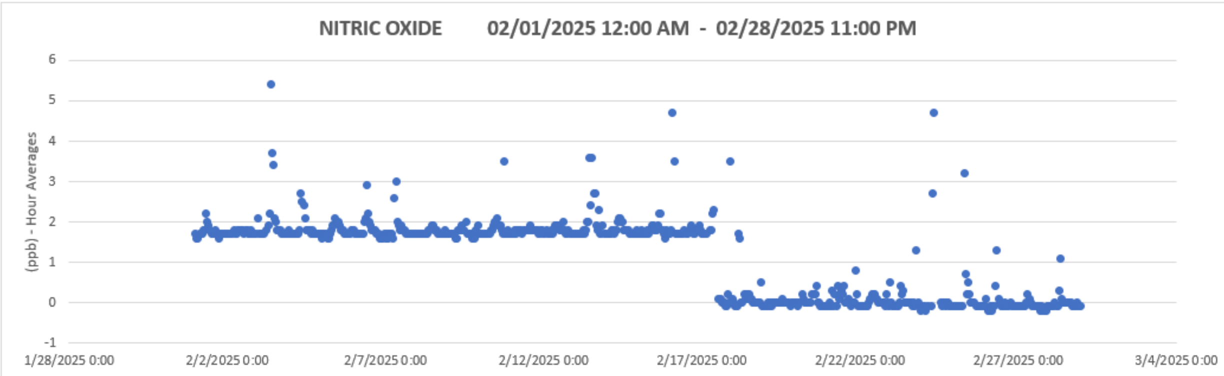


Figure D5-5: NO Hour Averages – February

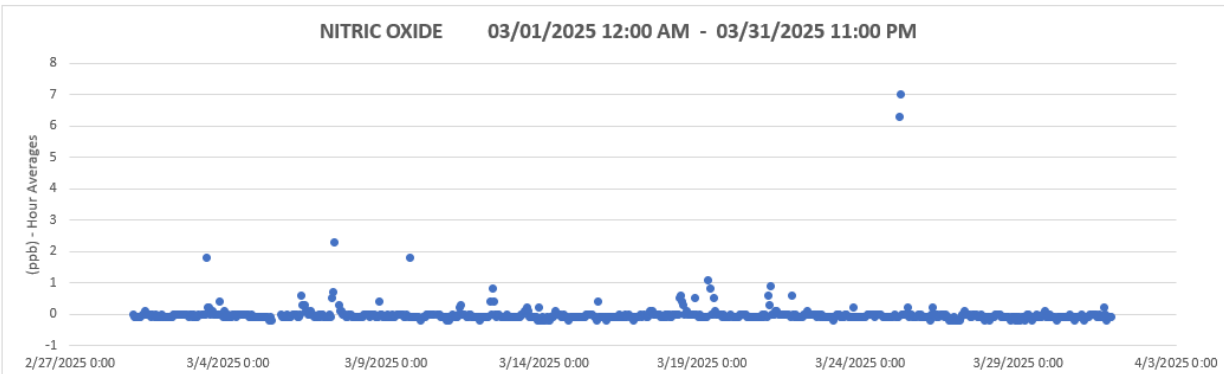


Figure D5-6: NO Hour Averages – March

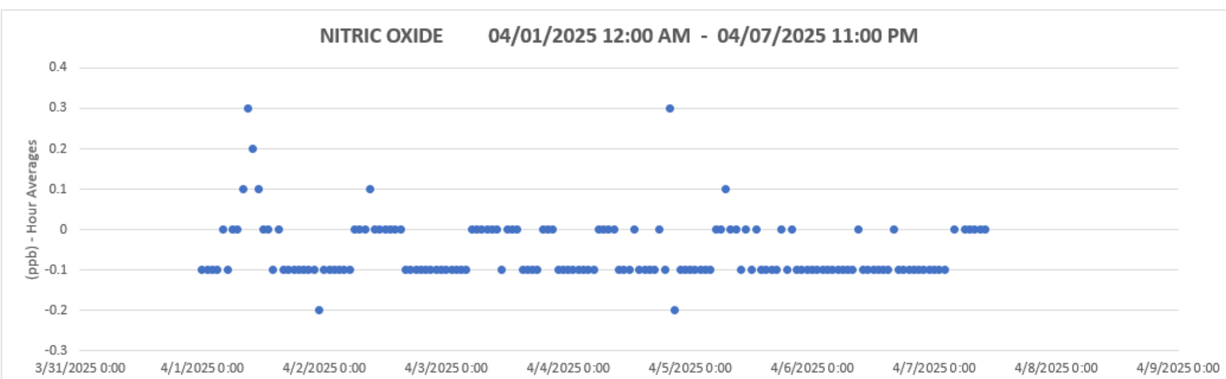


Figure D5-7: NO Hour Averages – April

Figures D5-8 – D5-14 plot averages based on the time of day for the entire collection period and for each month.

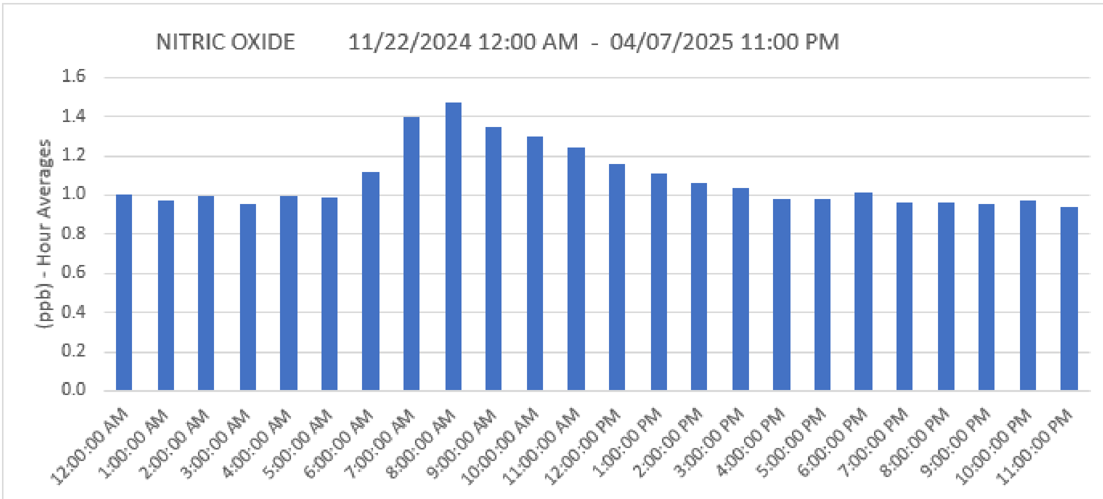


Figure D5-8: NO Hour Averages – Based on Time of Day for Collection Period

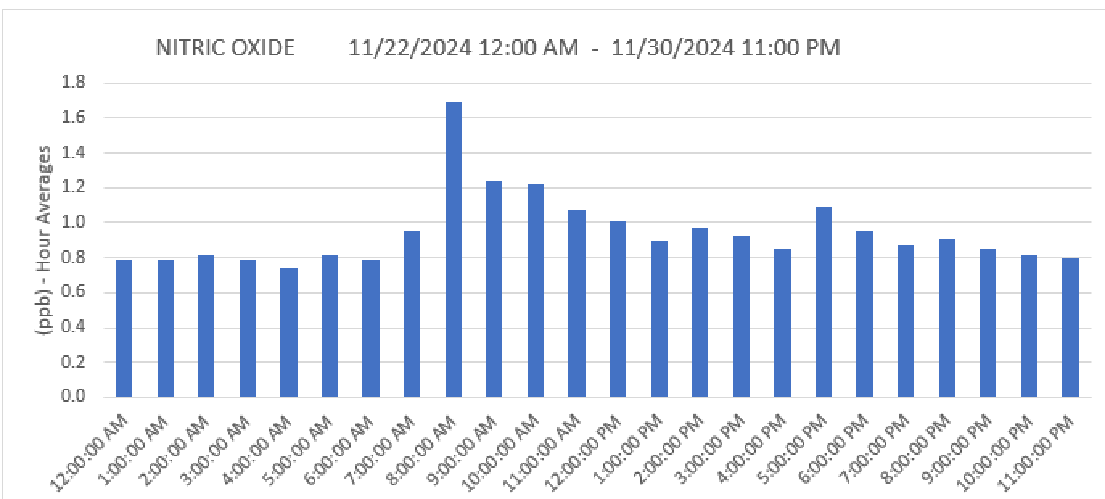


Figure D5-9: NO Hour Averages – Based on Time of Day for November

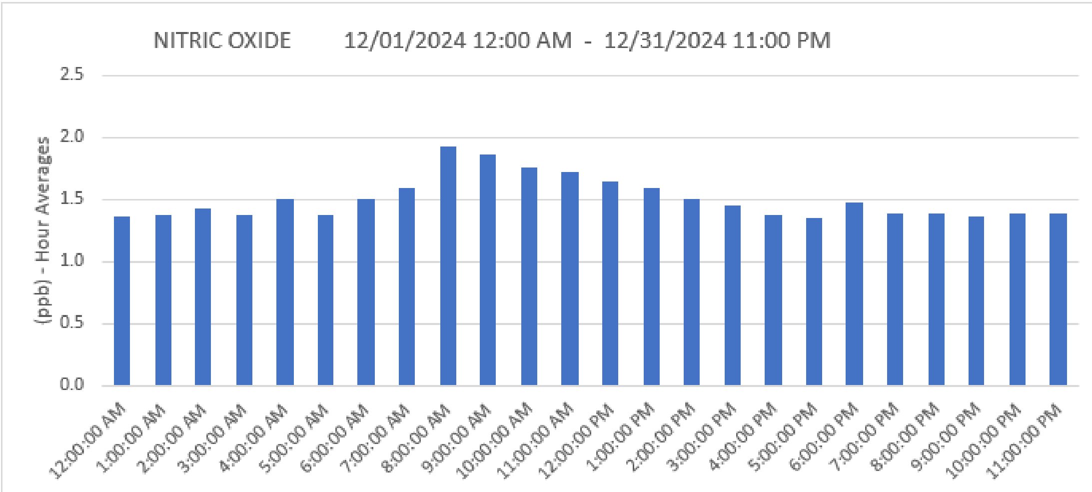


Figure D5-10: NO Hour Averages – Based on Time of Day for December

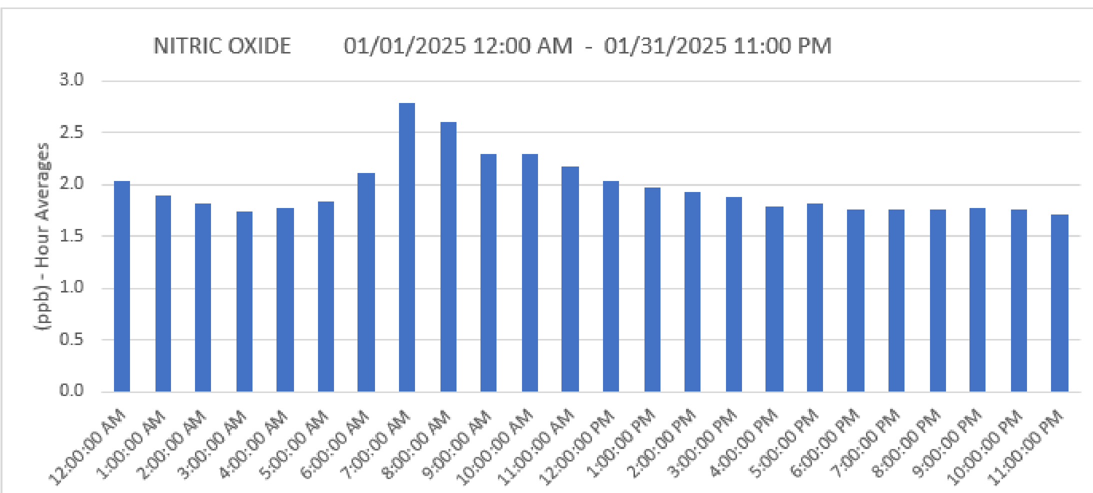


Figure D5-11: NO Hour Averages – Based on Time of Day for January

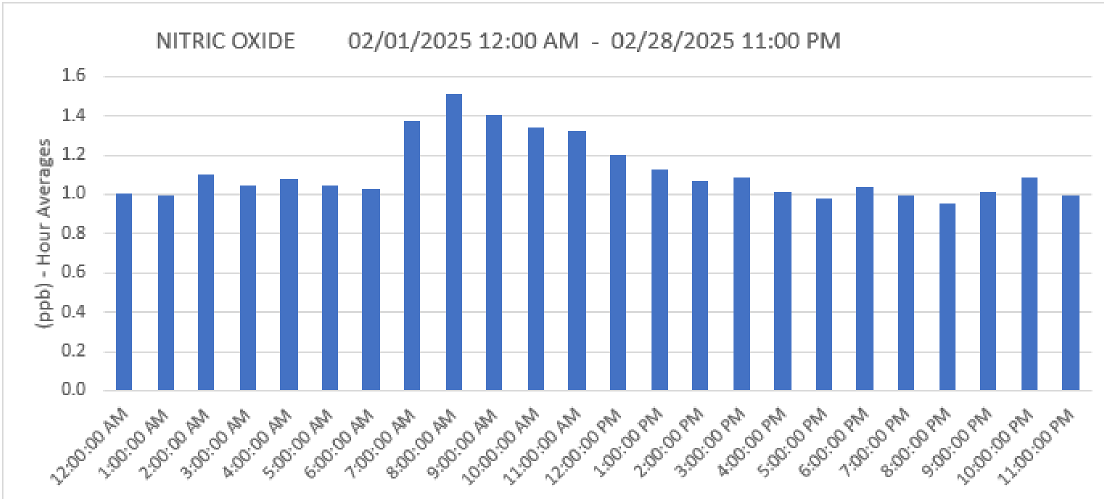


Figure D5-12: NO Hour Averages – Based on Time of Day for February

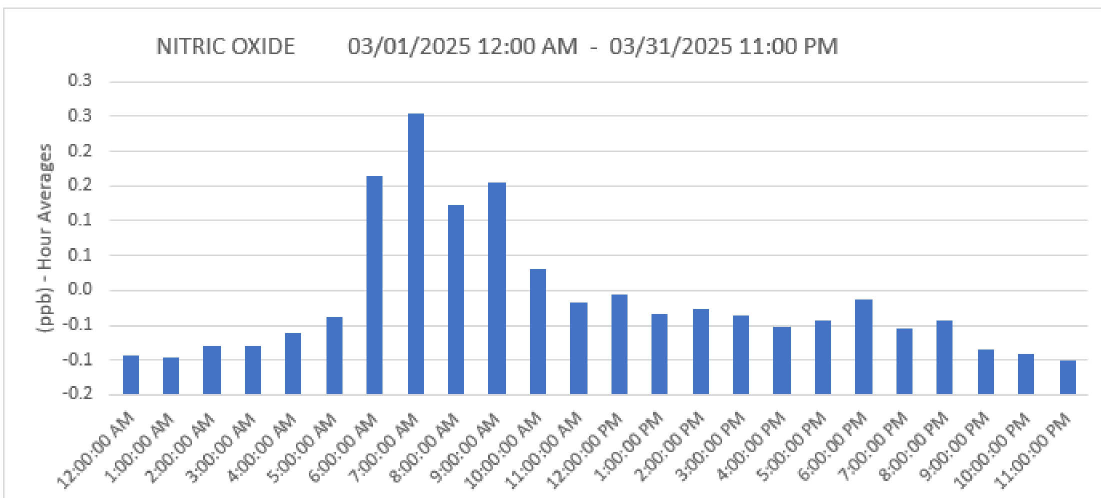


Figure D5-13: NO Hour Averages – Based on Time of Day for March

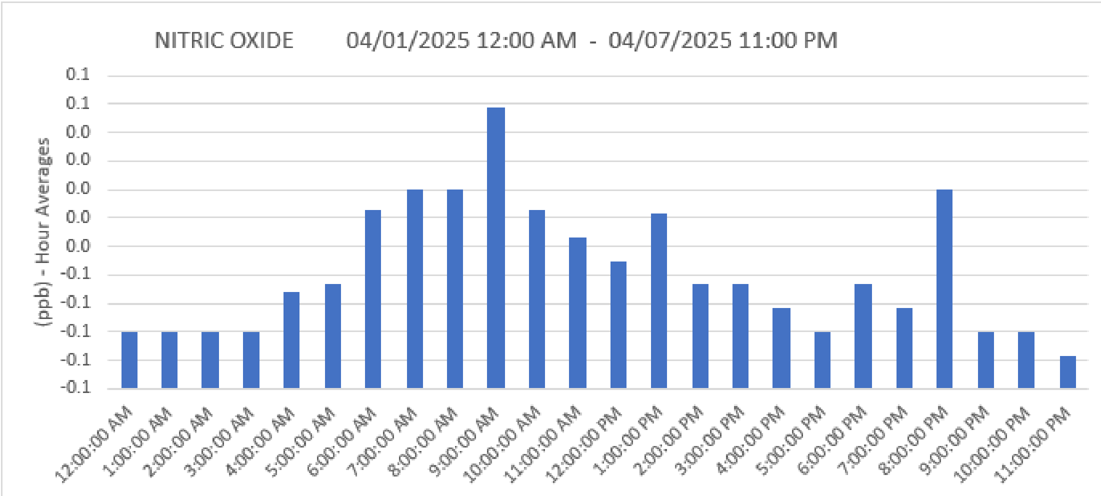


Figure D5-14: NO Hour Averages – Based on Time of Day for April

NITRIC OXIDE One-Hour Averages Ranked by Highest (ppb) - Hour Averages 11/22/2024 12:00 AM - 04/07/2025 11:00 PM		
Rank	**Concentration**	**Date & Time**
1	24.3	1/25/2025 7:00 AM
2	11.8	1/25/2025 8:00 AM
3	11.3	1/30/2025 12:00 AM
4	9.8	1/25/2025 6:00 AM
5	7.0	3/25/2025 7:00 AM
6	6.7	12/4/2024 8:00 AM
7	6.3	3/25/2025 6:00 AM
8	6.3	1/17/2025 7:00 AM
9	6.3	12/18/2024 4:00 AM
10	6.0	1/14/2025 8:00 AM
11	5.7	1/25/2025 1:00 AM
12	5.4	2/3/2025 9:00 AM
13	4.7	2/24/2025 8:00 AM
14	4.7	2/16/2025 2:00 AM
15	4.4	11/30/2024 8:00 AM
16	4.1	1/5/2025 6:00 AM
17	4.1	12/7/2024 6:00 AM
18	4.0	1/25/2025 5:00 AM
19	4.0	12/1/2024 8:00 AM
20	3.8	12/17/2024 9:00 AM
21	3.7	2/3/2025 10:00 AM
22	3.6	2/13/2025 1:00 PM
23	3.6	2/13/2025 11:00 AM
24	3.6	1/24/2025 10:00 AM

Figure D5-15: NO Hour Averages – Top 25 Concentrations

Figures D2:16 and D2:17 pollution roses display the pollutant concentration based on wind direction, which can indicate the direction of the pollution source.

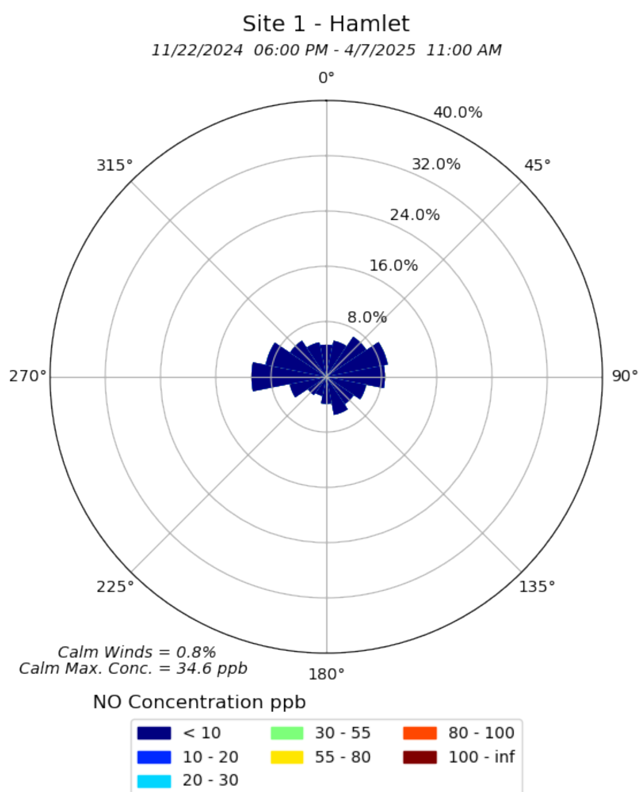


Figure D5-16: Pollution Rose

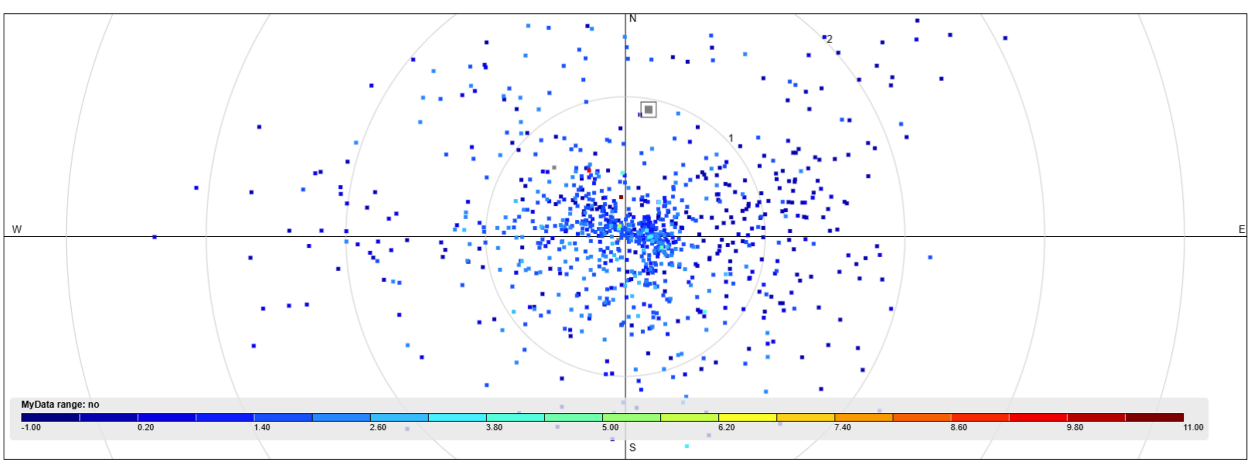


Figure D5-17: EPA RETIGO Pollution Rose 11/22/2024 - 4/7/2025

We separated the NO minute concentrations of at least 30 ppb and plotted those on a pollution rose for a better visual representation of the direction of the highest concentrations.

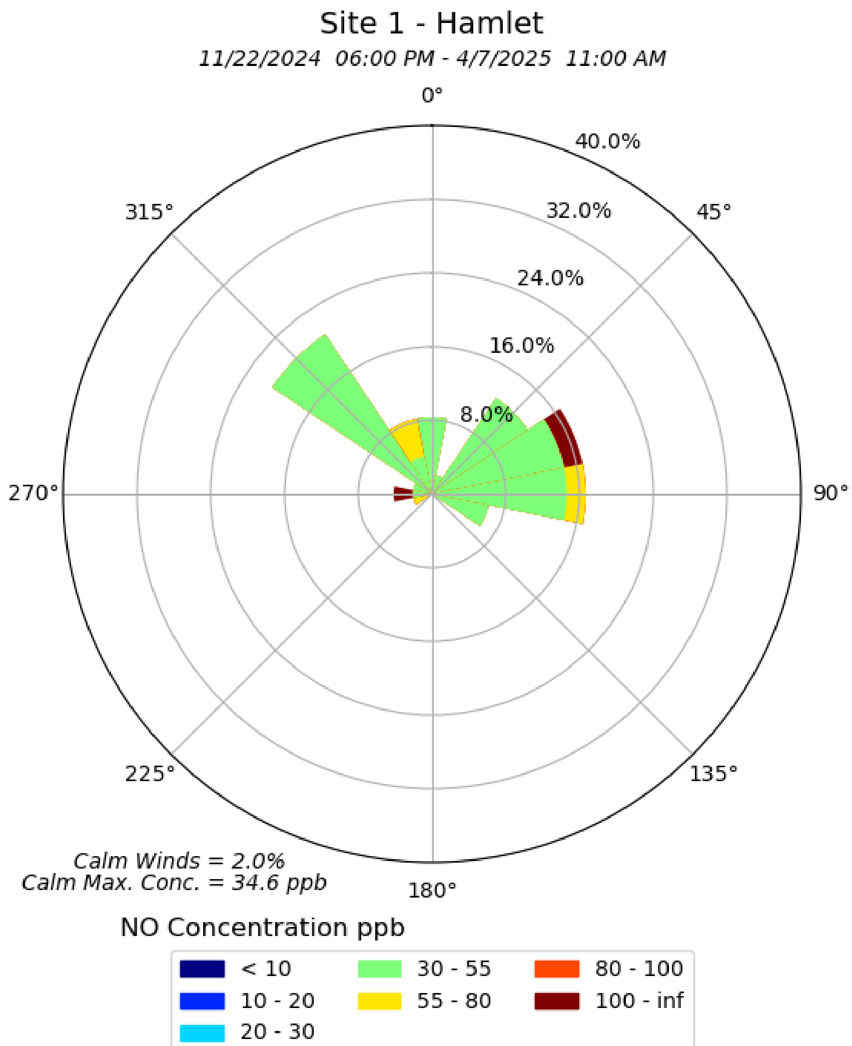


Figure D5-18: Pollution Rose displaying NO concentrations of at least 30 ppb.

NO Spikes

NO spikes were limited during our Site 1 monitoring. There were only 3 hours where the average concentration was at least 10 ppb. We will examine those spikes which occurred on January 25 and January 30.

January 25, 2025 Spike

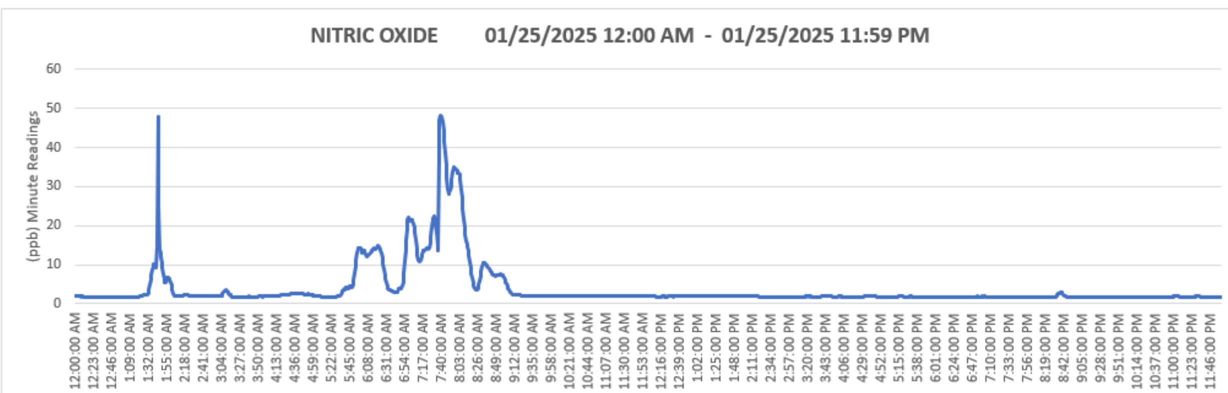


Figure D5-19: January 25 Minute Readings for Nitric Oxide.

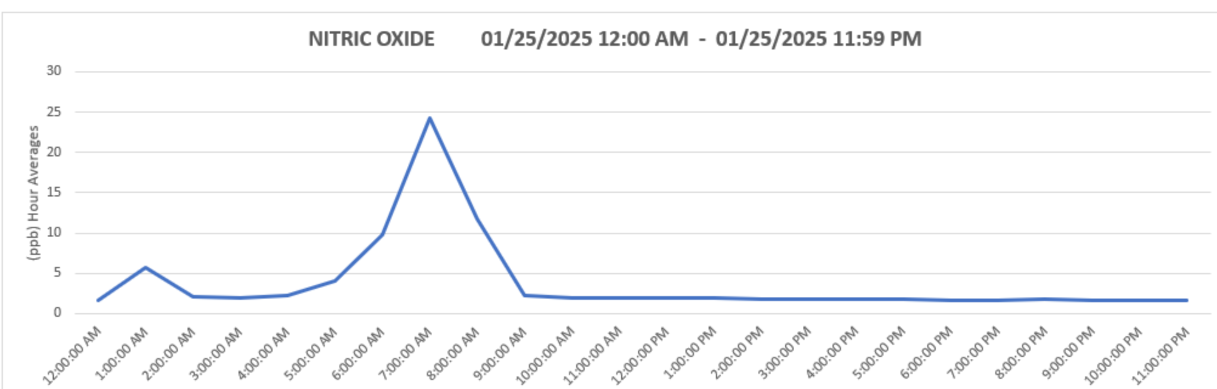


Figure D5-20: January 25 hour averages for Nitric Oxide.

NITRIC OXIDE Top 25 Concentrations (ppb) Minute Readings 01/25/2025 12:00 AM - 01/25/2025 11:59 PM		
Rank	Concentration	Time
1	48.3	7:39:00 AM
2	48.0	7:40:00 AM
3	47.9	1:44:00 AM
4	47.8	7:41:00 AM
5	46.8	7:38:00 AM
6	46.6	7:42:00 AM
7	44.3	7:43:00 AM
8	41.6	7:44:00 AM
9	38.7	7:45:00 AM
10	37.0	7:37:00 AM
11	35.7	7:46:00 AM
12	34.9	7:55:00 AM
13	34.7	7:56:00 AM
14	34.6	7:58:00 AM
15	34.4	7:57:00 AM
16	34.3	7:59:00 AM
17	34.0	8:00:00 AM
18	33.8	7:54:00 AM
19	33.5	8:01:00 AM
20	33.3	8:02:00 AM
21	33.0	8:03:00 AM
22	32.1	7:47:00 AM
23	31.8	8:04:00 AM
24	31.8	7:53:00 AM
25	30.1	7:52:00 AM

NITRIC OXIDE Hour Averages Ranked by Highest (ppb) Hour Averages 01/25/2025 12:00 AM - 01/25/2025 11:59 PM		
Rank	Concentration	Time
1	24.3	7:00:00 AM
2	11.8	8:00:00 AM
3	9.8	6:00:00 AM
4	5.7	1:00:00 AM
5	4.0	5:00:00 AM
6	2.3	9:00:00 AM
7	2.2	4:00:00 AM
8	2.1	2:00:00 AM
9	2.0	3:00:00 AM
10	1.9	1:00:00 PM
11	1.9	12:00:00 PM
12	1.9	11:00:00 AM
13	1.9	10:00:00 AM
14	1.8	8:00:00 PM
15	1.8	5:00:00 PM
16	1.8	4:00:00 PM
17	1.8	3:00:00 PM
18	1.8	2:00:00 PM
19	1.7	11:00:00 PM
20	1.7	10:00:00 PM
21	1.7	9:00:00 PM
22	1.7	7:00:00 PM
23	1.7	6:00:00 PM
24	1.7	12:00:00 AM

Figure D5-21: January 25 Nitric Oxide Top 25 Minute Readings and Hour Averages ranked from highest to lowest concentration.

January 30, 2025 Spike

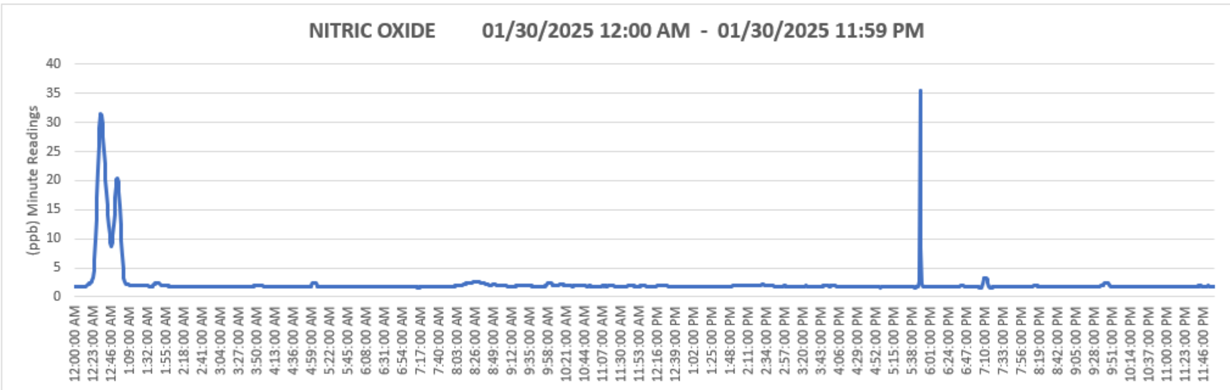


Figure D5-22: January 30 Minute Readings for Nitric Oxide.

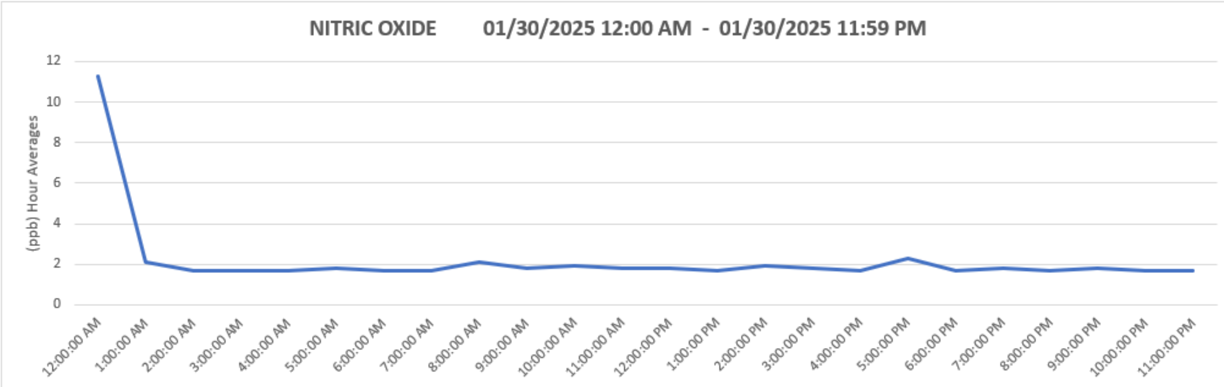


Figure D5-23: January 30 Hour Averages for Nitric Oxide.

NITRIC OXIDE Top 25 Concentrations (ppb) Minute Readings 01/30/2025 12:00 AM - 01/30/2025 11:59 PM		
Rank	Concentration	Time
1	35.4	5:48:00 PM
2	31.5	12:33:00 AM
3	31.2	12:34:00 AM
4	31.0	12:32:00 AM
5	29.8	12:35:00 AM
6	29.0	12:31:00 AM
7	27.6	12:36:00 AM
8	25.9	12:30:00 AM
9	25.3	12:37:00 AM
10	22.9	12:38:00 AM
11	21.7	12:29:00 AM
12	20.4	12:54:00 AM
13	20.2	12:53:00 AM
14	20.2	12:39:00 AM
15	19.8	12:55:00 AM
16	19.0	12:52:00 AM
17	18.1	12:56:00 AM
18	18.0	12:40:00 AM
19	17.1	12:28:00 AM
20	17.0	12:51:00 AM
21	15.8	12:57:00 AM
22	15.8	12:41:00 AM
23	14.1	12:50:00 AM
24	14.1	12:42:00 AM
25	13.3	12:27:00 AM

NITRIC OXIDE Hour Averages Ranked by Highest (ppb) Hour Averages 01/30/2025 12:00 AM - 01/30/2025 11:59 PM		
Rank	Concentration	Time
1	11.3	12:00:00 AM
2	2.3	5:00:00 PM
3	2.1	8:00:00 AM
4	2.1	1:00:00 AM
5	1.9	2:00:00 PM
6	1.9	10:00:00 AM
7	1.8	9:00:00 PM
8	1.8	7:00:00 PM
9	1.8	3:00:00 PM
10	1.8	12:00:00 PM
11	1.8	11:00:00 AM
12	1.8	9:00:00 AM
13	1.8	5:00:00 AM
14	1.7	11:00:00 PM
15	1.7	10:00:00 PM
16	1.7	8:00:00 PM
17	1.7	6:00:00 PM
18	1.7	4:00:00 PM
19	1.7	1:00:00 PM
20	1.7	7:00:00 AM
21	1.7	6:00:00 AM
22	1.7	4:00:00 AM
23	1.7	3:00:00 AM
24	1.7	2:00:00 AM

Figure D5-24: January 30 Nitric Oxide Top 25 Minute Readings and Hour Averages ranked from highest to lowest concentration.

D6: Data – Nitrogen Dioxide

Nitrogen Dioxide (NO2) Findings

- NO2 levels were lower during the daytime when compared to overnight, early morning and evening hours.
- NO2 levels were lower on Sundays with Fridays experiencing the highest concentrations.
- There were only 21 hours during our Site 1 monitoring when the NO2 levels were 10 ppb or greater.
- All monitoring days were considered code green good air quality days for NO2.

Data Presentations

BREDL data presentations for NO2 will include hour averages (the average of 60 one-minute readings), daily one-hour highs (NAAQS standard), and 24-hour daily averages (the average of 24 one-hour readings). Wind and pollution roses use the one-minute readings (1440 per day).

Time of day bar graphs are used to examine time periods of the day. For example, is there one part of the day where the pollution registered higher or lower? We also examined pollution levels by day of the week. Was there a particular day where the pollution was higher or lower?

Figures D6-1 – D6-15 plot hour averages for the entire collection period and for each month. These averages take the 60 one-minute readings for each hour and average them for the hour average. Hour highs for the day figures display the highest reported one-hour average concentration for the day. This is indicative of the NAAQS standard for NO2.

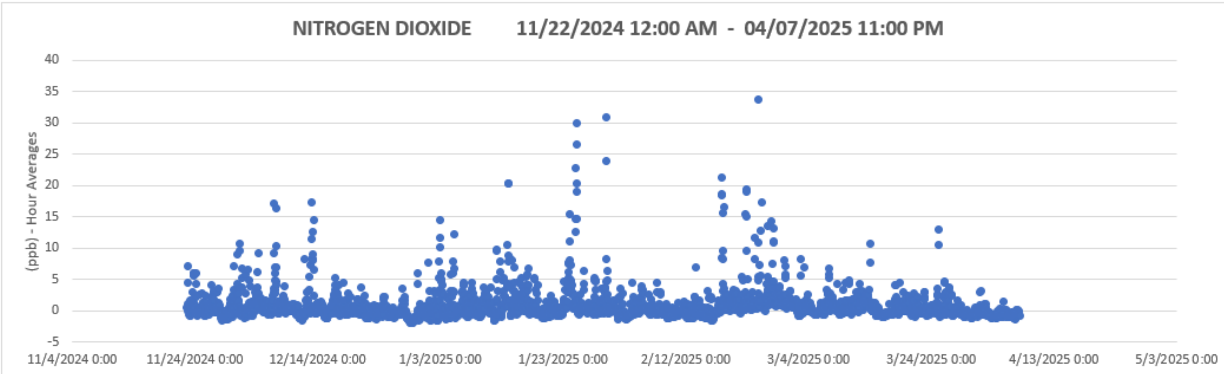


Figure D6-1: NO2 Hour Averages – Entire Collection Period

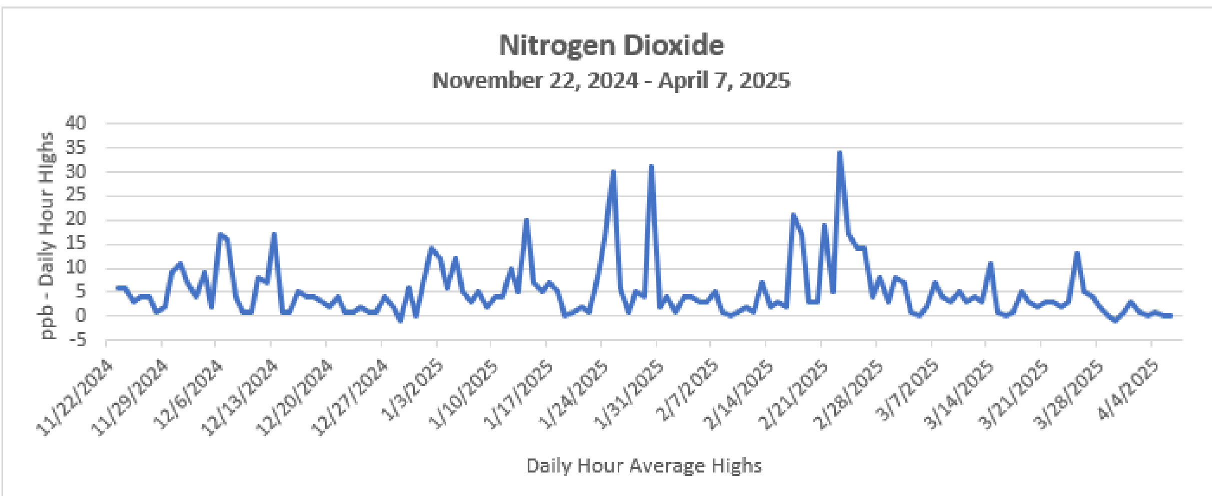


Figure D6-2: NO2 Daily 1-Hour Highs – Entire Collection Period

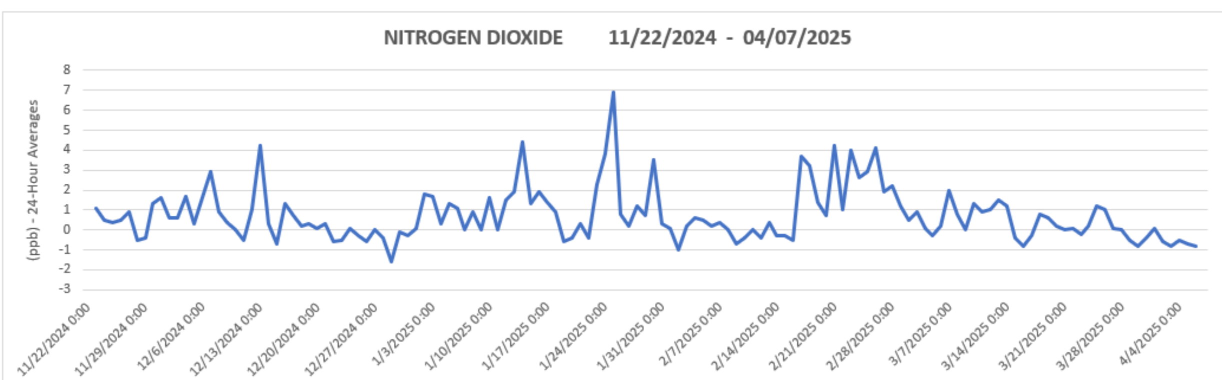


Figure D6-3: NO2 Day (24-Hour) Averages – Entire Collection Period

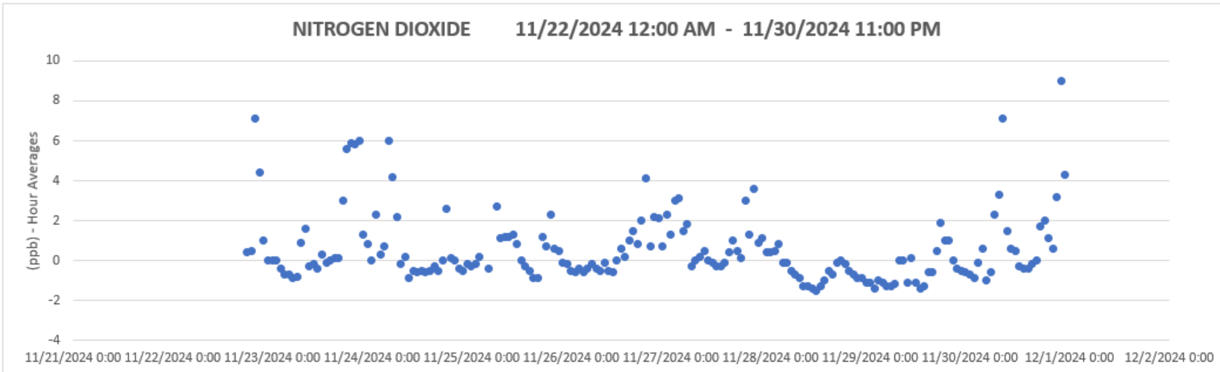


Figure D6-4: NO2 Daily 1-Hour Highs – November

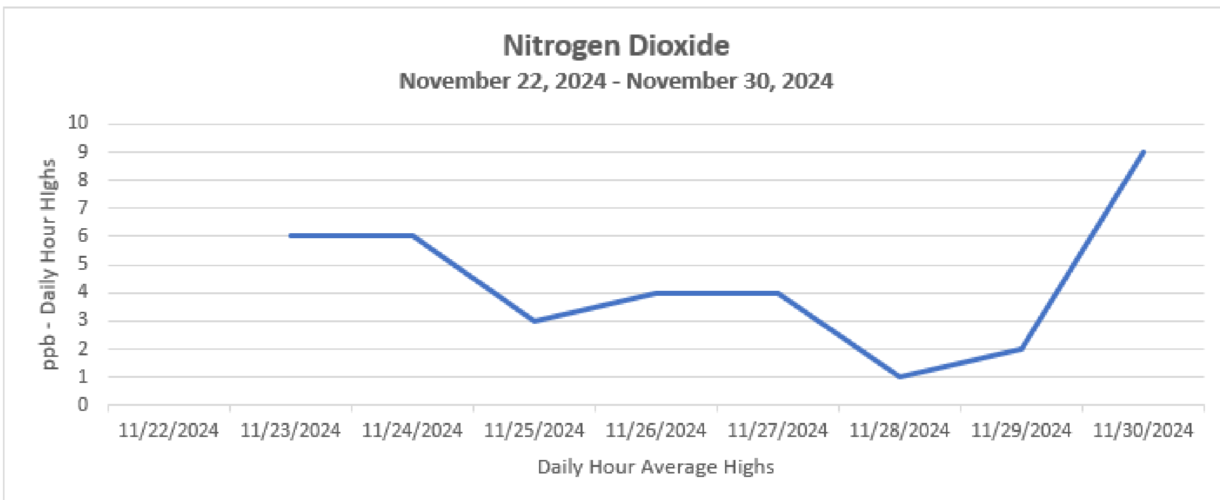


Figure D6-5: NO2 Day (24-Hour) Averages –November

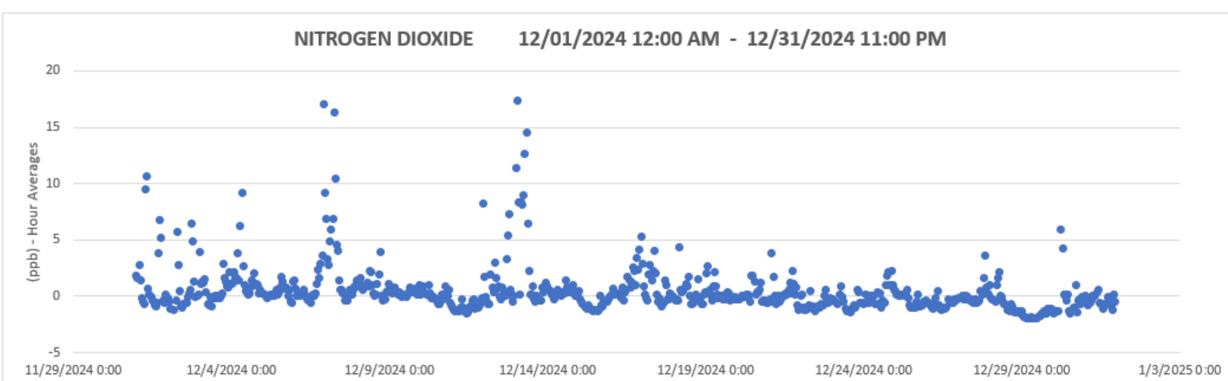


Figure D6-6: NO2 Hour Averages –December

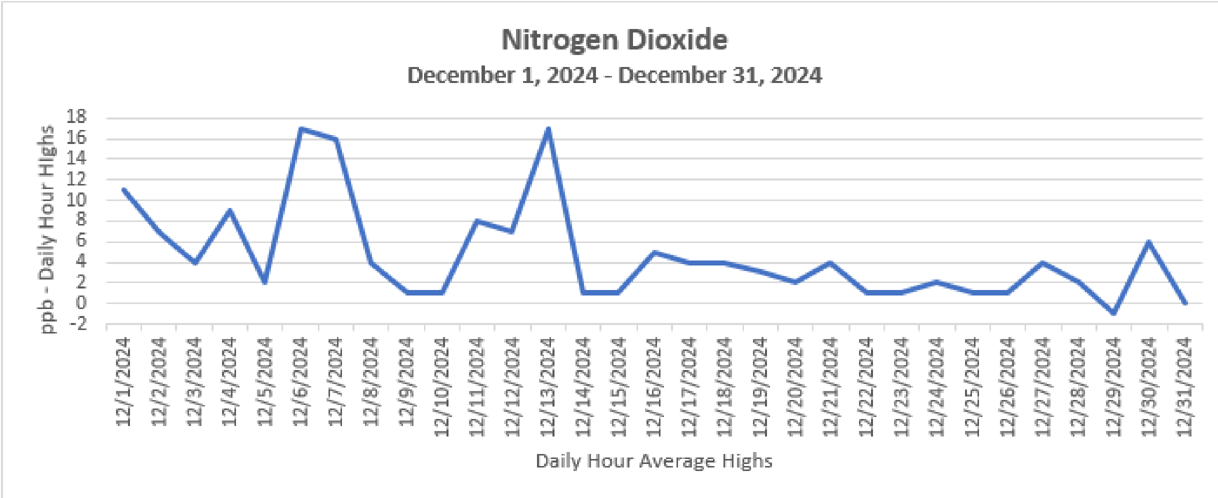


Figure D6-7: NO2 Daily 1-Hour Highs – December

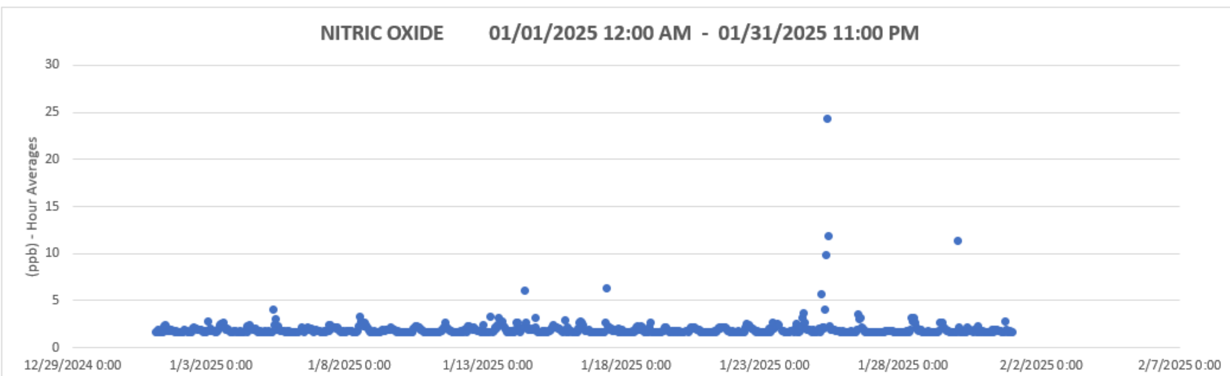


Figure D6-8: NO2 Hour Averages –January

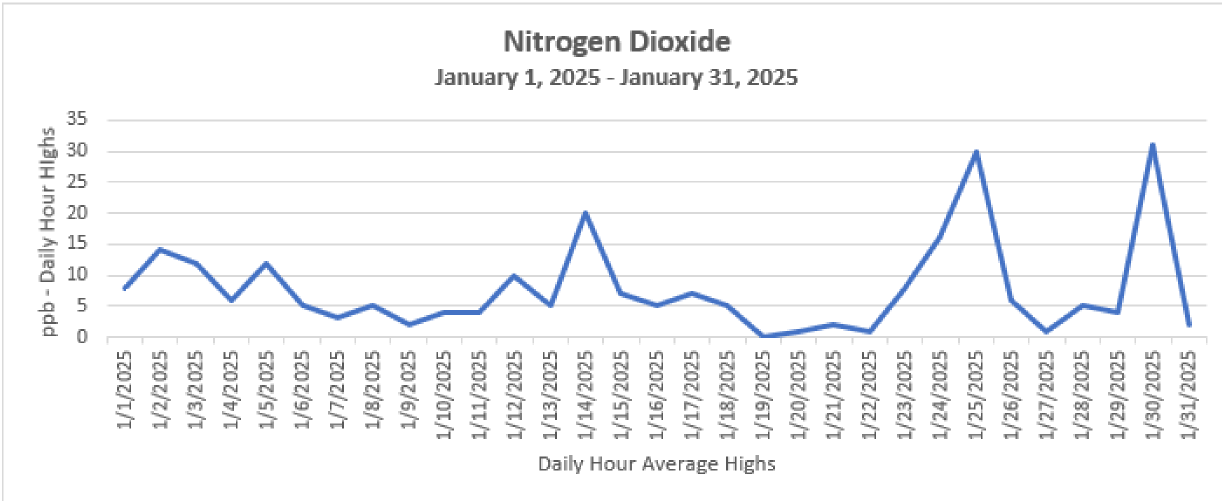


Figure D6-9: NO2 Daily 1-Hour Highs – January

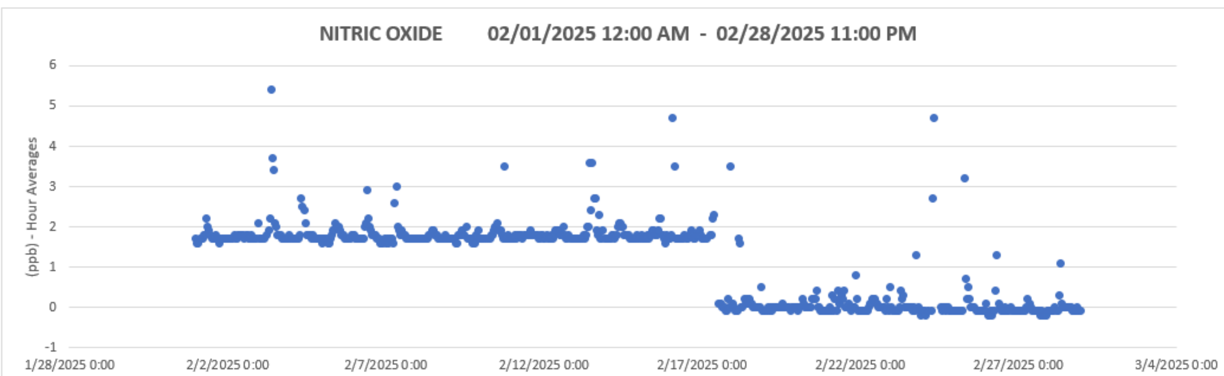


Figure D6-10: NO2 Hour Averages –February

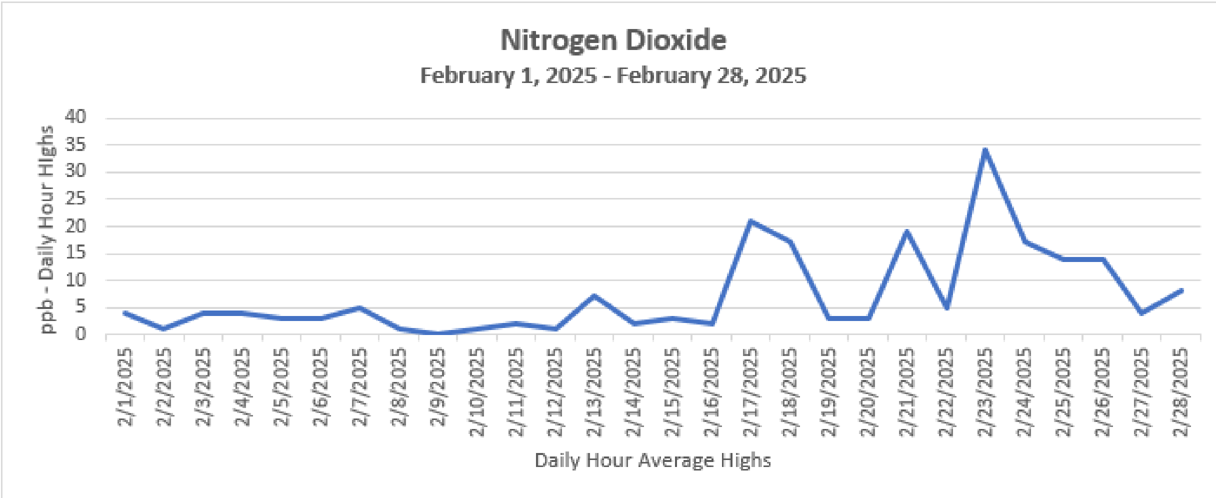


Figure D6-11: NO2 Daily 1-Hour Highs – February

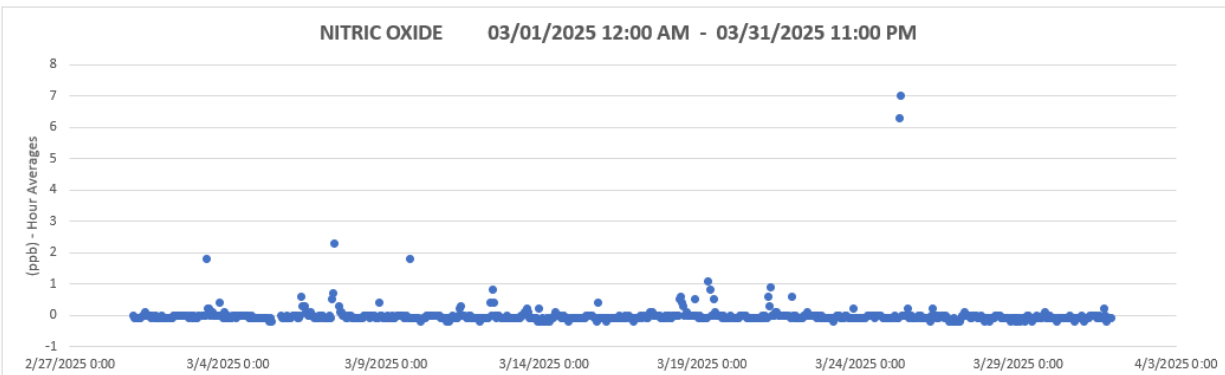


Figure D6-12: NO2 Hour Averages –March

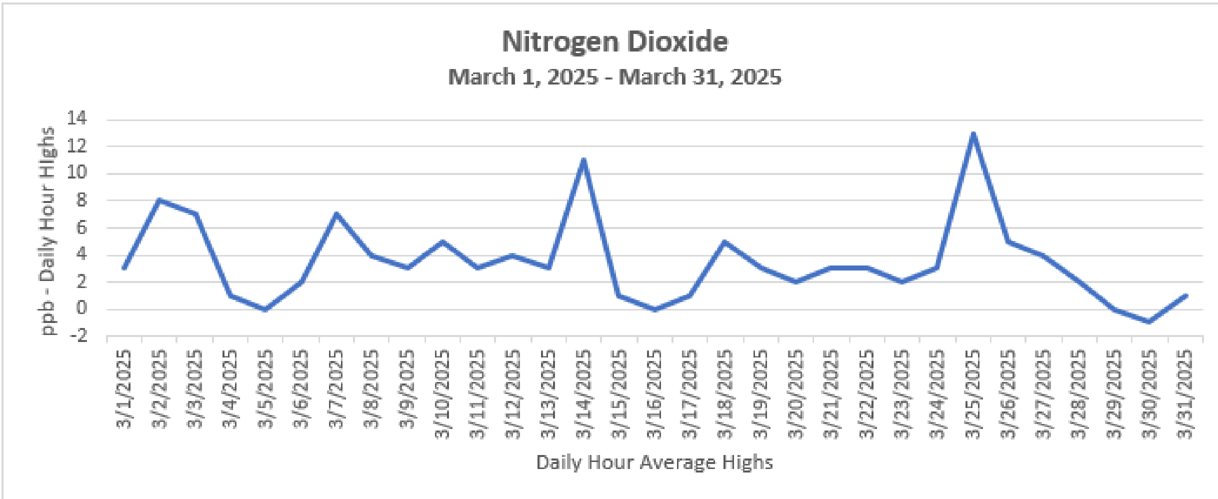


Figure D6-13: NO2 Daily 1-Hour Highs – March

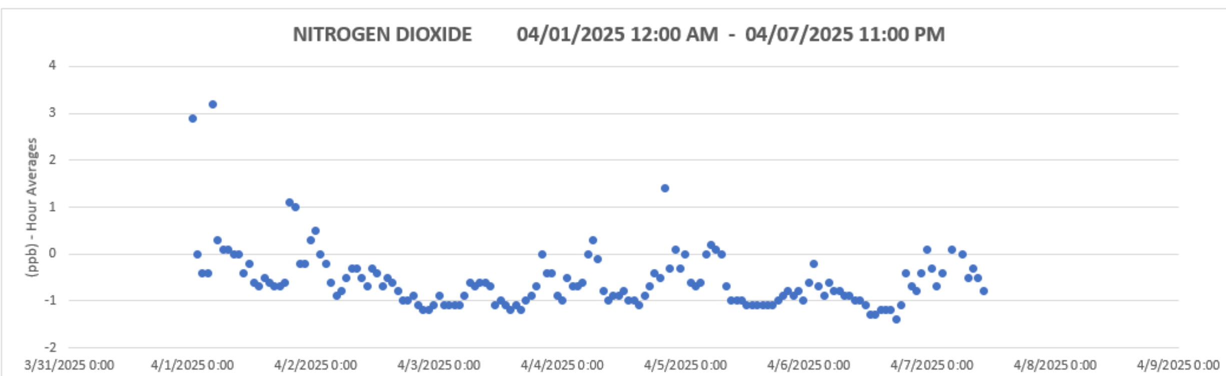


Figure D6-14: NO2 Hour Averages –April

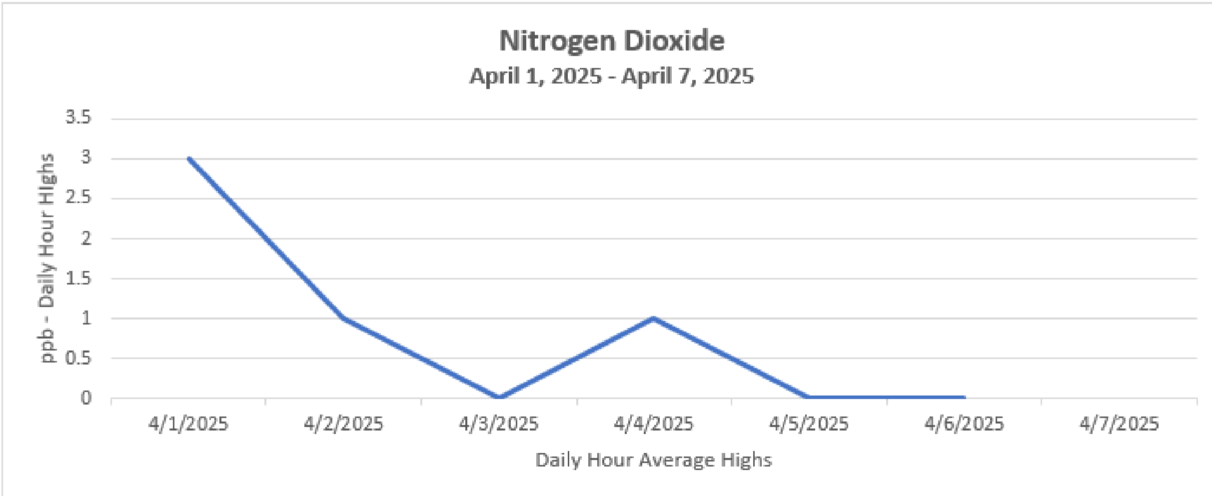


Figure D6-15: NO2 Daily 1-Hour Highs – April

Figures D6-16 – D6-22 plot averages based on the time of day for the entire collection period and for each month.

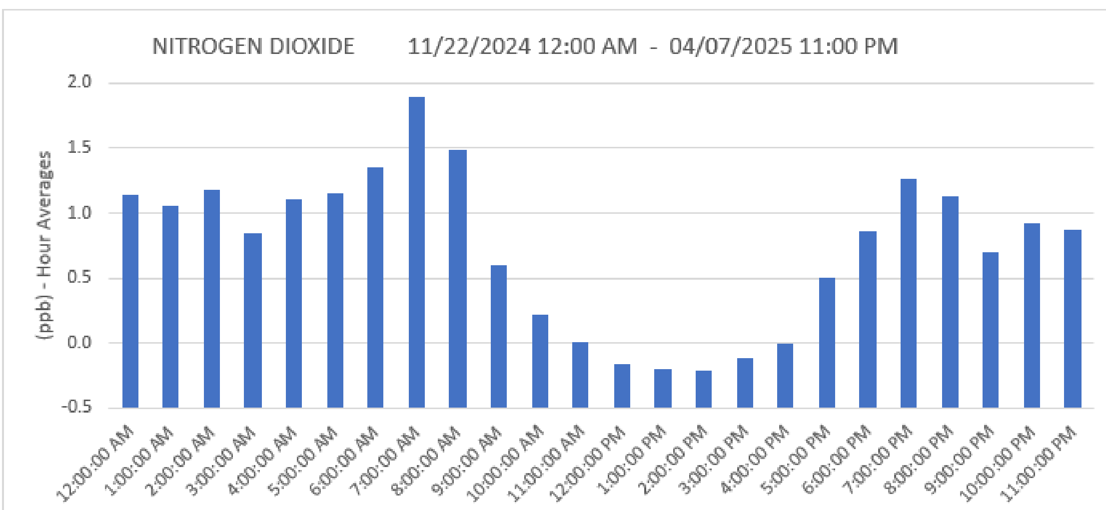


Figure D6-16: NO2 Hour Averages – Based on Time of Day for Collection Period

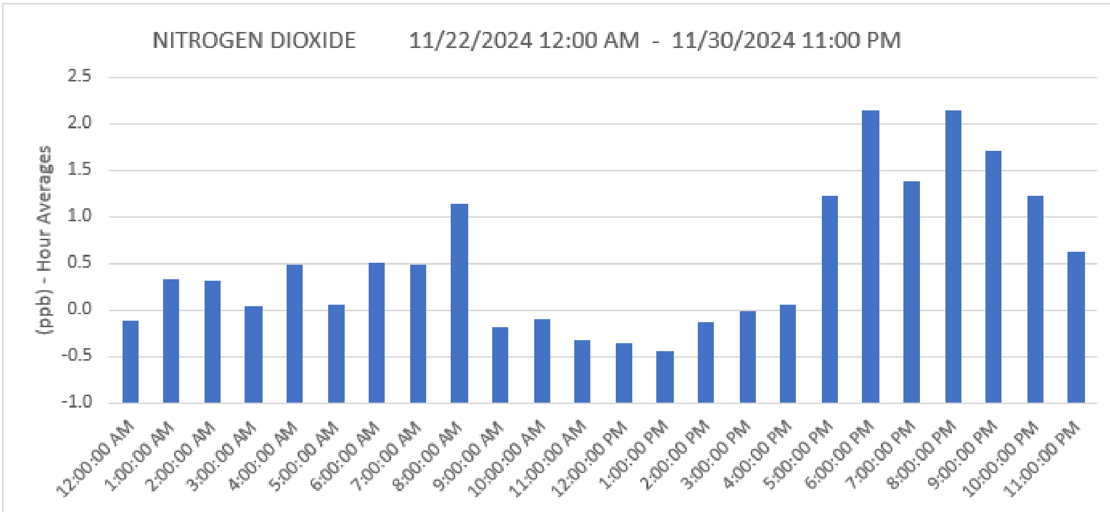


Figure D6-17: NO2 Hour Averages – Based on Time of Day for November

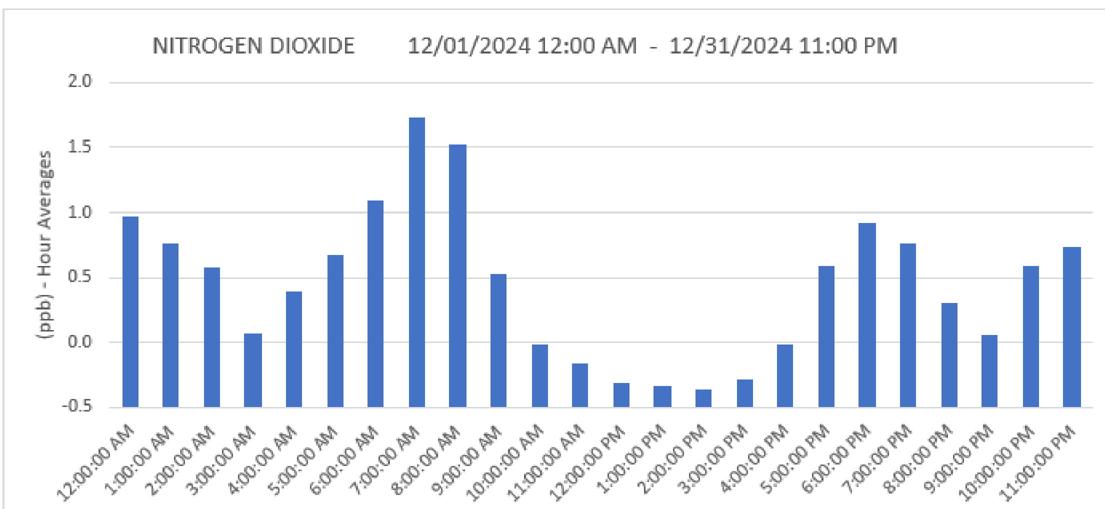


Figure D6-18: NO2 Hour Averages – Based on Time of Day for December

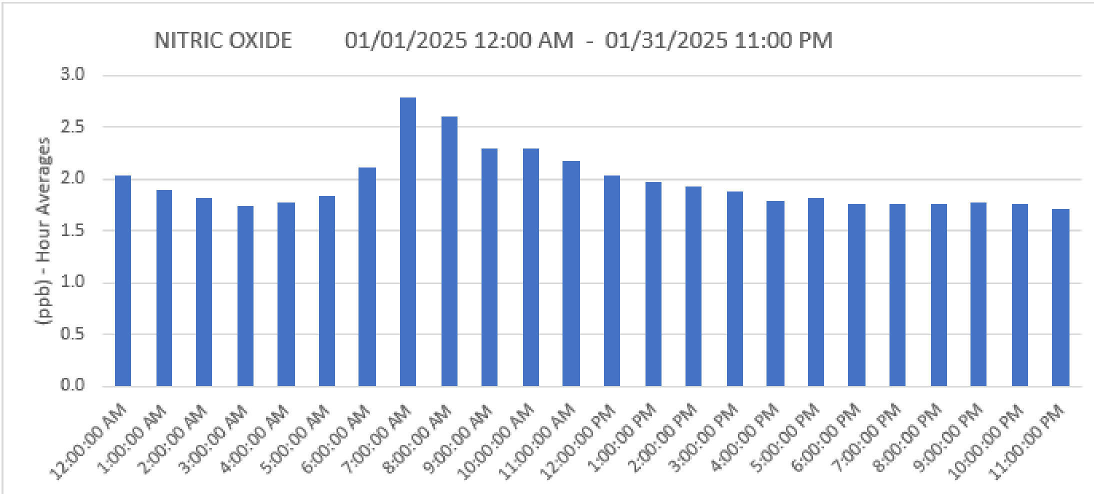


Figure D6-19: NO2 Hour Averages – Based on Time of Day for January

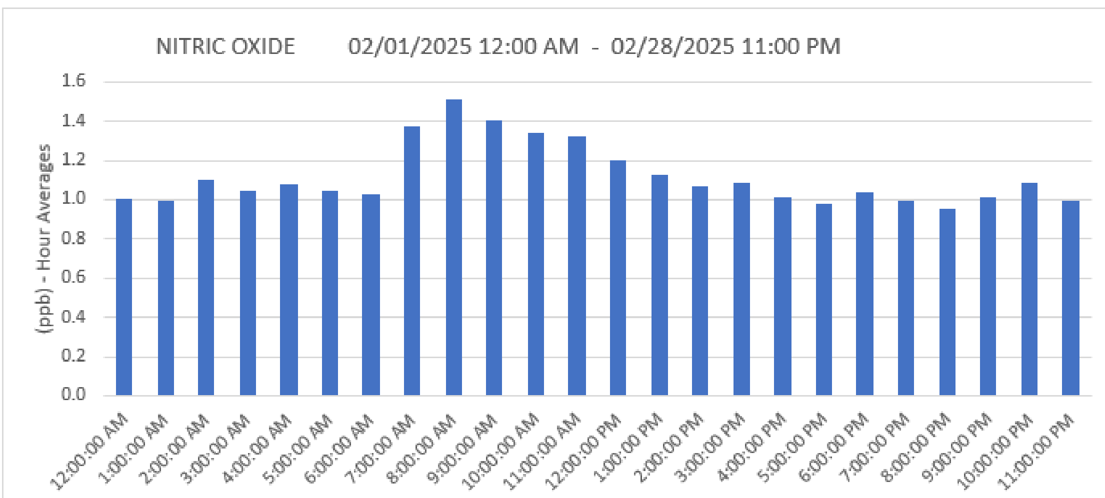


Figure D6-20: NO2 Hour Averages – Based on Time of Day for February

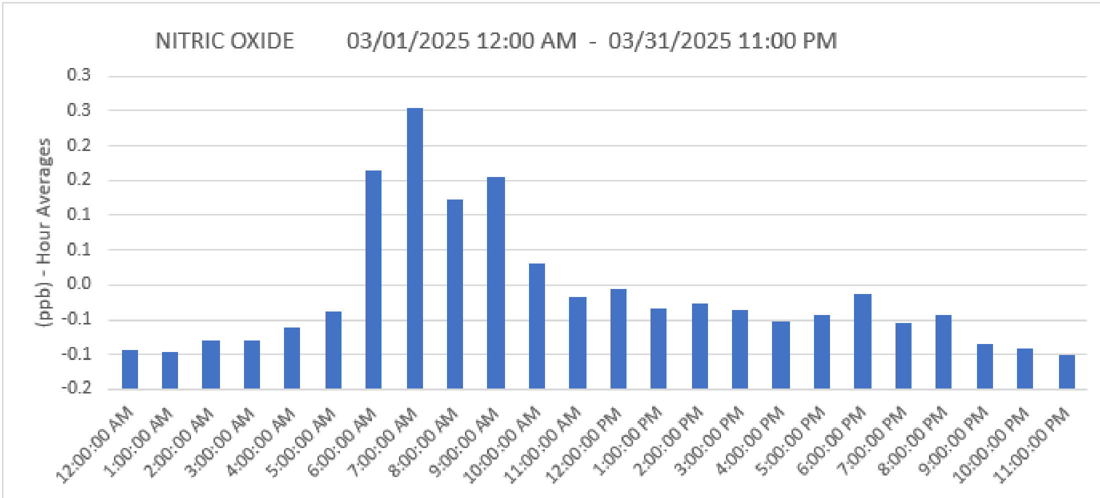


Figure D6-21: NO2 Hour Averages – Based on Time of Day for March

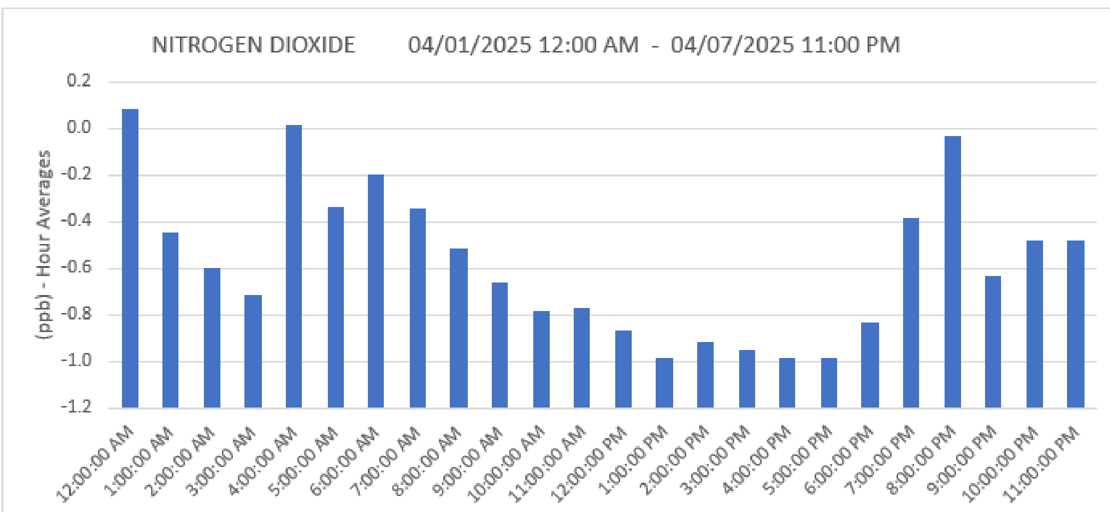


Figure D6-22: NO2 Hour Averages – Based on Time of Day for April

Figure D6-23 plot day averages based on the day of the week for the entire collection period.

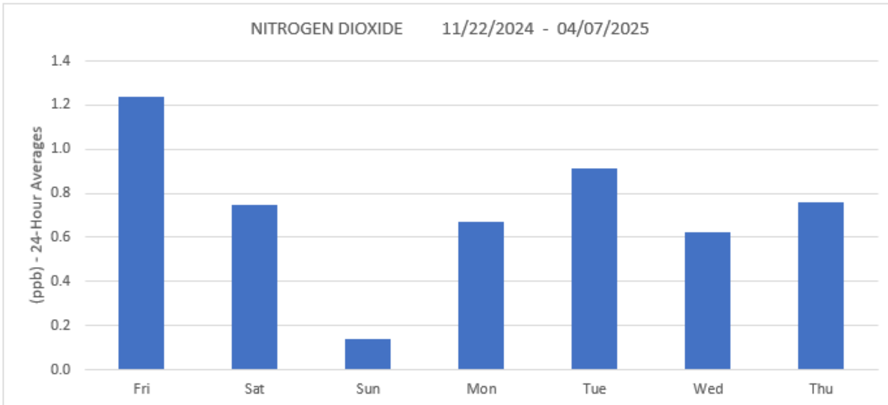


Figure D6-23: NO2 Day (24-Hour) Averages – Based on Day of the Week

NITROGEN DIOXIDE Top 25 Concentrations (ppb) - Hour Averages 11/22/2024 12:00 AM - 04/07/2025 11:00 PM		
Rank	Concentration	Date & Time
1	33.7	2/23/2025 7:00 PM
2	30.9	1/30/2025 12:00 AM
3	30.0	1/25/2025 7:00 AM
4	26.6	1/25/2025 6:00 AM
5	24.0	1/30/2025 1:00 AM
6	22.7	1/25/2025 2:00 AM
7	21.3	2/17/2025 10:00 PM
8	20.4	1/25/2025 4:00 AM
9	20.4	1/14/2025 2:00 AM
10	20.3	1/14/2025 1:00 AM
11	19.4	2/21/2025 8:00 PM
12	19.0	2/21/2025 10:00 PM
13	19.0	1/25/2025 8:00 AM
14	18.7	2/17/2025 8:00 PM
15	18.5	2/17/2025 11:00 PM
16	17.4	12/13/2024 1:00 AM
17	17.3	2/24/2025 8:00 AM
18	17.1	12/6/2024 10:00 PM
19	16.6	2/18/2025 5:00 AM
20	16.3	12/7/2024 6:00 AM
21	15.6	2/18/2025 4:00 AM
22	15.5	1/24/2025 4:00 AM
23	15.4	2/21/2025 7:00 PM
24	15.0	2/21/2025 9:00 PM
25	14.7	1/25/2025 1:00 AM

Nitrogen Dioxide Top 25 Concentrations Daily Hour Highs November 22, 2024 6:00 PM - April 7, 2025 11:00 AM		
Rank	Concentration	Date
1	34	2/23/2025
2	31	1/30/2025
3	30	1/25/2025
4	21	2/17/2025
5	20	1/14/2025
6	19	2/21/2025
7	17	12/6/2024
8	17	12/13/2024
9	17	2/18/2025
10	17	2/24/2025
11	16	12/7/2024
12	16	1/24/2025
13	14	1/2/2025
14	14	2/25/2025
15	14	2/26/2025
16	13	3/25/2025
17	12	1/3/2025
18	12	1/5/2025
19	11	12/1/2024
20	11	3/14/2025
21	10	1/12/2025
22	9	11/30/2024
23	9	12/4/2024
24	8	12/11/2024
25	8	1/1/2025

Figure D6-24: NO2 Top 25 Concentrations for Hour Averages and Daily Hour Highs

Figures D6:25 and D6:26 pollution roses display the pollutant concentration based on wind direction, which can indicate the direction of the pollution source.

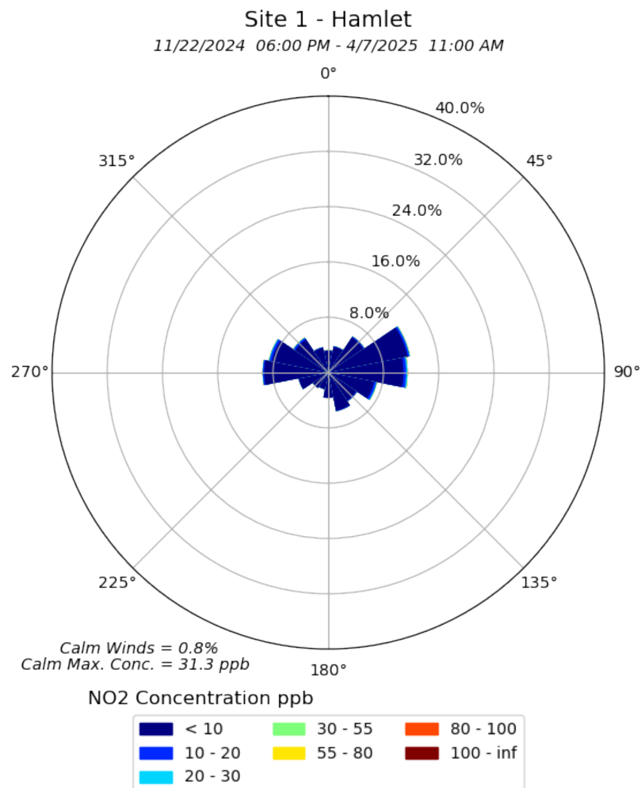


Figure D6-25: Pollution Rose

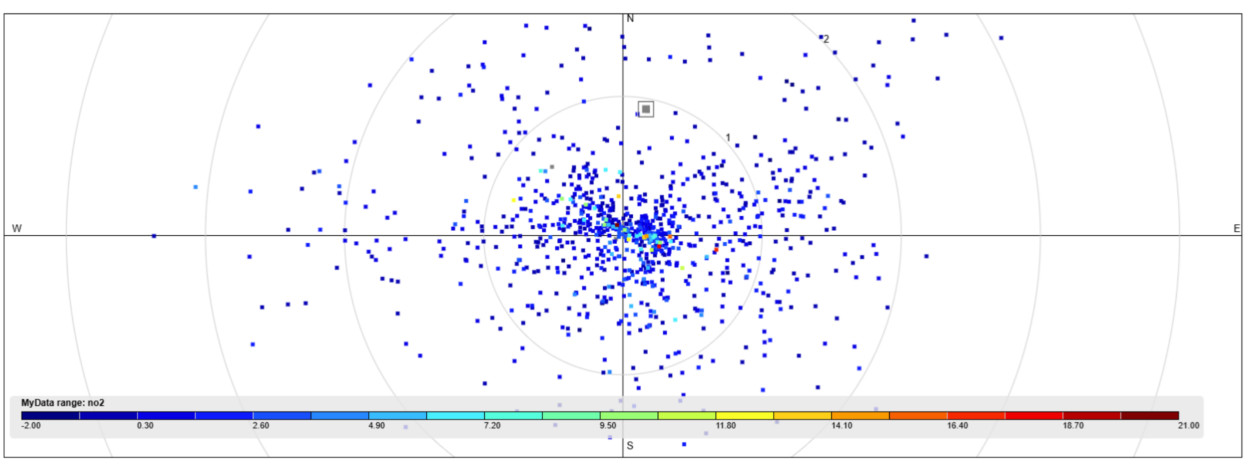


Figure D6-26: EPA RETIGO Pollution Rose 11/22/2024 - 4/7/2025

We separated the NO2 minute concentrations of at least 30 ppb and plotted those on a pollution rose for a better visual representation of the direction of the highest concentrations.

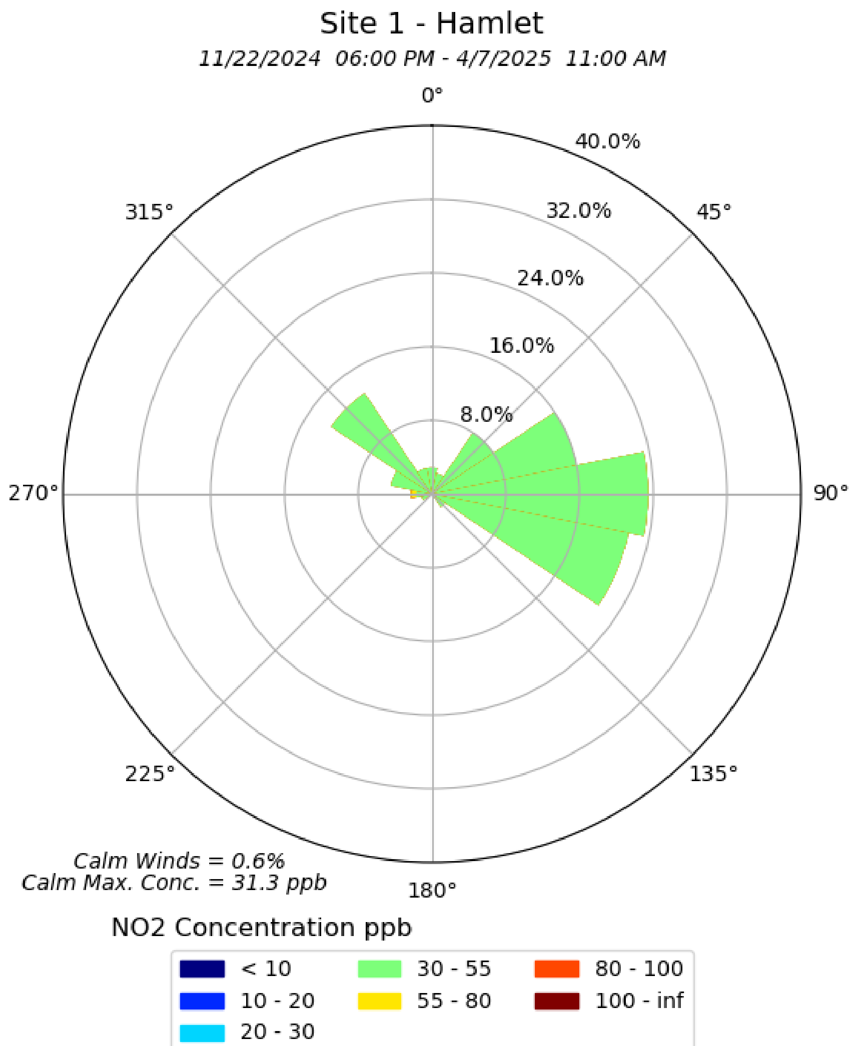


Figure D6-27: Pollution Rose displaying NO2 concentrations of at least 30 ppb.

NO2 Spikes

There were a few spikes in NO2 during our Site 1 monitoring. We will provide additional data for the top two - the February 23 spike and the January 30 spike. February 23 had a small spike in the morning and a larger spike in the evening. January 30 had two spikes, one lasting during the first couple of hours of the day beginning at midnight and another brief spike shortly after 5:30 PM. Note how the brief January 30 spike shows up on the minute data graph but is barely noticeable on the one-hour average graph.

February 23, 2025 Spike

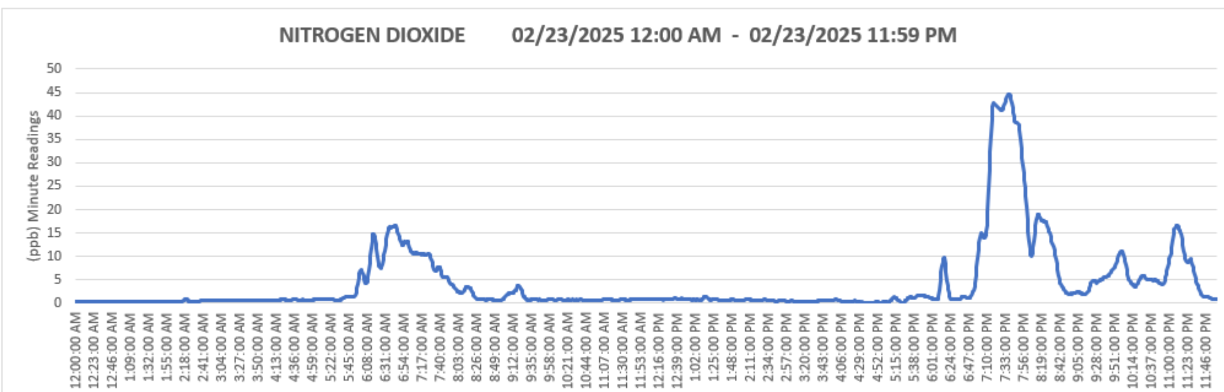


Figure D6-28: February 23 Minute Readings for Nitrogen Dioxide.

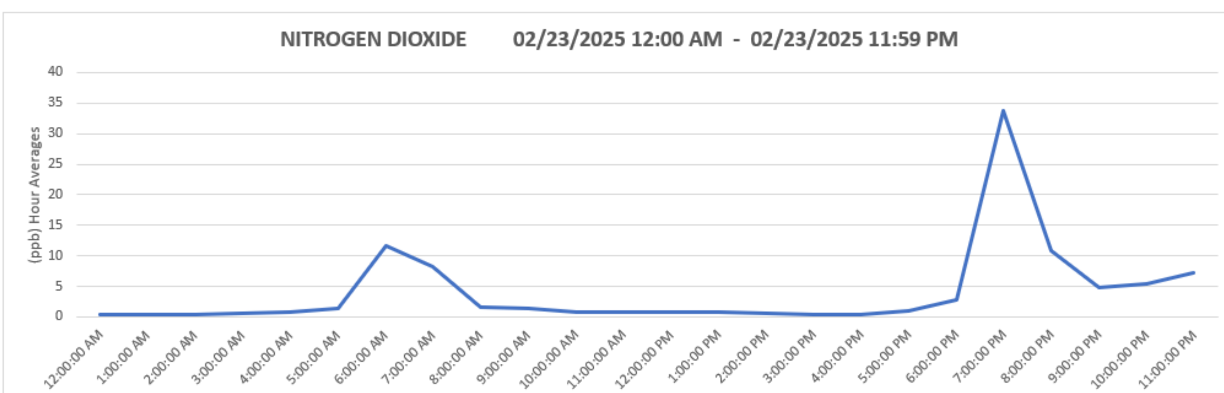


Figure D6-29: February 23 Hour Averages for Nitrogen Dioxide.

NITROGEN DIOXIDE
Top 25 Concentrations
(ppb) Minute Readings
02/23/2025 12:00 AM - 02/23/2025 11:59 PM

Rank	Concentration	Time
1	44.5	7:38:00 PM
2	44.5	7:37:00 PM
3	44.5	7:36:00 PM
4	44.3	7:39:00 PM
5	44.2	7:35:00 PM
6	43.7	7:40:00 PM
7	43.7	7:34:00 PM
8	43.0	7:33:00 PM
9	42.9	7:41:00 PM
10	42.7	7:18:00 PM
11	42.6	7:32:00 PM
12	42.6	7:19:00 PM
13	42.5	7:20:00 PM
14	42.2	7:21:00 PM
15	42.1	7:31:00 PM
16	42.1	7:22:00 PM
17	41.9	7:23:00 PM
18	41.9	7:17:00 PM
19	41.8	7:42:00 PM
20	41.7	7:24:00 PM
21	41.6	7:30:00 PM
22	41.5	7:26:00 PM
23	41.5	7:25:00 PM
24	41.4	7:27:00 PM
25	41.3	7:29:00 PM

NITROGEN DIOXIDE
Hour Averages Ranked by Highest
(ppb) Hour Averages
02/23/2025 12:00 AM - 02/23/2025 11:59 PM

Rank	Concentration	Time
1	33.7	7:00:00 PM
2	11.6	6:00:00 AM
3	10.8	8:00:00 PM
4	8.2	7:00:00 AM
5	7.3	11:00:00 PM
6	5.5	10:00:00 PM
7	4.9	9:00:00 PM
8	2.8	6:00:00 PM
9	1.5	8:00:00 AM
10	1.4	9:00:00 AM
11	1.3	5:00:00 AM
12	0.9	5:00:00 PM
13	0.8	12:00:00 PM
14	0.7	1:00:00 PM
15	0.7	11:00:00 AM
16	0.7	10:00:00 AM
17	0.7	4:00:00 AM
18	0.6	2:00:00 PM
19	0.6	3:00:00 AM
20	0.4	3:00:00 PM
21	0.4	2:00:00 AM
22	0.3	4:00:00 PM
23	0.3	1:00:00 AM
24	0.3	12:00:00 AM

Figure D6-30: February 23 Nitrogen Dioxide Top 25 Minute Readings and Hour Averages ranked from highest to lowest concentration.

January 30, 2025 Spike

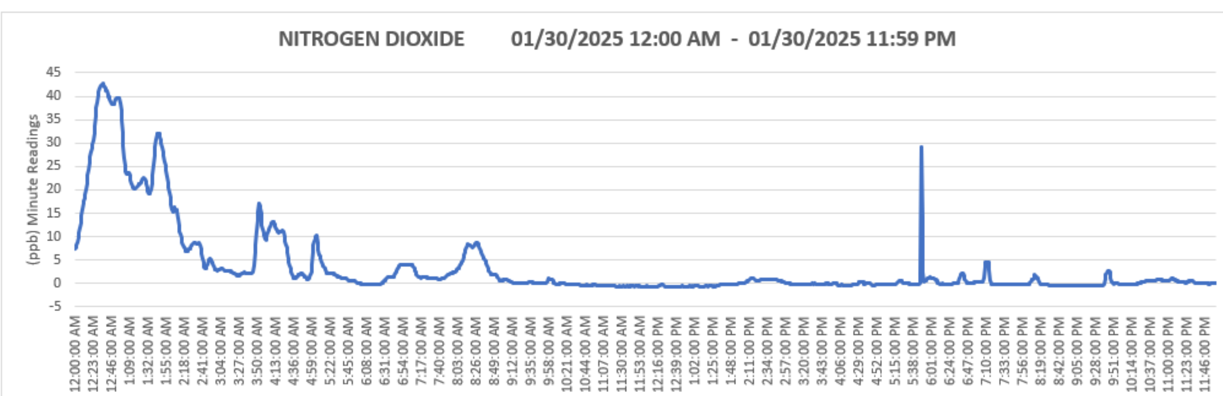


Figure D6-31: January 30 Minute Readings for Nitrogen Dioxide.

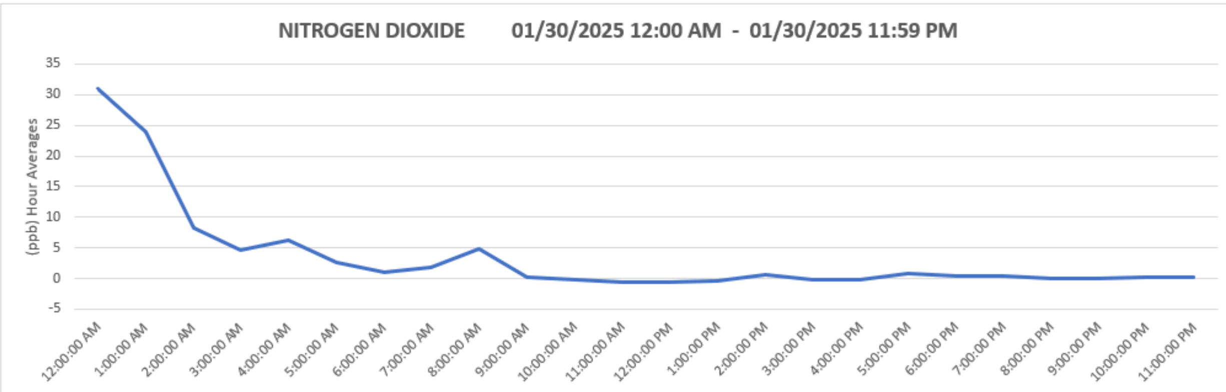


Figure D6-32: January 30 Hour Averages for Nitrogen Dioxide.

NITROGEN DIOXIDE Top 25 Concentrations (ppb) Minute Readings 01/30/2025 12:00 AM - 01/30/2025 11:59 PM		
Rank	**Concentration**	**Time**
1	42.7	12:35:00 AM
2	42.5	12:36:00 AM
3	42.4	12:34:00 AM
4	42.3	12:33:00 AM
5	42.2	12:32:00 AM
6	42.1	12:37:00 AM
7	41.7	12:38:00 AM
8	41.7	12:31:00 AM
9	41.3	12:39:00 AM
10	41.1	12:40:00 AM
11	41.0	12:30:00 AM
12	40.5	12:41:00 AM
13	40.1	12:29:00 AM
14	40.0	12:42:00 AM
15	39.8	12:43:00 AM
16	39.7	12:55:00 AM
17	39.6	12:54:00 AM
18	39.5	12:56:00 AM
19	39.5	12:53:00 AM
20	39.5	12:52:00 AM
21	39.3	12:51:00 AM
22	39.3	12:44:00 AM
23	38.9	12:45:00 AM
24	38.7	12:57:00 AM
25	38.7	12:50:00 AM

NITROGEN DIOXIDE Hour Averages Ranked by Highest (ppb) Hour Averages 01/30/2025 12:00 AM - 01/30/2025 11:59 PM		
Rank	**Concentration**	**Time**
1	30.9	12:00:00 AM
2	24.0	1:00:00 AM
3	8.3	2:00:00 AM
4	6.3	4:00:00 AM
5	4.8	8:00:00 AM
6	4.6	3:00:00 AM
7	2.6	5:00:00 AM
8	1.8	7:00:00 AM
9	1.1	6:00:00 AM
10	0.8	5:00:00 PM
11	0.6	2:00:00 PM
12	0.4	7:00:00 PM
13	0.4	6:00:00 PM
14	0.3	11:00:00 PM
15	0.2	10:00:00 PM
16	0.2	9:00:00 AM
17	0.0	9:00:00 PM
18	0.0	8:00:00 PM
19		3:00:00 PM
20		10:00:00 AM
21		4:00:00 PM
22		1:00:00 PM
23		12:00:00 PM
24		11:00:00 AM

Figure D6-33: January 30 Nitrogen Dioxide Top 25 Minute Readings and Hour Averages ranked from highest to lowest concentration.

D7: Data – Nitrogen Oxides

Nitrogen Oxides (NOx) Findings

- NOx levels were generally lower during the day and higher overnight, in the early morning, and during the evening.

Data Presentations

BREDL data presentations for NOx will include hour averages (the average of 60 one-minute readings). Wind and pollution roses use the one minute readings (1440 per day).

Time of day bar graphs are used to examine time periods of the day. For example, is there one part of the day where the pollution registered higher or lower?

Figures D7-1 – D7-7 plot hour averages for the entire collection period and for each month. These averages take the 60 one-minute readings for each hour and average them for the hour average.

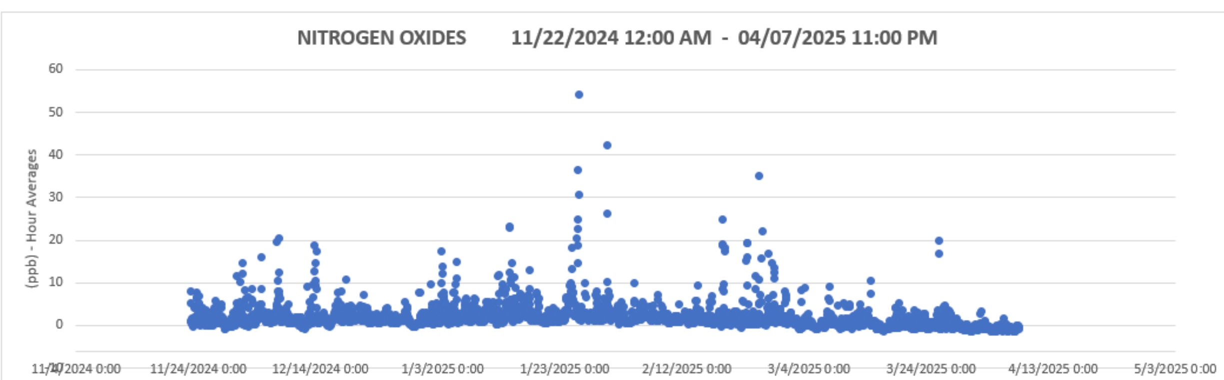


Figure D7-1: NOx Hour Averages – Entire Collection Period

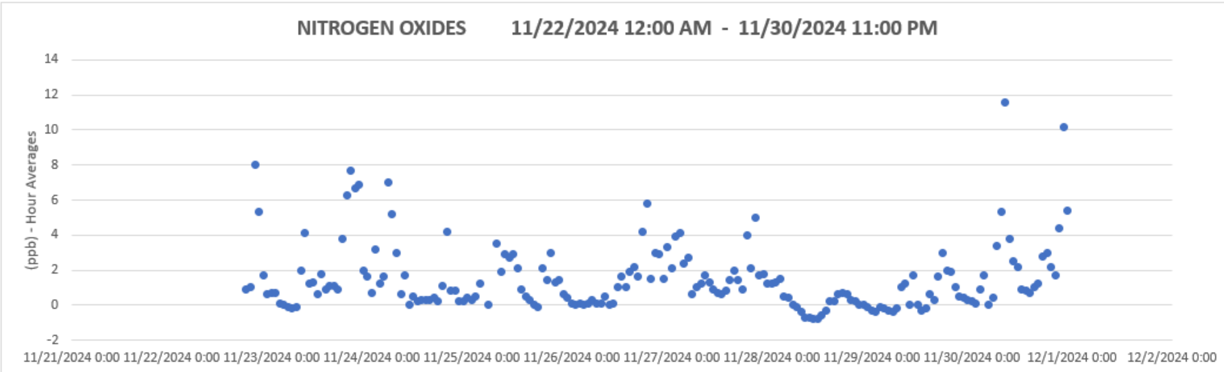


Figure D7-2: NOx Hour Averages – November

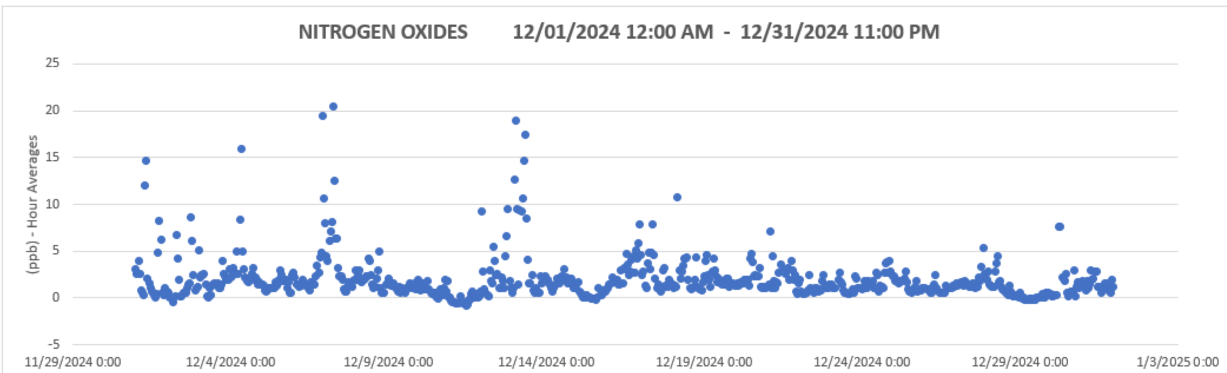


Figure D7-3: NOx Hour Averages – December

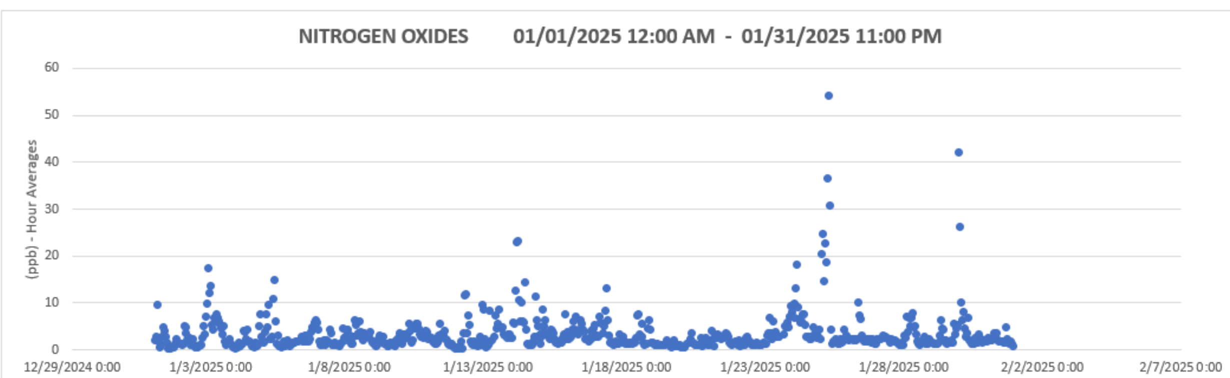


Figure D7-4: NOx Hour Averages – January

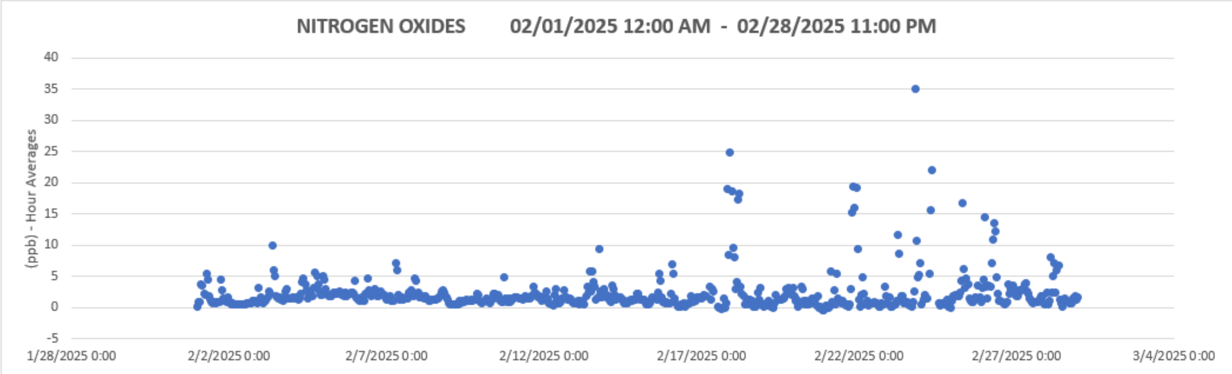


Figure D7-5: NOx Hour Averages – February

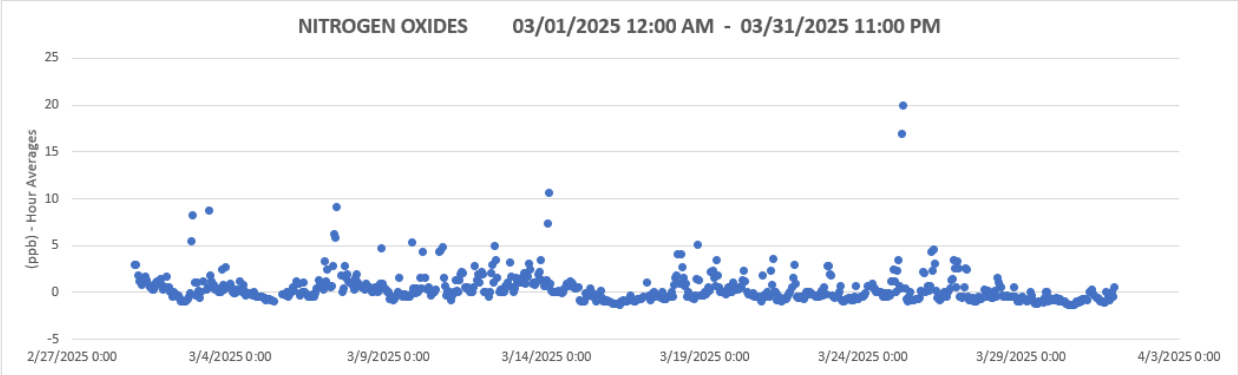


Figure D7-6: NOx Hour Averages – March

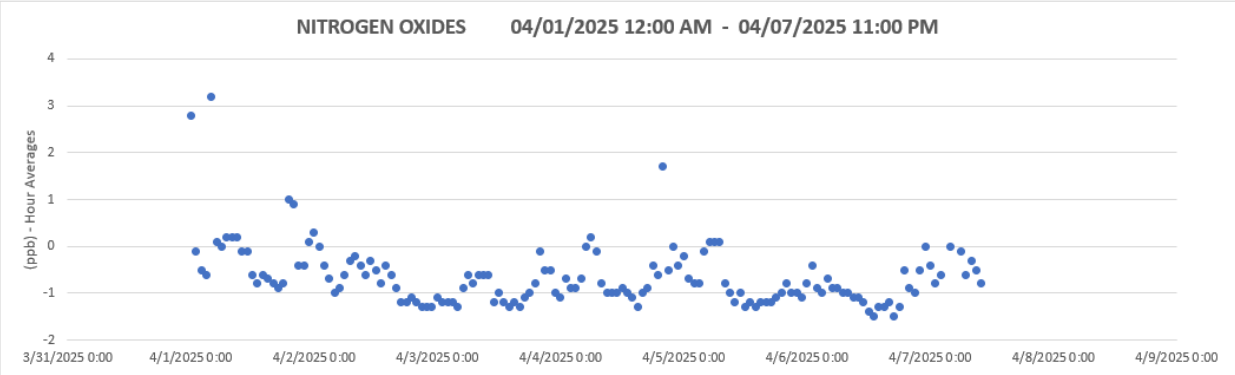


Figure D7-7: NOx Hour Averages – April

Figures D7-8 – D7-14 plot averages based on the time of day for the entire collection period and for each month.

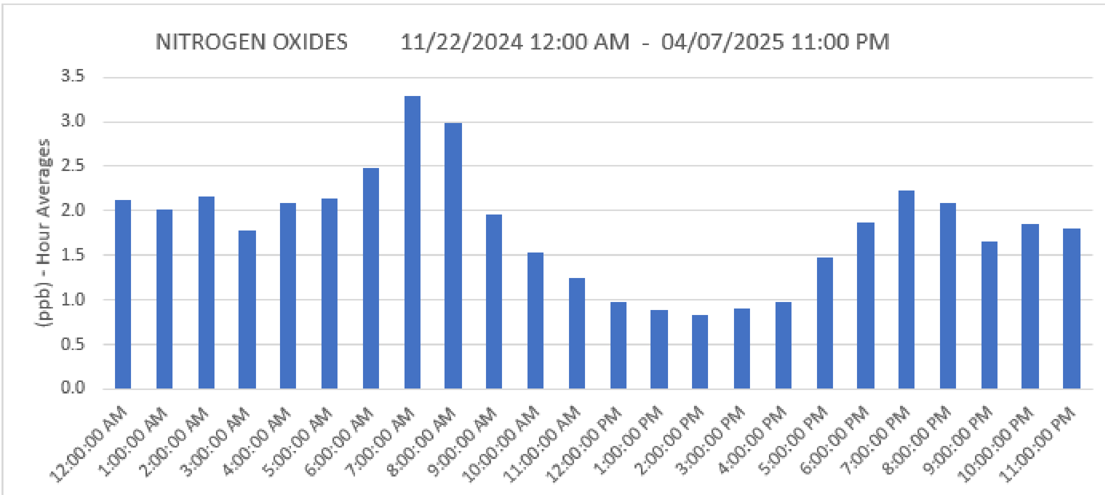


Figure D7-8: NOx Hour Averages – Based on Time of Day for Collection Period

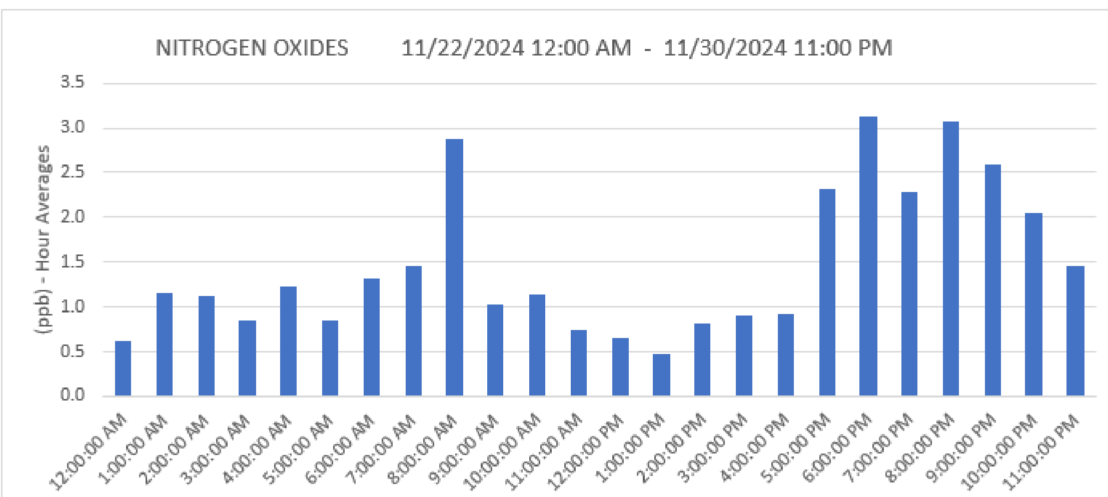


Figure D7-9: NOx Hour Averages – Based on Time of Day for November

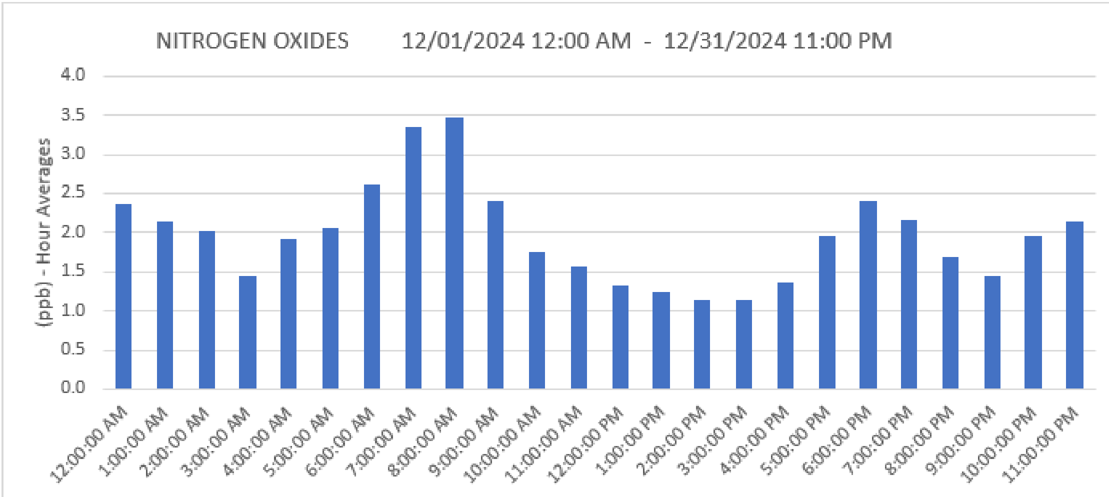


Figure D7-10: NOx Hour Averages – Based on Time of Day for December

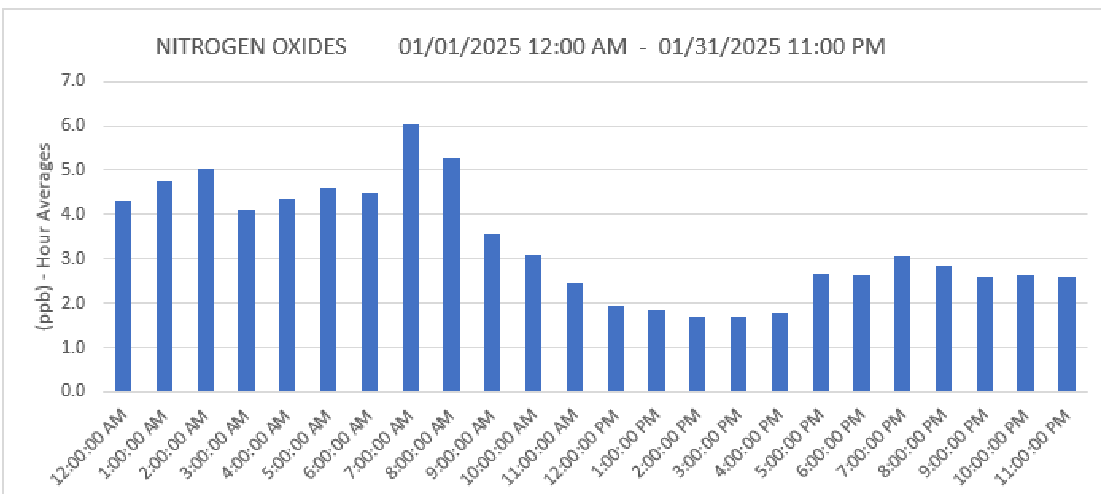


Figure D7-11: NOx Hour Averages – Based on Time of Day for January

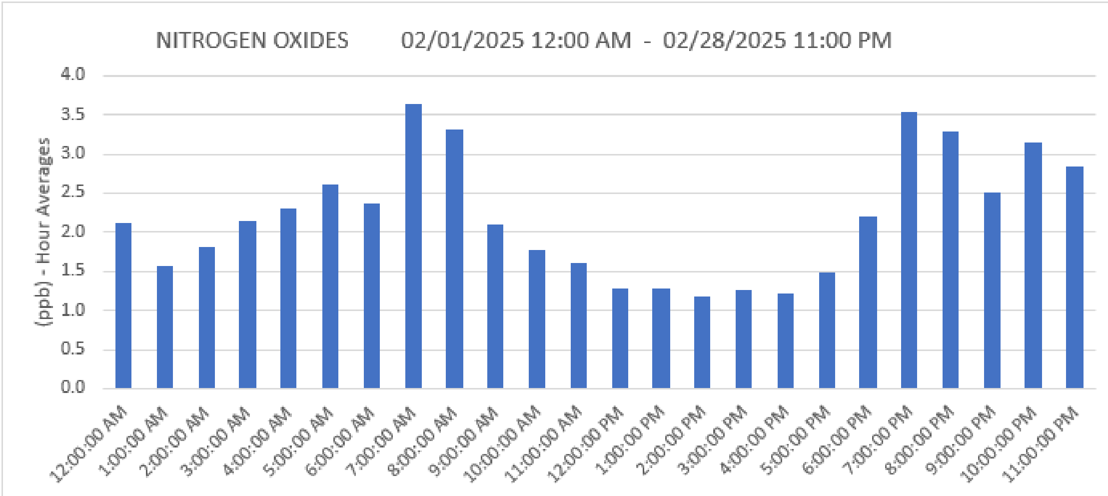


Figure D7-12: NOx Hour Averages – Based on Time of Day for February

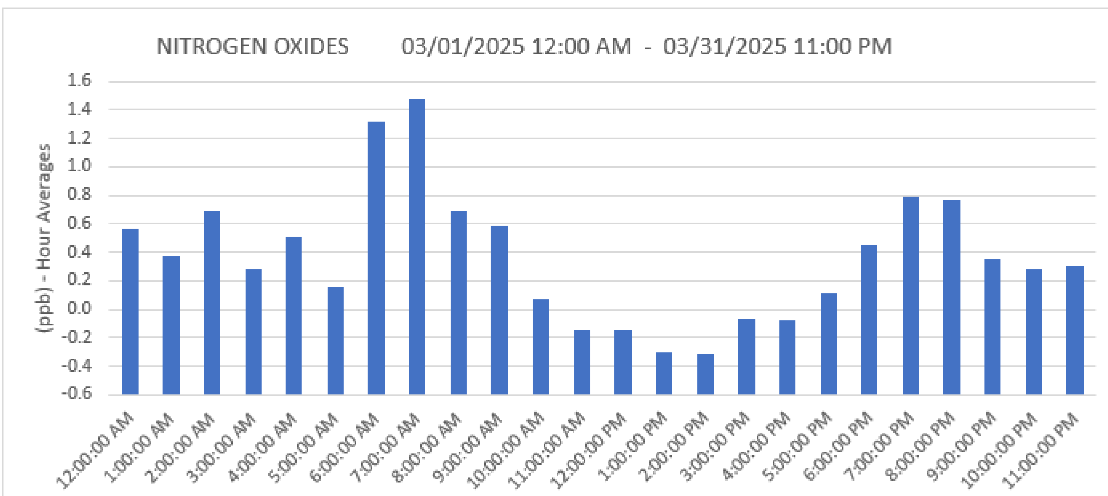


Figure D7-13: NOx Hour Averages – Based on Time of Day for March

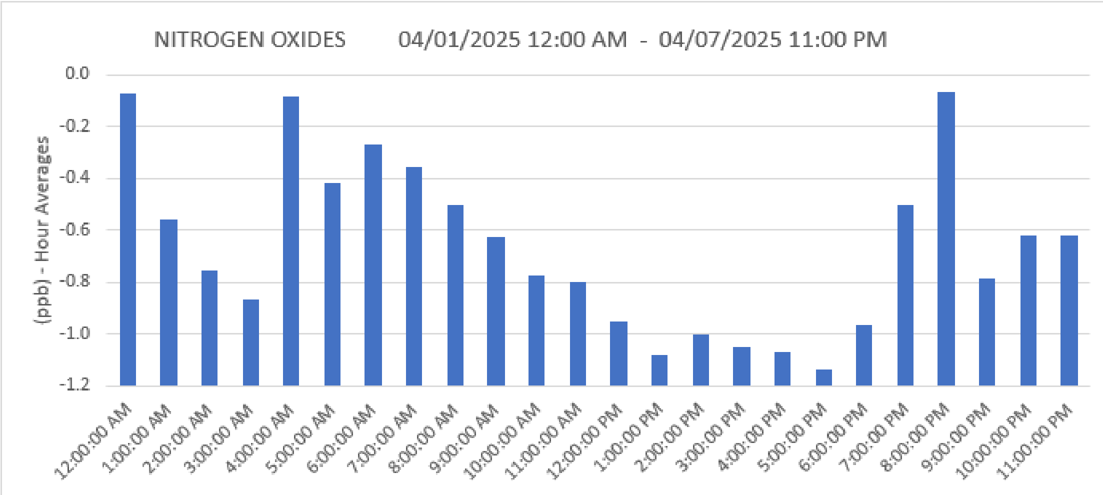


Figure D7-14: NOx Hour Averages – Based on Time of Day for April

NITROGEN OXIDES Top 25 Concentrations (ppb) - Hour Averages 11/22/2024 12:00 AM - 04/07/2025 11:00 PM		
Rank	**Concentration**	**Date & Time**
1	54.3	1/25/2025 7:00 AM
2	42.2	1/30/2025 12:00 AM
3	36.5	1/25/2025 6:00 AM
4	35.1	2/23/2025 7:00 PM
5	30.8	1/25/2025 8:00 AM
6	26.1	1/30/2025 1:00 AM
7	24.8	2/17/2025 10:00 PM
8	24.8	1/25/2025 2:00 AM
9	23.2	1/14/2025 2:00 AM
10	23.0	1/14/2025 1:00 AM
11	22.7	1/25/2025 4:00 AM
12	22.1	2/24/2025 8:00 AM
13	20.5	12/7/2024 6:00 AM
14	20.4	1/25/2025 1:00 AM
15	19.9	3/25/2025 7:00 AM
16	19.5	12/6/2024 10:00 PM
17	19.4	2/21/2025 8:00 PM
18	19.2	2/21/2025 10:00 PM
19	19.0	2/17/2025 8:00 PM
20	18.9	12/13/2024 1:00 AM
21	18.7	2/17/2025 11:00 PM
22	18.7	1/25/2025 5:00 AM
23	18.3	2/18/2025 5:00 AM
24	18.1	1/24/2025 4:00 AM
25	17.4	12/13/2024 8:00 AM

Figure D7-15: NOx Hour Averages – Top 25 Concentrations

Figures D7:16 and D7:17 pollution roses display the pollutant concentration based on wind direction, which can indicate the direction of the pollution source.

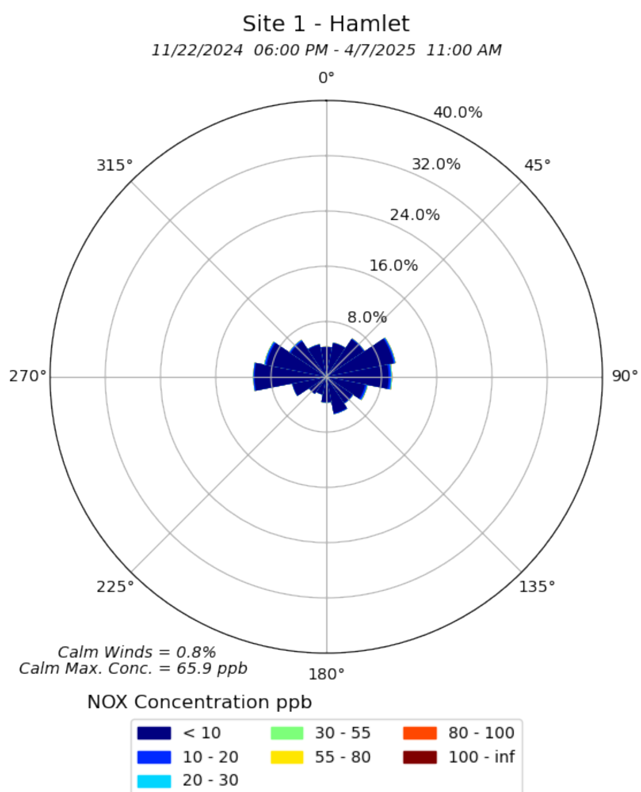


Figure D7-16: Pollution Rose

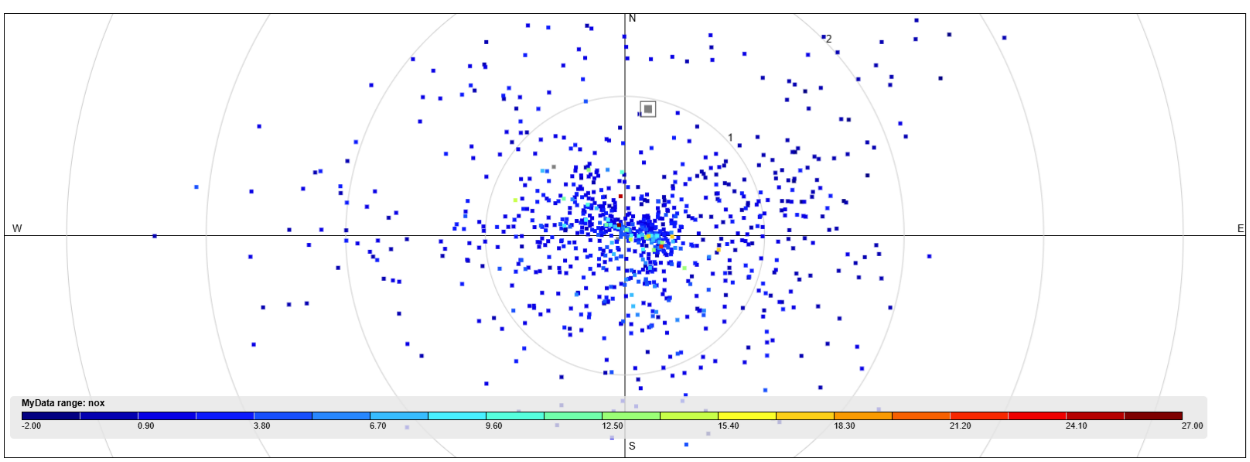


Figure D7-17: EPA RETIGO Pollution Rose 11/22/2024 - 4/7/2025

We separated the NOx minute concentrations of at least 60 ppb and plotted those on a pollution rose for a better visual representation of the direction of the highest concentrations.

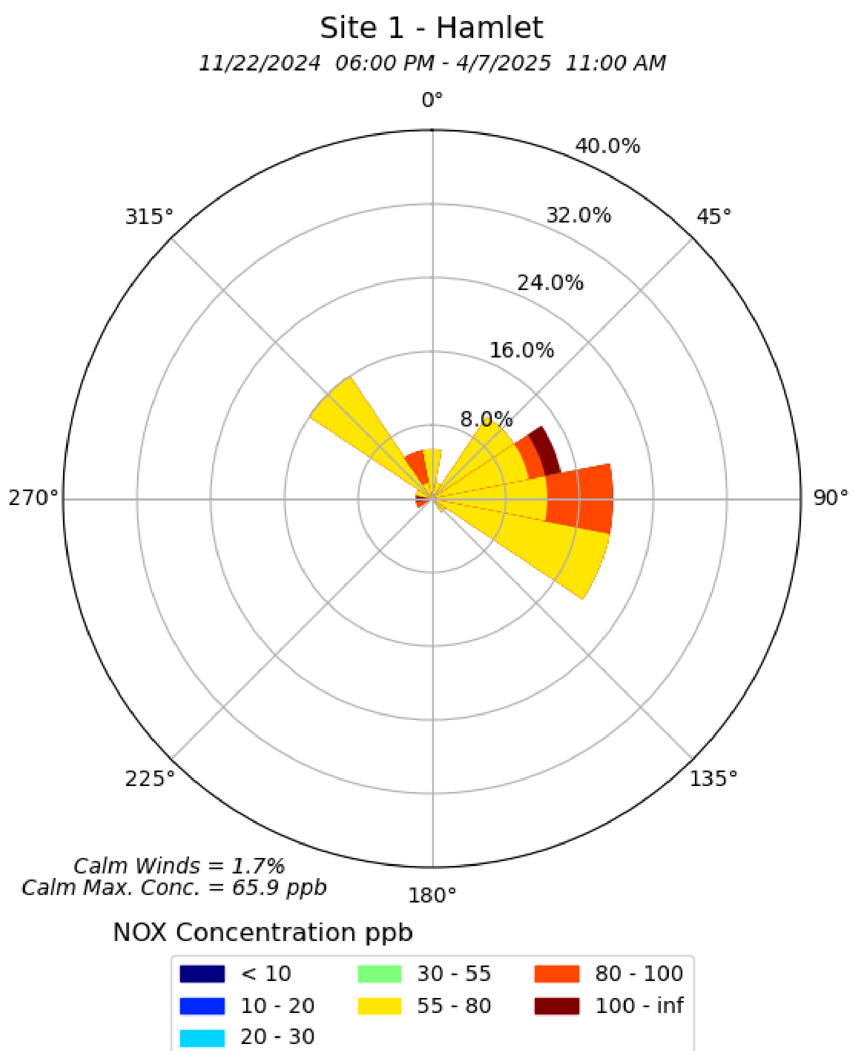


Figure D7-18: Pollution Rose displaying NOx concentrations of at least 60 ppb.

NOx Spikes

There were several spikes in NOx during our Site 1 monitoring. We will provide additional data for the top two – the January 25 spike and the January 30 spike. On January 25, there were two spikes. Note that the first spike was brief and did not register as high on the hour-average graph as the second spike. January 30 also had two spikes with the first spike lasting longer than the second one, which barely showed up on the hour-average graph.

January 25, 2025 Spike

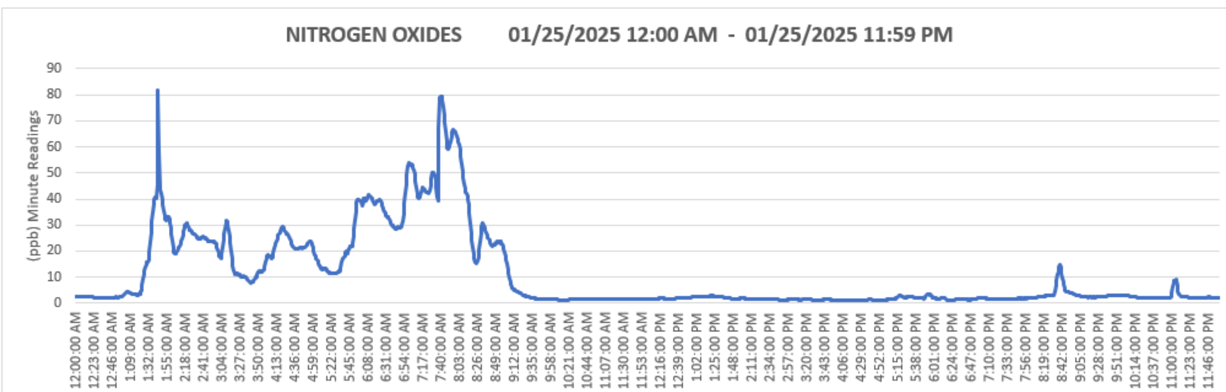


Figure D7-19: January 25 Minute Readings for Nitrogen Oxides.

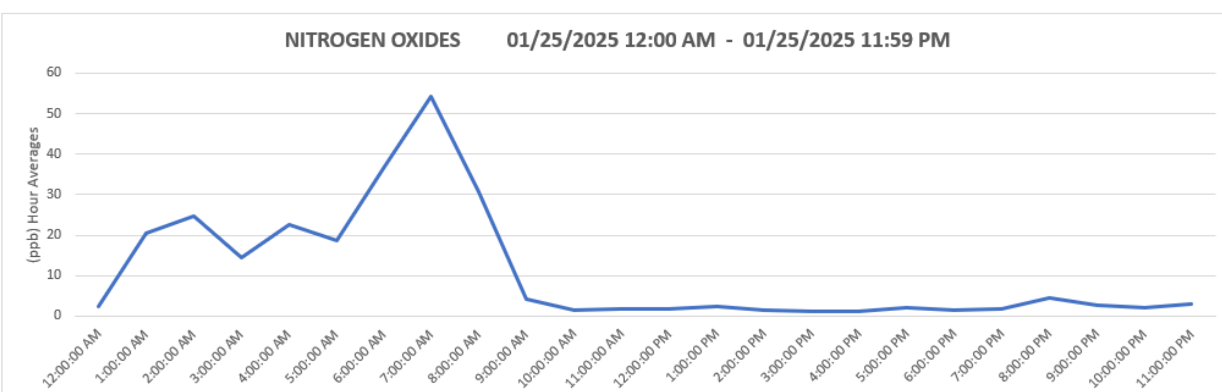


Figure D7-20: January 25 Hour Averages for Nitrogen Oxides.

NITROGEN OXIDES Top 25 Concentrations (ppb) Minute Readings 01/25/2025 12:00 AM - 01/25/2025 11:59 PM		
Rank	Concentration	Time
1	81.5	1:44:00 AM
2	79.4	7:41:00 AM
3	79.2	7:40:00 AM
4	78.9	7:39:00 AM
5	77.9	7:42:00 AM
6	77.3	7:38:00 AM
7	75.4	7:43:00 AM
8	72.4	7:44:00 AM
9	69.4	7:45:00 AM
10	67.0	7:37:00 AM
11	66.8	7:55:00 AM
12	66.7	7:56:00 AM
13	66.3	7:46:00 AM
14	66.1	7:57:00 AM
15	65.9	7:58:00 AM
16	65.6	7:54:00 AM
17	65.2	7:59:00 AM
18	64.3	8:00:00 AM
19	63.6	7:53:00 AM
20	63.0	8:01:00 AM
21	62.5	7:47:00 AM
22	61.9	7:52:00 AM
23	61.8	8:02:00 AM
24	60.8	8:03:00 AM
25	60.7	7:51:00 AM

NITROGEN OXIDES Hour Averages Ranked by Highest (ppb) Hour Averages 01/25/2025 12:00 AM - 01/25/2025 11:59 PM		
Rank	Concentration	Time
1	54.3	7:00:00 AM
2	36.5	6:00:00 AM
3	30.8	8:00:00 AM
4	24.8	2:00:00 AM
5	22.7	4:00:00 AM
6	20.4	1:00:00 AM
7	18.7	5:00:00 AM
8	14.6	3:00:00 AM
9	4.4	8:00:00 PM
10	4.2	9:00:00 AM
11	3.0	11:00:00 PM
12	2.6	9:00:00 PM
13	2.3	1:00:00 PM
14	2.3	12:00:00 AM
15	2.2	10:00:00 PM
16	2.2	5:00:00 PM
17	1.9	12:00:00 PM
18	1.7	7:00:00 PM
19	1.7	11:00:00 AM
20	1.6	6:00:00 PM
21	1.5	2:00:00 PM
22	1.4	10:00:00 AM
23	1.3	3:00:00 PM
24	1.2	4:00:00 PM

Figure D7-21: January 25 Nitrogen Oxides Top 25 Minute Readings and Hour Averages ranked from highest to lowest concentration.

January 30, 2025 Spike

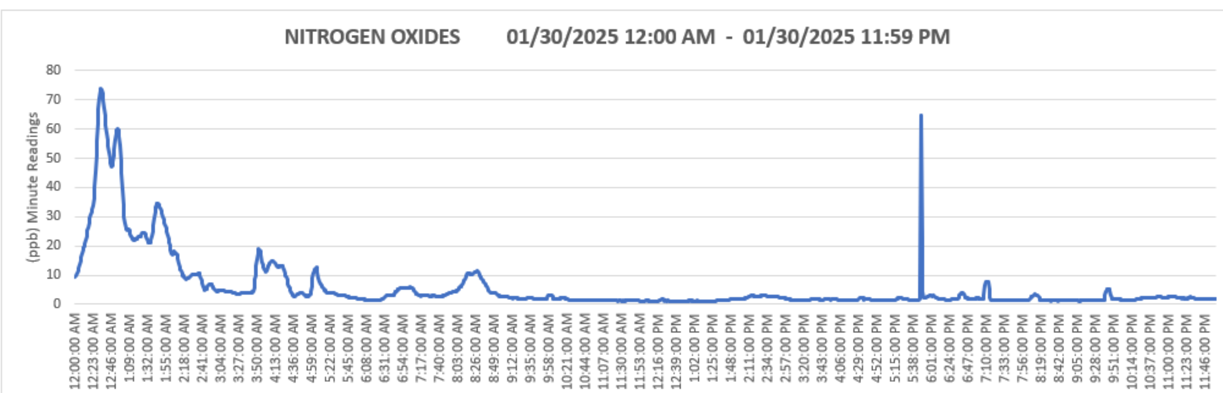


Figure D7-22: January 30 Minute Readings for Nitrogen Oxides.

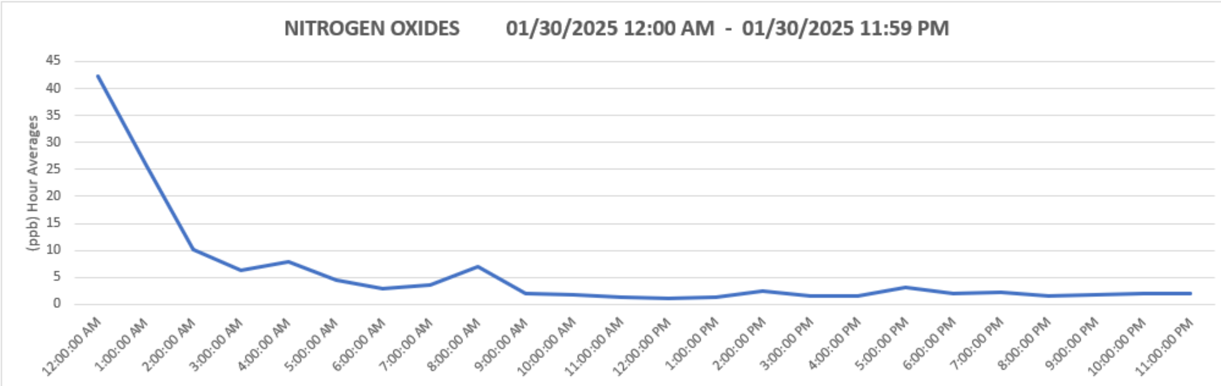


Figure D7-23: January 30 Hour Averages for Nitrogen Oxides.

NITROGEN OXIDES Top 25 Concentrations (ppb) Minute Readings 01/30/2025 12:00 AM - 01/30/2025 11:59 PM		
Rank	Concentration	Time
1	73.8	12:33:00 AM
2	73.6	12:34:00 AM
3	73.2	12:32:00 AM
4	72.4	12:35:00 AM
5	70.6	12:31:00 AM
6	70.1	12:36:00 AM
7	67.4	12:37:00 AM
8	66.9	12:30:00 AM
9	64.5	5:48:00 PM
10	64.5	12:38:00 AM
11	61.9	12:29:00 AM
12	61.5	12:39:00 AM
13	60.0	12:54:00 AM
14	59.6	12:53:00 AM
15	59.5	12:55:00 AM
16	59.0	12:40:00 AM
17	58.5	12:52:00 AM
18	57.6	12:56:00 AM
19	56.3	12:51:00 AM
20	56.3	12:41:00 AM
21	55.7	12:28:00 AM
22	54.5	12:57:00 AM
23	54.1	12:42:00 AM
24	52.9	12:50:00 AM
25	52.1	12:43:00 AM

NITROGEN OXIDES Hour Averages Ranked by Highest (ppb) Hour Averages 01/30/2025 12:00 AM - 01/30/2025 11:59 PM		
Rank	Concentration	Time
1	42.2	12:00:00 AM
2	26.1	1:00:00 AM
3	10.1	2:00:00 AM
4	8.0	4:00:00 AM
5	6.9	8:00:00 AM
6	6.4	3:00:00 AM
7	4.5	5:00:00 AM
8	3.5	7:00:00 AM
9	3.2	5:00:00 PM
10	2.9	6:00:00 AM
11	2.5	2:00:00 PM
12	2.3	7:00:00 PM
13	2.1	11:00:00 PM
14	2.1	6:00:00 PM
15	2.1	9:00:00 AM
16	2.0	10:00:00 PM
17	1.8	9:00:00 PM
18	1.7	10:00:00 AM
19	1.6	8:00:00 PM
20	1.6	3:00:00 PM
21	1.5	4:00:00 PM
22	1.4	1:00:00 PM
23	1.3	11:00:00 AM
24	1.2	12:00:00 PM

Figure D7-24: January 30 Nitrogen Oxides Top 25 Minute Readings and Hour Averages ranked from highest to lowest concentration.

D8: Data Completeness

Data is being delivered to BREDL via daily emails and obtained daily via manual logins to our on board DAS computer and online for Aeroqual data stored in their cloud. If necessary, data may be obtained monthly directly from the trailer's central computer. Data will be backed up in several places as mentioned in our QAPP.

At least 75% completeness is our acceptance criteria for each air monitor.[14] Each hour requires at least 75% of minute data (45 minutes of data) to be a complete, valid hour. Each day requires at least 75% of hour data (18 hours of data) to be a complete, valid day of data.

All of our pollutant data exceeded EPA's requirement for completeness at our Site 1 location.

DATA COMPLETENESS Hamlet Data Range: 11/22/2024 - 04/07/2025 Number of Data Days: 137						
	VOC	PM25	PM10	NO	NOX	NO2
Number of Data Hours	3252	3250	3250	3197	3197	3197
Ave. No. of Hour Readings per day	23.7	23.7	23.7	23.3	23.3	23.3
Hour Data Completeness	98.91%	98.84%	98.84%	97.23%	97.23%	97.23%
Minute Data Completeness	98.90%	98.90%	98.90%	97.34%	97.34%	97.34%

Figure D8-1: Table displaying pollutant data completeness for Site 1.

[14] EPA has a history of using 75% completeness for air toxins and VOCs. EPA research documentation and presentations indicate the use of 75% completeness. Reference examples include:
1992: https://www.tandfonline.com/doi/abs/10.1080/10473289.1992.10467079 ;
2009: https://www3.epa.gov/ttnamti1/files/ambient/airtox/workbook/T-Workbook_Secs1-8.pdf ;
2015: https://www.tandfonline.com/doi/full/10.1080/10962247.2015.1076538

D9: Wind Data

Figure D9-1 displays the wind speed and wind direction from minute measurements at our Site 1 location during our monitoring period.

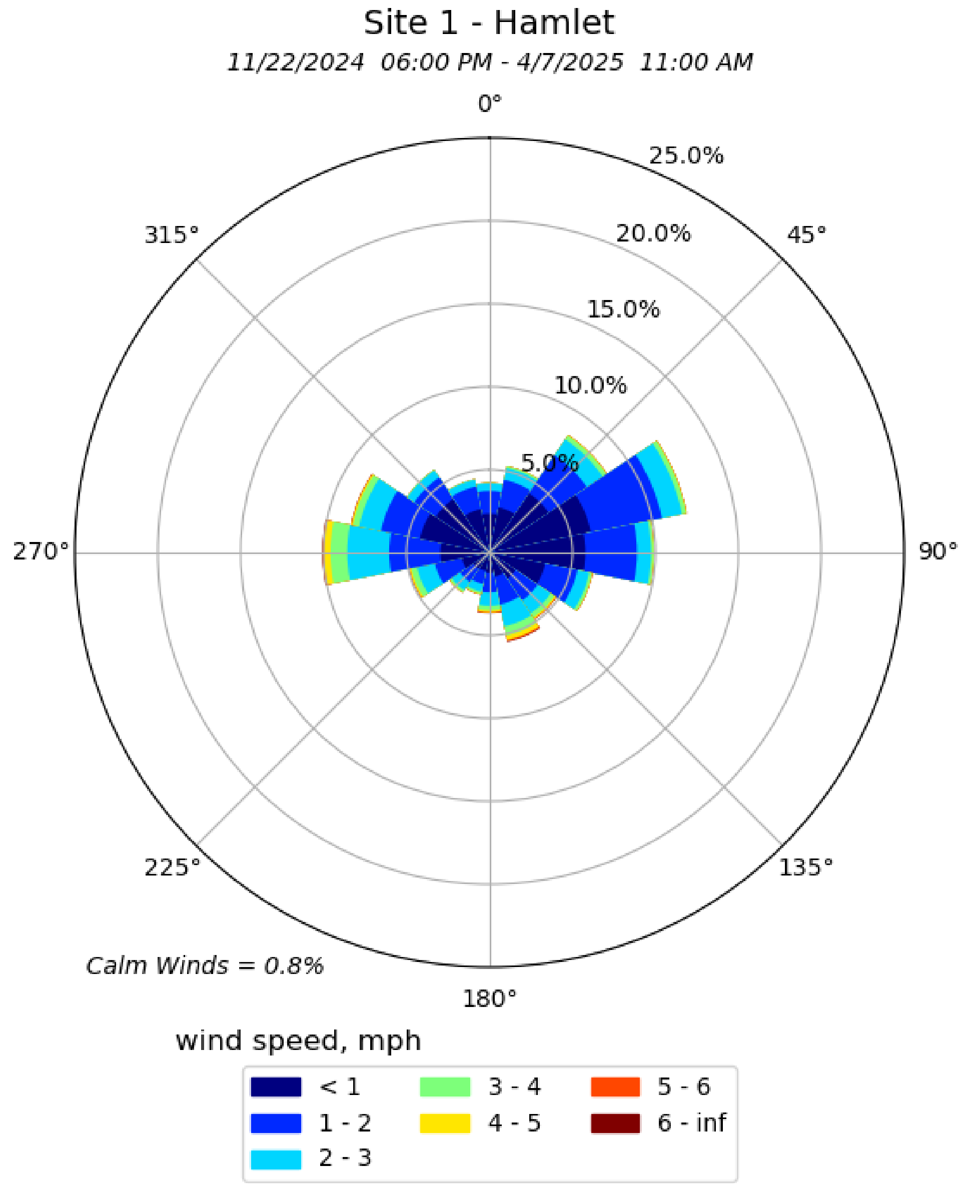


Figure D9-1: Wind Rose

The wind roses on this page are from EPA's RETIGO tool. Both graphics used BREDL's BEAST data taken at Site 1 from November 22, 2024 – April 7, 2025.

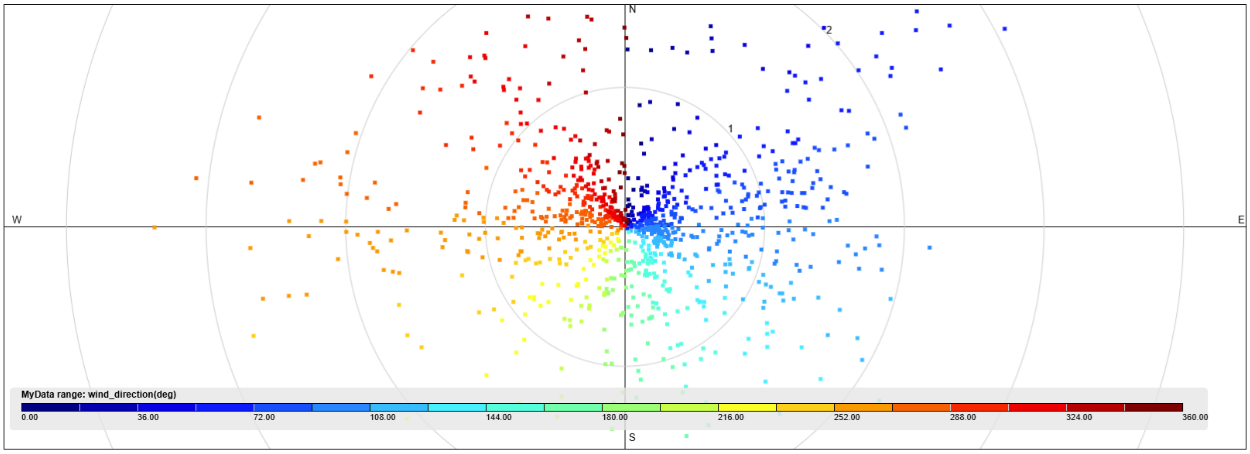


Figure D9-2: EPA RETIGO Wind Rose displaying wind direction

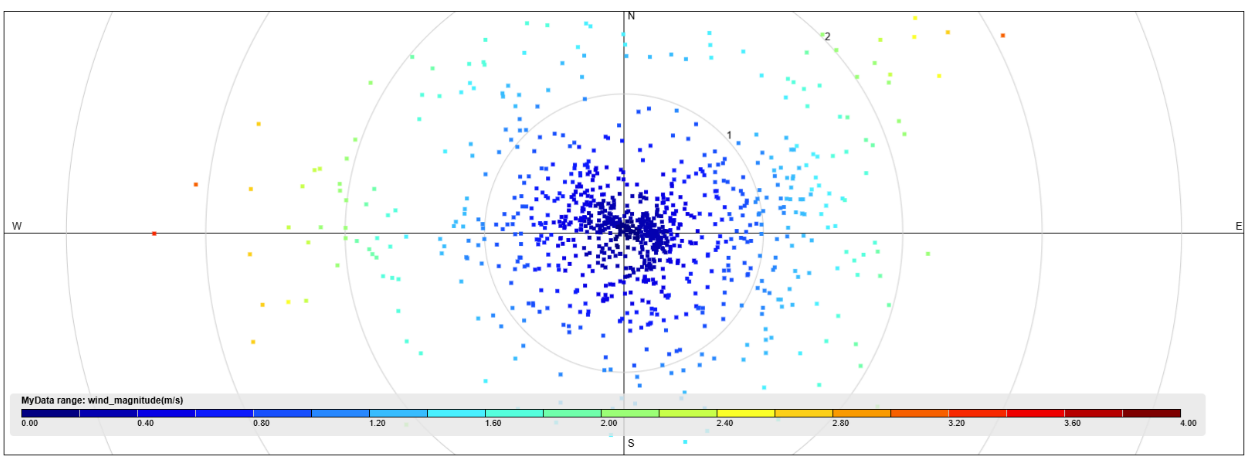


Figure D9-3: EPA RETIGO Wind Rose displaying wind speed

D10: Regional Agency Air Monitors

Three (PM2.5, PM10, and NO2) of the six pollutants that we are monitoring are criteria pollutants with National Ambient Air Quality Standards with Air Quality Indices. We screened the BEAST data with regional agency monitors to see if the current air monitoring network is a sufficient indication of this community's air quality. In the following map, we used one of the facilities of concern as the map anchor point to conceal the exact location of the BEAST.

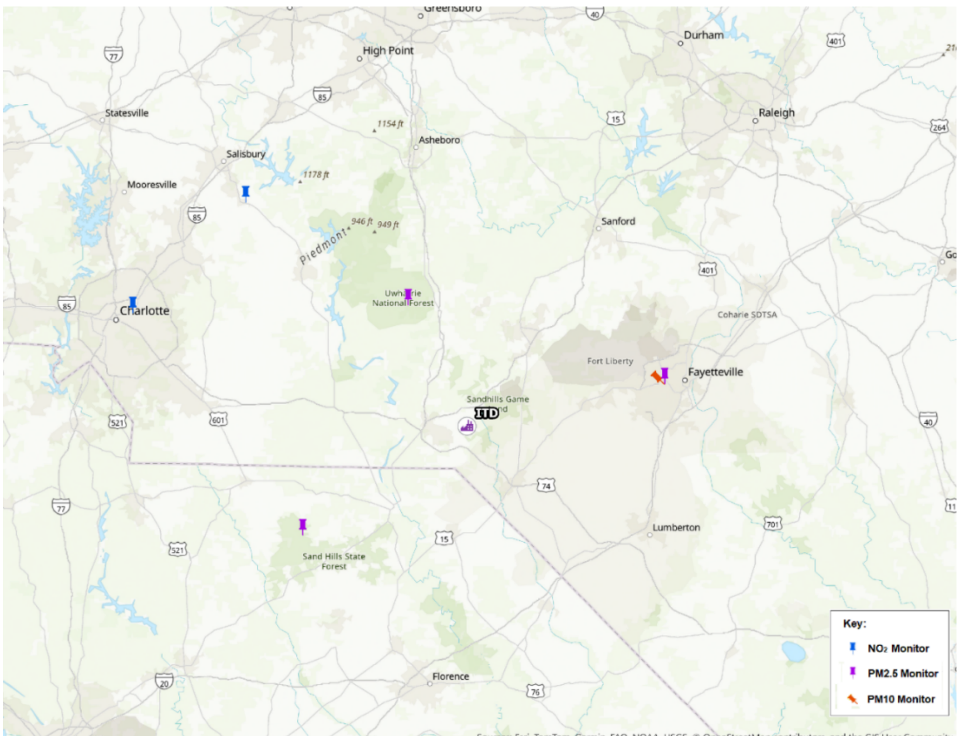


Figure D10-1: Map displaying regional agency air monitors

CARE-4-AIR SITE 1			
Pollutant	**Agency Monitor**	**Monitor ID**	**Miles from BEAST**
PM2.5	Chesterfield	450250001	45-50 miles
PM2.5	Candor	371230001	30-35 miles
PM2.5	W Owen	370510009	45-50 miles
PM10	W Owen	370510009	45-50 miles
NO2	Rockwell	371590021	75-80 miles
NO2	Garinger	371190041	80-85 miles

Figure D10-2: Table displaying regional air monitors with approximate miles from BEAST

BEAST screened with regional PM 2.5 monitors

NOVEMBER — PM 2.5 - Concentration with AQI color code — 2024

	S	M	T	W	T	F	S
						22	23
BEAST						-	2.8
Chesterfield						-	2.6
Candor						-	4.7
W Owen						-	-
	24	25	26	27	28	29	30
BEAST	6.3	7.5	8.1	9.3	8.0	4.2	5.7
Chesterfield	6.1	8.5	8.6	8.3	8.8	4.1	4.6
Candor	14.0	11.7	9.0	7.0	14.1	2.3	2.0
W Owen	19.6	-	-	7.9	7.0	2.2	12.6

PM2.5 concentration is the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

NOVEMBER — PM 2.5 - AQI — 2024

	S	M	T	W	T	F	S
						22	23
BEAST						-	16
Chesterfield						-	14
Candor						-	26
W Owen						-	-
	24	25	26	27	28	29	30
BEAST	35	42	45	51	44	23	32
Chesterfield	34	47	48	46	49	23	26
Candor	60	56	50	39	60	13	11
W Owen	71	-	-	44	39	12	58

PM2.5 AQI is based on the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

DECEMBER — PM 2.5 - Concentration with AQI color code — 2024

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
BEAST	6.2	4.1	6.1	9.6	9.6	6	8.7
Chesterfield	4.7	4.2	5.4	8.6	10.3	5.4	6.6
Candor	4.7	3.0	3.1	7.3	7.8	2.1	6.0
W Owen	16.7	4.1	7.9	9.8	9.0	-	22.8
	8	9	10	11	12	13	14
BEAST	8.1	9.3	9.5	3.8	4.2	7.8	8.4
Chesterfield	9.6	11.0	9.8	4.1	3.6	5.3	9.5
Candor	8.0	9.2	8.1	2.2	2.6	6.0	8.2
W Owen	11.1	10.4	10.8	2.5	4.7	14.2	8.5
	15	16	17	18	19	20	21
BEAST	5.3	11.0	8.1	6.1	3.6	6.2	3.1
Chesterfield	6.5	10.1	8.0	6.2	5.5	5.5	3.3
Candor	5.7	5.7	8.0	8.0	2.8	5.1	1.1
W Owen	-	-	11.2	7.4	3.0	5.2	1.9
	22	23	24	25	26	27	28
BEAST	3.5	4.6	6.5	6.8	7.5	8.6	8.0
Chesterfield	4.7	6.0	8.3	8.8	9.5	10.6	10.5
Candor	3.4	4.3	6.6	6.2	7.6	7.6	7.1
W Owen	4.4	6.4	8.7	9.2	8.4	9.9	6.5
	29	30	31				
BEAST	3.4	4.4	6.2				
Chesterfield	3.7	4.4	6.0				
Candor	1.7	2.2	6.0				
W Owen	1.5	4.5	-				

PM2.5 concentration is the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

DECEMBER — PM 2.5 - AQI — 2024

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
BEAST	34	23	34	52	52	33	48
Chesterfield	26	23	30	48	53	30	37
Candor	26	17	17	41	43	12	33
W Owen	65	23	44	52	50	-	77
	8	9	10	11	12	13	14
BEAST	45	51	52	21	23	43	47
Chesterfield	52	55	52	23	20	29	52
Candor	44	51	45	12	14	33	46
W Owen	55	53	54	14	26	61	47
	15	16	17	18	19	20	21
BEAST	29	55	45	34	20	34	17
Chesterfield	36	53	44	34	31	31	18
Candor	32	32	44	44	16	28	6
W Owen	-	-	55	41	17	29	11
	22	23	24	25	26	27	28
BEAST	19	26	36	38	42	48	44
Chesterfield	26	33	46	49	52	54	54
Candor	19	24	37	34	42	42	39
W Owen	24	36	48	51	47	52	36
	29	30	31				
BEAST	19	24	34				
Chesterfield	21	24	33				
Candor	9	12	33				
W Owen	8	25	-				

PM2.5 AQI is based on the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

Figure D10-3: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

JANUARY PM 2.5 - Concentration with AQI color code **2025**

	S	M	T	W	T	F	S
				1	2	3	4
BEAST				2.2	4.6	6.1	3.5
Chesterfield				2.1	4.2	4.8	2.8
Candor				1.1	1.6	4.8	2.7
W Owen				-	-	-	-
	5	6	7	8	9	10	11
BEAST	6.7	6.4	3.9	5.6	5.7	7.5	5.4
Chesterfield	5.0	4.6	3.7	6.1	6.0	7.4	4.6
Candor	5.7	3.6	1.8	3.9	3.0	4.5	3.8
W Owen	12.4	6.4	3.3	4.7	7.0	7.5	4.9
	12	13	14	15	16	17	18
BEAST	6.7	10.0	6.1	5.9	8.9	6.2	8.1
Chesterfield	5.4	6.3	5.9	5.5	6.3	5.1	6.4
Candor	3.1	-	-	-	4.9	4.0	6.6
W Owen	9.8	15.3	8.5	11.1	16.3	6.5	10.6
	19	20	21	22	23	24	25
BEAST	4.9	3.9	4.2	6.3	10.5	14.4	9.8
Chesterfield	5.8	4.9	4.7	6.0	8.3	12.8	7.5
Candor	5.2	1.7	3.7	4.1	9.8	7.5	4.8
W Owen	4.9	3.3	4.7	6.0	10.6	13.2	12.2
	26	27	28	29	30	31	
BEAST	9.0	7.3	6.6	6.0	6.1	10.5	
Chesterfield	8.4	8.0	5.5	10.9	-	10.1	
Candor	5.7	6.0	5.4	5.6	-	-	
W Owen	-	-	4.6	7.5	7.3	9.0	

PM2.5 concentration is the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

JANUARY PM 2.5 - AQI **2025**

	S	M	T	W	T	F	S
				1	2	3	4
BEAST				12	26	34	19
Chesterfield				12	23	27	16
Candor				6	9	27	15
W Owen				-	-	-	-
	5	6	7	8	9	10	11
BEAST	37	36	22	31	32	42	30
Chesterfield	28	26	21	34	33	41	26
Candor	32	20	10	22	17	25	21
W Owen	57	36	18	26	39	42	27
	12	13	14	15	16	17	18
BEAST	37	53	34	33	49	34	45
Chesterfield	30	35	33	31	35	28	36
Candor	17	-	-	-	27	22	37
W Owen	52	63	47	55	64	36	54
	19	20	21	22	23	24	25
BEAST	27	22	23	35	54	61	52
Chesterfield	32	27	26	33	46	58	42
Candor	29	9	21	23	52	42	27
W Owen	27	18	26	33	54	59	57
	26	27	28	29	30	31	
BEAST	50	41	37	33	34	54	
Chesterfield	47	44	31	54	-	53	
Candor	32	33	30	31	-	-	
W Owen	-	-	26	42	41	50	

PM2.5 AQI is based on the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

FEBRUARY PM 2.5 - Concentration with AQI color code **2025**

	S	M	T	W	T	F	S
							1
BEAST							4.3
Chesterfield							5.3
Candor							4.1
W Owen							3.0
	2	3	4	5	6	7	8
BEAST	4.6	8.6	10.5	12.7	17.6	9.3	14.6
Chesterfield	5.2	14.3	11.4	14.0	13.8	10.0	14.3
Candor	4.0	7.7	9.4	6.9	10.2	4.7	9.0
W Owen	3.6	-	14.2	6.4	11.1	-	-
	9	10	11	12	13	14	15
BEAST	10.3	5.7	6.7	1.6	3.7	6.1	6.6
Chesterfield	11.2	5.6	7.0	2.8	3.1	6.1	7.2
Candor	7.5	2.8	3.1	0.9	1.8	3.3	6.3
W Owen	11.7	4.5	10.3	8.1	4.5	6.4	5.9
	16	17	18	19	20	21	22
BEAST	3.6	4.1	7.2	6.8	6.6	5.5	5.7
Chesterfield	3.3	4.2	9.0	9.0	8.8	4.5	9.4
Candor	-	1.5	4.0	5.2	3.8	1.9	4.6
W Owen	2.4	3.2	5.4	5.8	3.3	5.2	7.5
	23	24	25	26	27	28	
BEAST	10.7	21.4	19.9	13.1	17.9	4.2	
Chesterfield	9.8	12.2	20.7	16.9	18.2	2.9	
Candor	6.6	5.2	15.9	10.3	14.3	2.8	
W Owen	12.1	13.9	20.7	-	-	-	

PM2.5 concentration is the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

FEBRUARY PM 2.5 - AQI **2025**

	S	M	T	W	T	F	S
							1
BEAST							24
Chesterfield							29
Candor							23
W Owen							17
	2	3	4	5	6	7	8
BEAST	26	48	54	58	67	51	61
Chesterfield	29	61	55	60	60	53	61
Candor	22	43	52	38	53	26	50
W Owen	20	-	61	36	55	-	-
	9	10	11	12	13	14	15
BEAST	53	32	37	9	21	34	37
Chesterfield	55	31	39	16	17	34	40
Candor	42	16	17	5	10	18	35
W Owen	56	25	53	45	25	36	33
	16	17	18	19	20	21	22
BEAST	20	23	40	38	37	31	32
Chesterfield	18	23	50	50	49	25	52
Candor	-	8	22	29	21	11	26
W Owen	13	18	30	32	18	29	42
	23	24	25	26	27	28	
BEAST	54	74	71	58	67	23	
Chesterfield	52	57	73	66	68	16	
Candor	37	29	64	53	61	16	
W Owen	57	60	73	-	-	-	

PM2.5 AQI is based on the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

Figure D10-4: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

MARCH — PM 2.5 - Concentration with AQI color code — 2025

	S	M	T	W	T	F	S
							1
BEAST							10.6
Chesterfield							11.3
Candor							6.1
W Owen							-
	2	3	4	5	6	7	8
BEAST	5.0	9.3	4.9	6.8	1.3	14.6	13.8
Chesterfield	4.4	5.1	4.6	7.2	1.6	9.3	16.6
Candor	9.5	9.7	4.5	4.0	1.3	9.8	11.5
W Owen	3.7	6.1	5.1	5.2	0.8	4.0	-
	9	10	11	12	13	14	15
BEAST	5.5	8.9	5.7	10.4	27.0	25.7	11.2
Chesterfield	4.7	8.6	5.4	12.5	30.1	36.2	10.6
Candor	4.6	5.8	6.8	9.5	18.0	27.2	11.9
W Owen	-	-	5.4	11.2	18.8	17.5	9.4
	16	17	18	19	20	21	22
BEAST	5.3	4.7	4.4	16.1	13.3	3.3	8.9
Chesterfield	6.4	5.0	3.3	15.6	12.9	4.2	10.6
Candor	5.0	3.6	2.4	-	11.2	-	6.6
W Owen	4.3	3.7	5.1	13.3	10.9	2.1	9.3
	23	24	25	26	27	28	29
BEAST	5.1	10.1	4.3	4.5	3.8	7.8	6.3
Chesterfield	5.3	11.7	4.8	5.8	5.3	8.9	6.9
Candor	4.9	10.3	3.3	2.6	3.6	-	-
W Owen	6.0	10.7	3.4	4.1	4.6	7.9	5.5
	30	31					
BEAST	6.3	7.8					
Chesterfield	7.6	7.6					
Candor	5.7	6.3					
W Owen	4.8	4.6					

PM2.5 concentration is the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

MARCH — PM 2.5 - AQI — 2025

	S	M	T	W	T	F	S
							1
BEAST							54
Chesterfield							55
Candor							34
W Owen							-
	2	3	4	5	6	7	8
BEAST	28	51	27	38	7	61	60
Chesterfield	24	28	26	40	9	51	65
Candor	52	52	25	22	7	52	55
W Owen	21	34	28	29	4	22	-
	9	10	11	12	13	14	15
BEAST	31	49	32	53	84	82	55
Chesterfield	26	48	30	57	90	103	54
Candor	26	32	38	52	68	85	56
W Owen	-	-	30	55	69	67	52
	16	17	18	19	20	21	22
BEAST	29	26	24	64	59	18	49
Chesterfield	36	28	18	63	58	23	54
Candor	28	20	13	-	55	-	37
W Owen	24	21	28	59	54	12	51
	23	24	25	26	27	28	29
BEAST	28	53	24	25	21	43	35
Chesterfield	29	56	27	32	29	49	38
Candor	27	53	18	14	20	-	-
W Owen	33	54	19	23	26	44	31
	30	31					
BEAST	35	43					
Chesterfield	42	42					
Candor	32	35					
W Owen	27	26					

PM2.5 AQI is based on the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

APRIL — PM 2.5 - Concentration with AQI color code — 2025

	S	M	T	W	T	F	S
			1	2	3	4	5
BEAST			4.1	7.4	8.8	9.6	8.2
Chesterfield			5.2	10.1	9.8	10.7	9.8
Candor			-	-	6.5	9.3	8.1
W Owen			-	-	-	9.5	7.8
	6	7					
BEAST	7.1	-					
Chesterfield	7.8	-					
Candor	7.0	-					
W Owen	6.4	-					

PM2.5 concentration is the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

APRIL — PM 2.5 - AQI — 2025

	S	M	T	W	T	F	S
			1	2	3	4	5
BEAST			23	41	49	52	46
Chesterfield			29	53	52	54	52
Candor			-	-	36	51	45
W Owen			-	-	-	52	43
	6	7					
BEAST	39	-					
Chesterfield	43	-					
Candor	39	-					
W Owen	36	-					

PM2.5 AQI is based on the day's 24-hour average.
Data from the Chesterfield, Candor, and W Owen agency monitors are raw data that have not been quality assured.

Figure D10-5: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

The Chesterfield PM 2.5 monitor was the nearest regional monitor that had data which was the closest to the BEAST data. 54% of daily 24-hour averages were within 1 ug/m3 of the BEAST. Over 83% of the daily 24-hour averages were within 2 ug/m3 of the BEAST. Nearly 92% were within 3 ug/m3.

	AMOUNT of Days		
RANGE	Chesterfield	Candor	W Owen
Within 1	70	38	44
Within 2	39	34	31
Within 3	11	22	8
Within 4	5	12	8
Within 5	2	7	0
Within 6	2	4	3
Within 7	0	2	5
Within 8	0	2	2
Within 9	0	1	2
Within 10	1	0	0
More than 10	1	1	4

	PERCENTAGE		
RANGE	Chesterfield	Candor	W Owen
Within 1	53.44%	30.89%	41.12%
Within 2	29.77%	27.64%	28.97%
Within 3	8.40%	17.89%	7.48%
Within 4	3.82%	9.76%	7.48%
Within 5	1.53%	5.69%	0.00%
Within 6	1.53%	3.25%	2.80%
Within 7	0.00%	1.63%	4.67%
Within 8	0.00%	1.63%	1.87%
Within 9	0.00%	0.81%	1.87%
Within 10	0.76%	0.00%	0.00%
More than 10	0.76%	0.81%	3.74%

Figure D10-6: The left table provides the number of days within a ug/m3 range of our BEAST data. The second table provides the percentage of days within the ug/m3 range.

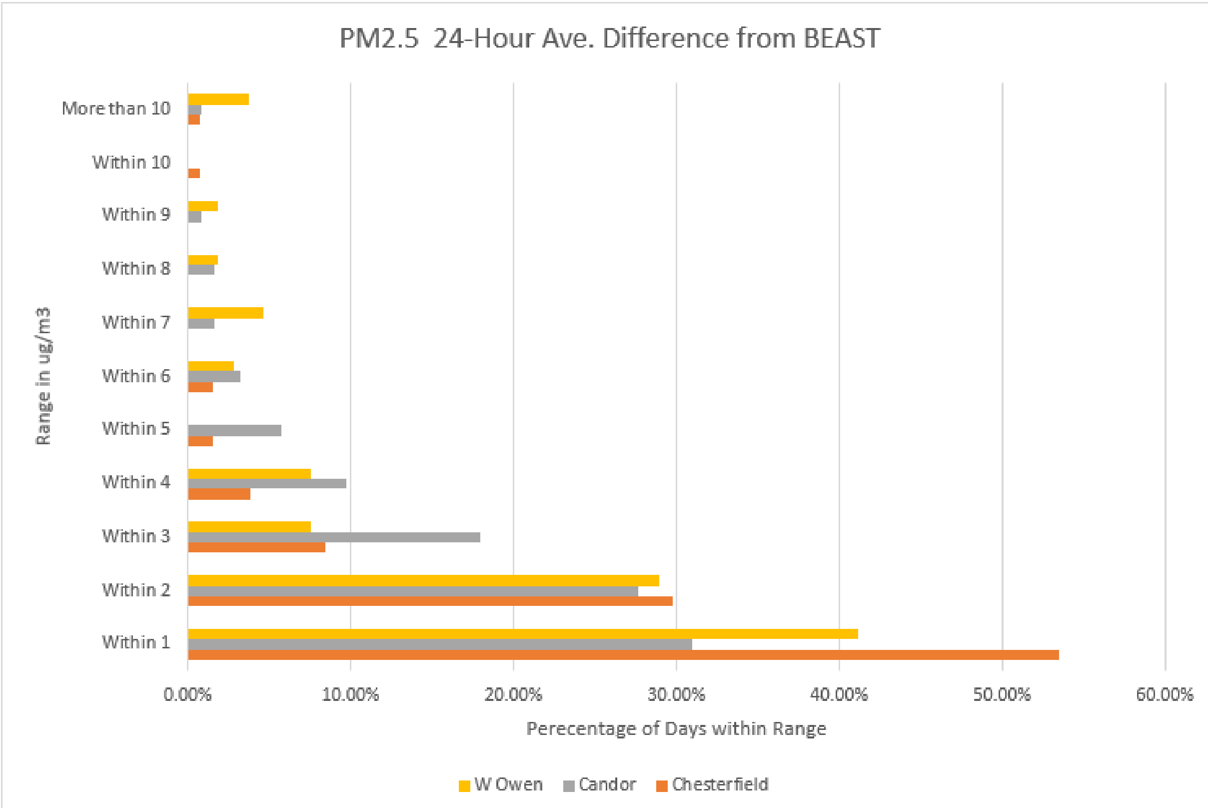


Figure D10-7: Provides a side bar chart of how close regional monitors were when screened with our BEAST data.

BEAST screened with regional PM 10 monitor

NOVEMBER — PM 10 - Concentration with AQI color code — **2024**

	S	M	T	W	T	F	S
						22	23
BEAST						-	7
W Owen						-	7
	24	25	26	27	28	29	30
BEAST	11	13	15	14	12	9	12
W Owen	23	19	15	13	12	6	17

PM10 concentration is the day's 24-hour average. Rounded to whole number.
Data from the W Owen agency monitor are raw data that have not been quality assured.

NOVEMBER — PM 10 - AQI — **2024**

	S	M	T	W	T	F	S
						22	23
BEAST						-	6
W Owen						-	6
	24	25	26	27	28	29	30
BEAST	10	12	14	13	11	8	11
W Owen	21	18	14	12	11	6	11

PM10 AQI is based on the day's 24-hour average.
Data from the W Owen agency monitor are raw data that have not been quality assured.

DECEMBER — PM 10 - Concentration with AQI color code — **2024**

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
BEAST	12	9	12	17	18	14	17
W Owen	19	8	11	15	17	14	26
	8	9	10	11	12	13	14
BEAST	13	14	16	8	7	13	13
W Owen	16	13	14	7	10	19	14
	15	16	17	18	19	20	21
BEAST	10	22	14	9	6	10	5
W Owen	11	18	16	10	6	12	5
	22	23	24	25	26	27	28
BEAST	6	7	11	10	11	11	15
W Owen	6	9	13	10	12	12	11
	29	30	31				
BEAST	9	9	11				
W Owen	7	8	11				

PM10 concentration is the day's 24-hour average. Rounded to whole number.
Data from the W Owen agency monitor are raw data that have not been quality assured.

DECEMBER — PM 10 - AQI — **2024**

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
BEAST	11	8	11	16	17	13	16
W Owen	18	7	10	14	16	13	24
	8	9	10	11	12	13	14
BEAST	12	13	15	7	6	12	12
W Owen	15	12	13	6	9	18	13
	15	16	17	18	19	20	21
BEAST	9	20	13	8	6	9	5
W Owen	10	17	15	9	6	11	5
	22	23	24	25	26	27	28
BEAST	6	6	10	9	10	10	14
W Owen	6	8	12	9	11	11	10
	29	30	31				
BEAST	8	8	10				
W Owen	6	7	10				

PM10 AQI is based on the day's 24-hour average.
Data from the W Owen agency monitor are raw data that have not been quality assured.

Figure D10-8: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

JANUARY — **PM 10 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
				1	2	3	4
BEAST				4	8	10	6
W Owen				5	7	10	7
	5	6	7	8	9	10	11
BEAST	11	10	6	9	9	12	7
W Owen	14	8	6	8	10	13	10
	12	13	14	15	16	17	18
BEAST	9	14	10	11	14	11	13
W Owen	14	17	12	15	21	10	14
	19	20	21	22	23	24	25
BEAST	10	7	9	11	17	22	16
W Owen	10	8	10	9	16	18	17
	26	27	28	29	30	31	
BEAST	15	11	12	13	14	17	
W Owen	15	10	9	13	15	16	

PM10 concentration is the day's 24-hour average. Rounded to whole number.
Data from the W Owen agency monitor are raw data that have not been quality assured.

JANUARY — **PM 10 - AQI** — **2025**

	S	M	T	W	T	F	S
				1	2	3	4
BEAST				4	7	9	6
W Owen				5	6	9	6
	5	6	7	8	9	10	11
BEAST	10	9	6	8	8	11	6
W Owen	13	7	6	7	9	12	9
	12	13	14	15	16	17	18
BEAST	8	13	9	10	13	10	12
W Owen	13	16	11	14	19	9	13
	19	20	21	22	23	24	25
BEAST	9	6	8	10	16	20	15
W Owen	9	7	9	8	15	17	16
	26	27	28	29	30	31	
BEAST	14	10	11	12	13	16	
W Owen	14	9	8	12	14	15	

PM10 AQI is based on the day's 24-hour average.
Data from the W Owen agency monitor are raw data that have not been quality assured.

FEBRUARY — **PM 10 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							10
W Owen							8
	2	3	4	5	6	7	8
BEAST	10	16	23	24	29	20	24
W Owen	11	15	22	20	21	17	17
	9	10	11	12	13	14	15
BEAST	16	10	9	3	9	9	13
W Owen	17	10	12	11	10	10	11
	16	17	18	19	20	21	22
BEAST	8	11	13	11	11	12	10
W Owen	7	9	14	9	8	11	12
	23	24	25	26	27	28	
BEAST	19	29	31	29	34	9	
W Owen	17	21	30	29	28	12	

PM10 concentration is the day's 24-hour average. Rounded to whole number.
Data from the W Owen agency monitor are raw data that have not been quality assured.

FEBRUARY — **PM 10 - AQI** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							9
W Owen							7
	2	3	4	5	6	7	8
BEAST	9	15	21	22	27	19	22
W Owen	10	14	20	19	19	16	16
	9	10	11	12	13	14	15
BEAST	15	9	8	3	8	8	12
W Owen	16	9	11	10	9	9	10
	16	17	18	19	20	21	22
BEAST	7	10	12	10	10	11	9
W Owen	6	8	13	8	7	10	11
	23	24	25	26	27	28	
BEAST	18	27	29	27	31	8	
W Owen	16	19	28	27	26	11	

PM10 AQI is based on the day's 24-hour average.
Data from the W Owen agency monitor are raw data that have not been quality assured.

Figure D10-9: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

MARCH — **PM 10 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							21
W Owen							20
	2	3	4	5	6	7	8
BEAST	12	17	11	26	4	20	23
W Owen	9	11	12	27	7	8	22
	9	10	11	12	13	14	15
BEAST	16	15	11	18	36	33	17
W Owen	10	14	11	17	26	24	15
	16	17	18	19	20	21	22
BEAST	13	12	8.4	25	27	7	17
W Owen	14	13	8	22	28	7	20
	23	24	25	26	27	28	29
BEAST	12	18	13	12	10	18	17
W Owen	18	28	18	11	14	20	19
	30	31					
BEAST	17	17					
W Owen	17	14					

PM10 concentration is the day's 24-hour average. Rounded to whole number.
Data from the W Owen agency monitor are raw data that have not been quality assured.

MARCH — **PM 10 - AQI** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							19
W Owen							19
	2	3	4	5	6	7	8
BEAST	11	16	10	24	4	19	21
W Owen	8	10	11	25	6	7	20
	9	10	11	12	13	14	15
BEAST	15	14	10	17	33	31	16
W Owen	9	13	10	16	24	22	14
	16	17	18	19	20	21	22
BEAST	12	11	8	23	25	6	16
W Owen	13	12	7	20	26	6	19
	23	24	25	26	27	28	29
BEAST	11	17	12	11	9	17	16
W Owen	17	26	17	10	13	19	18
	30	31					
BEAST	16	16					
W Owen	16	13					

PM10 AQI is based on the day's 24-hour average.
Data from the W Owen agency monitor are raw data that have not been quality assured.

APRIL — **PM 10 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
			1	2	3	4	5
BEAST			11	17	19	20	18
W Owen			15	18	21	23	22
	6	7					
BEAST	16						
W Owen	18	-					

PM10 concentration is the day's 24-hour average. Rounded to whole number.
Data from the W Owen agency monitor are raw data that have not been quality assured.

APRIL — **PM 10 - AQI** — **2025**

	S	M	T	W	T	F	S
			1	2	3	4	5
BEAST			10	16	18	19	17
W Owen			14	17	19	21	20
	6	7					
BEAST	15						
W Owen	17	-					

PM10 AQI is based on the day's 24-hour average.
Data from the W Owen agency monitor are raw data that have not been quality assured.

Figure D10-10: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

There was only one regional monitor close enough for screening with the BEAST. The W Owen PM 10 monitor daily 24-hour average was within 1 ug/m3 of the BEAST data nearly 32% of the time. The W Owen monitor was within 2 ug/m3 of the BEAST nearly 59% of the time. Nearly 74% of the time, the W Owen fell within 3 ug/m3 of the BEAST.

AMOUNT of Days	
RANGE	**W Owen**
Within 1	42
Within 2	36
Within 3	21
Within 4	12
Within 5	4
Within 6	4
Within 7	5
Within 8	1
Within 9	2
Within 10	4
More than 10	2

PERCENTAGE	
RANGE	**W Owen**
Within 1	31.58%
Within 2	27.07%
Within 3	15.79%
Within 4	9.02%
Within 5	3.01%
Within 6	3.01%
Within 7	3.76%
Within 8	0.75%
Within 9	1.50%
Within 10	3.01%
More than 10	1.50%

Figure D10-11: The left table provides the number of days within a ug/m3 range of our BEAST data. The second table provides the percentage of days within the ug/m3 range.

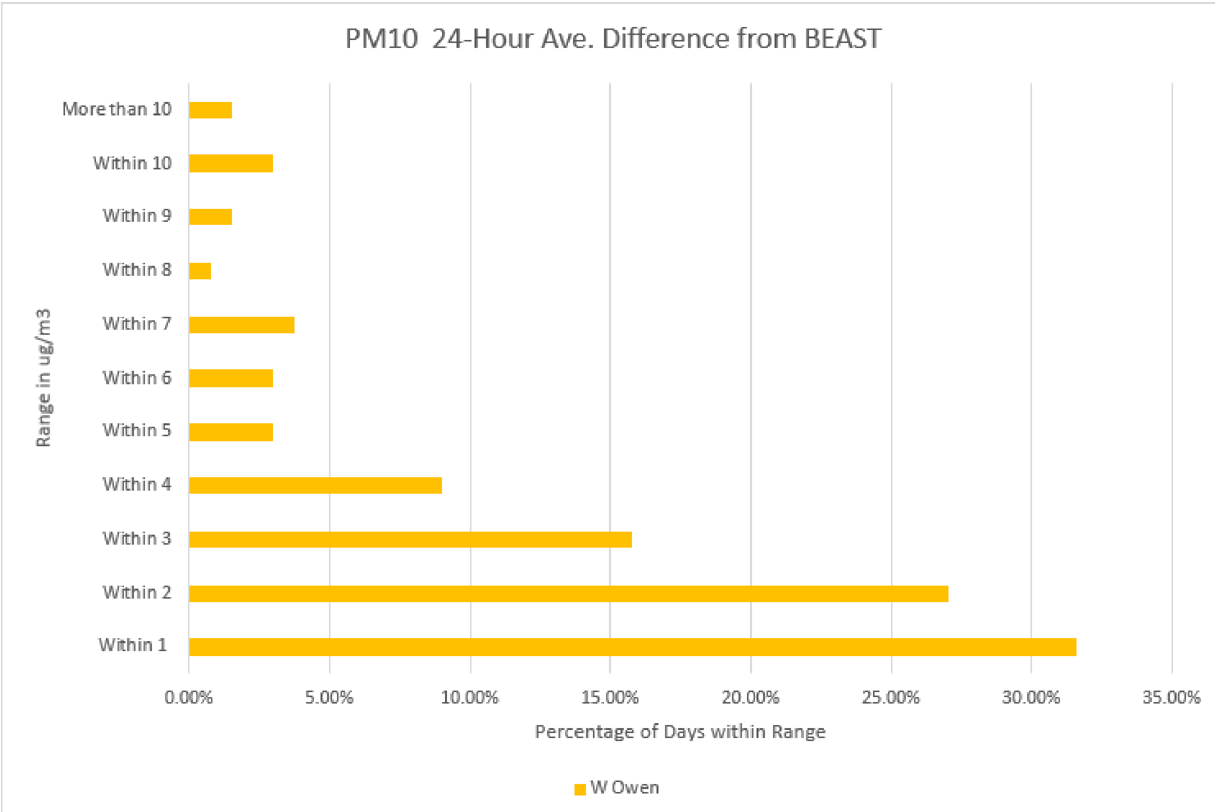


Figure D10-12: Provides a side bar chart of how close regional monitors were when screened with our BEAST data.

BEAST screened with regional NO2 monitors

NOVEMBER — **NO2 - Concentration with AQI color code** — **2024**

	S	M	T	W	T	F	S
						22	23
BEAST						-	6
Rockwell						-	13
Garinger						-	22
	24	25	26	27	28	29	30
BEAST	6	3	4	4	1	2	9
Rockwell	21	16	7	23	10	10	13
Garinger	19	15	27	27	16	15	30

NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

NOVEMBER — **NO2 - AQI** — **2024**

	S	M	T	W	T	F	S
						22	23
BEAST						-	6
Rockwell						-	12
Garinger						-	21
	24	25	26	27	28	29	30
BEAST	6	3	4	4	1	2	8
Rockwell	20	15	7	22	9	9	12
Garinger	18	14	25	25	15	14	28

NO2 AQI is based on the day's highest 1-hour average.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

DECEMBER — **NO2 - Concentration with AQI color code** — **2024**

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
BEAST	11	7	4	9	2	17	16
Rockwell	12	24	11	15	9	24	25
Garinger	32	27	28	21	8	33	29
	8	9	10	11	12	13	14
BEAST	4	1	1	8	7	17	1
Rockwell	13	18	10	4	-	-	20
Garinger	19	9	13	12	30	31	17
	15	16	17	18	19	20	21
BEAST	1	5	4	4	3	2	4
Rockwell	7	12	16	13	7	7	5
Garinger	7	17	25	12	14	12	11
	22	23	24	25	26	27	28
BEAST	1	1	2	1	1	4	2
Rockwell	13	26	22	17	15	7	13
Garinger	27	33	35	24	14	6	16
	29	30	31				
BEAST	-1	6	0				
Rockwell	9	16	9				
Garinger	11	26	17				

NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

DECEMBER — **NO2 - AQI** — **2024**

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
BEAST	10	7	4	8	2	16	15
Rockwell	11	23	10	14	8	23	24
Garinger	30	25	26	20	8	31	27
	8	9	10	11	12	13	14
BEAST	4	1	1	8	7	16	1
Rockwell	12	17	9	4	-	-	19
Garinger	18	8	12	11	28	29	16
	15	16	17	18	19	20	21
BEAST	1	5	4	4	3	2	4
Rockwell	7	11	15	12	7	7	5
Garinger	7	16	24	11	13	11	10
	22	23	24	25	26	27	28
BEAST	1	1	2	1	1	4	2
Rockwell	12	25	21	16	14	7	12
Garinger	25	31	33	23	13	6	15
	29	30	31				
BEAST	0	6	0				
Rockwell	8	15	8				
Garinger	10	25	16				

NO2 AQI is based on the day's highest 1-hour average.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

Figure D10-13: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

JANUARY — **NO2 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
				1	2	3	4
BEAST				8	14	12	6
Rockwell				3	16	14	27
Garinger				13	31	27	25
	5	6	7	8	9	10	11
BEAST	12	5	3	5	2	4	4
Rockwell	14	9	6	5	7	11	10
Garinger	30	15	26	26	29	33	14
	12	13	14	15	16	17	18
BEAST	10	5	20	7	5	7	5
Rockwell	20	22	14	23	21	23	9
Garinger	31	29	31	34	33	36	11
	19	20	21	22	23	24	25
BEAST	0	1	2	1	8	16	30
Rockwell	9	19	9	30	25	28	28
Garinger	7	27	10	28	36	39	31
	26	27	28	29	30	31	
BEAST	6	1	5	4	31	2	
Rockwell	16	21	15	13	23	15	
Garinger	28	17	21	18	31	13	

NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

JANUARY — **NO2 - AQI** — **2025**

	S	M	T	W	T	F	S
				1	2	3	4
BEAST				8	13	11	6
Rockwell				3	15	13	25
Garinger				12	29	25	24
	5	6	7	8	9	10	11
BEAST	11	5	3	5	2	4	4
Rockwell	13	8	6	5	7	10	9
Garinger	28	14	25	25	27	31	13
	12	13	14	15	16	17	18
BEAST	9	5	19	7	5	7	5
Rockwell	19	21	13	22	20	22	9
Garinger	29	27	29	32	31	34	10
	19	20	21	22	23	24	25
BEAST	0	1	2	1	8	15	28
Rockwell	8	18	8	28	24	26	26
Garinger	7	25	9	26	34	37	29
	26	27	28	29	30	31	
BEAST	6	1	5	4	29	2	
Rockwell	15	20	14	12	22	14	
Garinger	26	16	20	17	29	12	

NO2 AQI is based on the day's highest 1-hour average.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

FEBRUARY — **NO2 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							4
Rockwell							8
Garinger							12
	2	3	4	5	6	7	8
BEAST	1	4	4	3	3	5	1
Rockwell	14	12	28	5	9	11	6
Garinger	31	24	31	27	6	22	11
	9	10	11	12	13	14	15
BEAST	0	1	2	1	7	2	3
Rockwell	7	8	8	5	15	7	11
Garinger	5	9	6	8	17	27	12
	16	17	18	19	20	21	22
BEAST	2	21	17	3	3	19	5
Rockwell	7	13	20	9	7	21	17
Garinger	17	33	31	11	7	34	30
	23	24	25	26	27	28	
BEAST	34	17	14	14	4	8	
Rockwell	22	26	27	18	17	10	
Garinger	37	41	36	39	10	27	

NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

FEBRUARY — **NO2 - AQI** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							4
Rockwell							8
Garinger							11
	2	3	4	5	6	7	8
BEAST	1	4	4	3	3	5	1
Rockwell	13	11	26	5	8	10	6
Garinger	29	23	29	25	6	21	10
	9	10	11	12	13	14	15
BEAST	0	1	2	1	7	2	3
Rockwell	7	8	8	5	14	7	10
Garinger	5	8	6	8	16	25	11
	16	17	18	19	20	21	22
BEAST	2	20	16	3	3	18	5
Rockwell	7	12	19	8	7	20	16
Garinger	16	31	29	10	7	32	28
	23	24	25	26	27	28	
BEAST	32	16	13	13	4	8	
Rockwell	21	25	25	17	16	9	
Garinger	35	39	34	37	9	25	

NO2 AQI is based on the day's highest 1-hour average.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

Figure D10-14: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

MARCH — **NO2 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							3
Rockwell							8
Garinger							8
	2	3	4	5	6	7	8
BEAST	8	7	1	0	2	7	4
Rockwell	24	19	22	3	6	12	10
Garinger	28	28	32	2	5	27	5
	9	10	11	12	13	14	15
BEAST	3	5	3	4	3	11	1
Rockwell	10	14	12	22	19	17	10
Garinger	14	27	35	36	23	26	4
	16	17	18	19	20	21	22
BEAST	0	1	5	3	2	3	3
Rockwell	3	3	13	22	9	5	12
Garinger	4	6	25	18	3	11	15
	23	24	25	26	27	28	29
BEAST	2	3	13	5	4	2	0
Rockwell	8	13	19	16	26	6	5
Garinger	28	16	20	23	26	11	7
	30	31					
BEAST	-1	1					
Rockwell	4	6					
Garinger	2	5					

NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

MARCH — **NO2 - AQI** — **2025**

	S	M	T	W	T	F	S
							1
BEAST							3
Rockwell							8
Garinger							8
	2	3	4	5	6	7	8
BEAST	8	7	1	0	2	7	4
Rockwell	23	18	21	3	6	11	9
Garinger	26	26	30	2	5	25	5
	9	10	11	12	13	14	15
BEAST	3	5	3	4	3	10	1
Rockwell	9	13	11	21	18	16	9
Garinger	13	25	33	34	22	25	4
	16	17	18	19	20	21	22
BEAST	0	1	5	3	2	3	3
Rockwell	3	3	12	21	8	5	11
Garinger	4	6	24	17	3	10	14
	23	24	25	26	27	28	29
BEAST	2	3	12	5	4	2	0
Rockwell	8	12	18	15	25	6	5
Garinger	26	15	19	22	25	10	7
	30	31					
BEAST	0	1					
Rockwell	4	6					
Garinger	2	5					

NO2 AQI is based on the day's highest 1-hour average.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

APRIL — **NO2 - Concentration with AQI color code** — **2025**

	S	M	T	W	T	F	S
			1	2	3	4	5
BEAST			3	1	0	1	0
Rockwell			5	8	4	5	4
Garinger			8	7	9	3	2
	6	7					
BEAST	0	-					
Rockwell	6	-					
Garinger	4	-					

NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

APRIL — **NO2 - AQI** — **2025**

	S	M	T	W	T	F	S
			1	2	3	4	5
BEAST			3	1	0	1	0
Rockwell			5	8	4	5	4
Garinger			8	7	8	3	2
	6	7					
BEAST	0	-					
Rockwell	6	-					
Garinger	4	-					

NO2 AQI is based on the day's highest 1-hour average.
Data from the Rockwell and Garinger agency monitors are raw data that have not been quality assured.

Figure D10-15: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

Neither of the two regional NO_2 monitors were a good indication of the local community's air quality. In this case, the BEAST registered lower NO_2 concentrations during our 4.5 months of air monitoring. This was good news since there are several sources of NO_2 near the BEAST location.

	AMOUNT	
RANGE	Rockwell	Garinger
Within 1	2	0
Within 2	6	6
Within 3	12	10
Within 4	19	17
Within 5	25	14
Within 6	19	10
Within 7	15	9
Within 8	13	11
Within 9	7	13
Within 10	5	8
More than 10	5	35

	PERCENTAGE	
RANGE	Rockwell	Garinger
Within 1	1.56%	0.00%
Within 2	4.69%	4.51%
Within 3	9.38%	7.52%
Within 4	14.84%	12.78%
Within 5	19.53%	10.53%
Within 6	14.84%	7.52%
Within 7	11.72%	6.77%
Within 8	10.16%	8.27%
Within 9	5.47%	9.77%
Within 10	3.91%	6.02%
More than 10	3.91%	26.32%

Figure D10-16: The left table provides the number of days within a ug/m3 range of our BEAST data. The second table provides the percentage of days within the ug/m3 range.

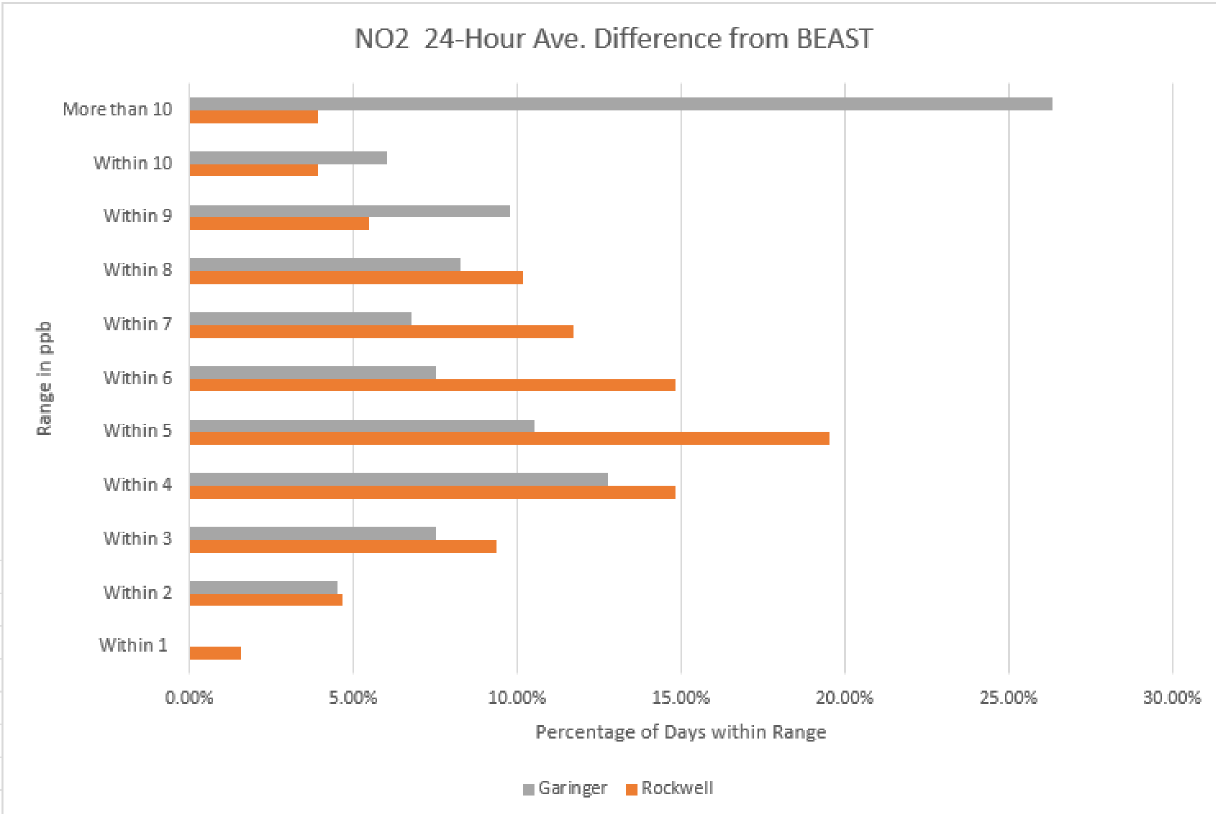


Figure D10-17: Provides a side bar chart of how close regional monitors were when screened with our BEAST data.

The Beast registered lower NO2 concentrations than screened regional NO2 monitors

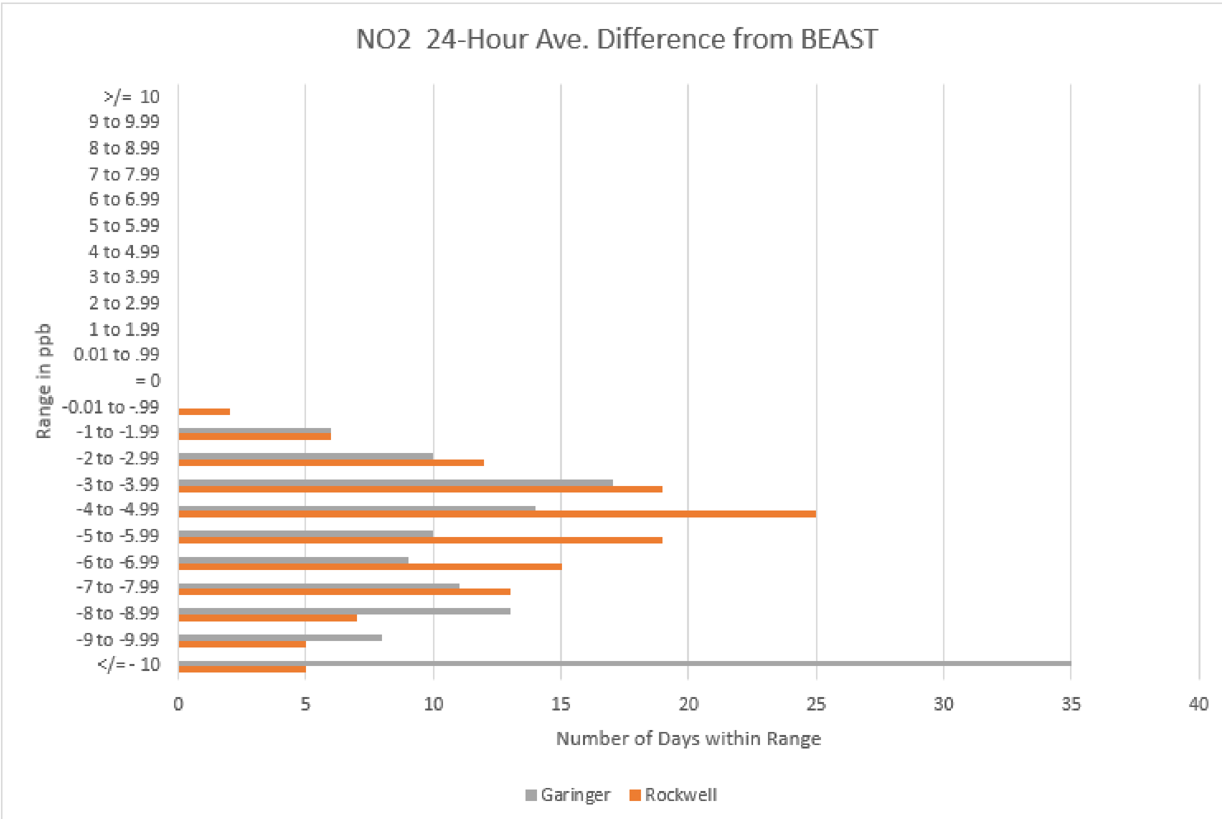


Figure D10-18: Shows that the BEAST registered NO2 levels below the nearest agency NO2 monitors.

D11: AQI

Three (PM2.5, PM10, and NO2) of the six pollutants that we are monitoring are criteria pollutants with National Ambient Air Quality Standards with Air Quality Indices. Thus, we compiled our BEAST data's AQI for commonality.

The AQI data in this section was compiled following guidelines from the EPA Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI).[15] The EPA's AirNow website offers more information about AQI.[16]

AQI and Cautionary Statements for PM 2.5, PM 10, and NO2[17]

Category	AQI	PM 2.5 /PM 10 (24-hr)	NO2 (1-hr)
Good	**0 -50**	It's a great day to be active outside.	It's a great day to be active outside.
Moderate	**51 - 100**	**Unusually sensitive people:** Consider making outdoor activities shorter and less intense. Go inside if you have symptoms such as coughing or shortness of breath.	**Unusually sensitive people:** Consider limiting prolonged exertion especially near busy roads.
Unhealthy for Sensitive Groups	**101-150**	**Sensitive groups:** Make outdoor activities shorter and less intense. It's OK to be active outdoors but take more breaks. Watch for symptoms such as coughing or shortness of breath. **People with asthma:** Follow your asthma action plan and keep quick relief medicine handy. **People with heart disease:** Symptoms such as palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your health care provider.	**Sensitive groups:** Limit prolonged exertion outdoors, especially near busy roads. **People with asthma:** Follow your asthma action plan and keep quick relief medicine handy.

[15] Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI), EPA-454/B-24-002, May 2024

[16] https://www.airnow.gov/aqi/aqi-basics/

[17] Table compiled from information from: Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI), EPA-454/B-24-002, May 2024

Unhealthy	**151 - 200**	**Sensitive groups:** Consider rescheduling or moving all activities inside. Go inside if you have symptoms. **People with asthma:** Follow your asthma action plan and keep quick-relief medicine handy. **People with heart disease:** Symptoms such as palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your health care provider. **Everyone else:** Keep outdoor activities shorter and less intense. Go inside if you have symptoms.	**Sensitive groups:** Avoid prolonged outdoor exertion near roadways. **People with asthma:** Follow your asthma action plan and keep quick relief medicine handy. **Everyone else:** Limit prolonged outdoor exertion especially near busy roads.
Very Unhealthy	**201-300**	**Sensitive groups:** Avoid all physical activity outdoors. Reschedule to a time when air quality is better or move activities indoors.* **People with asthma:** Follow your asthma action plan and keep quick-relief medicine handy. **People with heart disease:** Symptoms such as palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your health care provider. **Everyone else:** Limit outdoor physical activity. Go indoors* if you have symptoms.	**Sensitive groups:** Avoid all outdoor exertion. **People with asthma:** Follow your asthma action plan and keep quick relief medicine handy. **Everyone else:** Avoid prolonged outdoor exertion especially near busy roads.
Hazardous	**301 +**	**Sensitive groups:** Stay indoors and keep activity levels light. Follow tips for keeping particle levels low indoors.* **People with asthma:** Follow your asthma action plan and keep quick-relief medicine handy. **People with heart disease:** Symptoms such as palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your health care provider. **Everyone:** Avoid all physical activity outdoors.*	**Sensitive groups:** Remain indoors.* **People with asthma:** Follow your asthma action plan and keep quick relief medicine handy. **Everyone else:** Avoid all outdoor exertion.
*Note: If you don't have an air conditioner, staying indoors with the windows closed may be dangerous in extremely hot weather. If you are hot, go someplace with air conditioning or check with your local government to find out if cooling centers are available in your community.			

Figure D11-1: EPA AQI and Cautionary Statements for PM 2.5, PM 10, and NO2.

NOVEMBER — Concentration with AQI color code — 2024

	S	M	T	W	T	F	S
						22	23
PM2.5						-	2.8
PM10						-	7
NO2						-	6
	24	25	26	27	28	29	30
PM2.5	6.3	7.5	8.1	9.3	8.0	4.2	5.7
PM10	11	13	15	14	12	9	12
NO2	6	3	4	4	1	2	9

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

NOVEMBER — AQI — 2024

	S	M	T	W	T	F	S
						22	23
PM2.5						-	16
PM10						-	6
NO2						-	6
	24	25	26	27	28	29	30
PM2.5	35	42	45	51	44	23	32
PM10	10	12	14	13	11	8	11
NO2	6	3	4	4	1	2	8

PM2.5 AQI is based on the day's 24-hour average.
PM10 AQI is based on the day's 24-hour average.
NO2 AQI is based on the day's highest 1-hour average.

DECEMBER — Concentration with AQI color code — 2024

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
PM2.5	6.2	4.1	6.1	9.6	9.6	6	8.7
PM10	12	9	12	17	18	14	17
NO2	11	7	4	9	2	17	16
	8	9	10	11	12	13	14
PM2.5	8.1	9.3	9.5	3.8	4.2	7.8	8.4
PM10	13	14	16	8	7	13	13
NO2	4	1	1	8	7	17	1
	15	16	17	18	19	20	21
PM2.5	5.3	11.0	8.1	6.1	3.6	6.2	3.1
PM10	10	22	14	9	6	10	5
NO2	1	5	4	4	3	2	4
	22	23	24	25	26	27	28
PM2.5	3.5	4.6	6.5	6.8	7.5	8.6	8.0
PM10	6	7	11	10	11	11	15
NO2	1	1	2	1	1	4	2
	29	30	31				
PM2.5	3.4	4.4	6.2				
PM10	9	9	11				
NO2	-1	6	0				

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

DECEMBER — AQI — 2024

	S	M	T	W	T	F	S
	1	2	3	4	5	6	7
PM2.5	34	23	34	52	52	33	48
PM10	11	8	11	16	17	13	16
NO2	10	7	4	8	2	16	15
	8	9	10	11	12	13	14
PM2.5	45	51	52	21	23	43	47
PM10	12	13	15	7	6	12	12
NO2	4	1	1	8	7	16	1
	15	16	17	18	19	20	21
PM2.5	29	55	45	34	20	34	17
PM10	9	20	13	8	6	9	5
NO2	1	5	4	4	3	2	4
	22	23	24	25	26	27	28
PM2.5	19	26	36	38	42	48	44
PM10	6	6	10	9	10	10	14
NO2	1	1	2	1	1	4	2
	29	30	31				
PM2.5	19	24	34				
PM10	8	8	10				
NO2	0	6	0				

PM2.5 AQI is based on the day's 24-hour average.
PM10 AQI is based on the day's 24-hour average.
NO2 AQI is based on the day's highest 1-hour average.

Figure D11-2: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

JANUARY — Concentration with AQI color code — **2025**

	S	M	T	W	T	F	S
				1	2	3	4
PM2.5				2.2	4.6	6.1	3.5
PM10				4	8	10	6
NO2				8	14	12	6
	5	6	7	8	9	10	11
PM2.5	6.7	6.4	3.9	5.6	5.7	7.5	5.4
PM10	11	10	6	9	9	12	7
NO2	12	5	3	5	2	4	4
	12	13	14	15	16	17	18
PM2.5	6.7	10.0	6.1	5.9	8.9	6.2	8.1
PM10	9	14	10	11	14	11	13
NO2	10	5	20	7	5	7	5
	19	20	21	22	23	24	25
PM2.5	4.9	3.9	4.2	6.3	10.5	14.4	9.8
PM10	10	7	9	11	17	22	16
NO2	0	1	2	1	8	16	30
	26	27	28	29	30	31	
PM2.5	9.0	7.3	6.6	6.0	6.1	10.5	
PM10	15	11	12	13	14	17	
NO2	6	1	5	4	31	2	

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

JANUARY — AQI — **2025**

	S	M	T	W	T	F	S
				1	2	3	4
PM2.5				12	26	34	19
PM10				4	7	9	6
NO2				8	13	11	6
	5	6	7	8	9	10	11
PM2.5	37	36	22	31	32	42	30
PM10	10	9	6	8	8	11	6
NO2	11	5	3	5	2	4	4
	12	13	14	15	16	17	18
PM2.5	37	53	34	33	49	34	45
PM10	8	13	9	10	13	10	12
NO2	9	5	19	7	5	7	5
	19	20	21	22	23	24	25
PM2.5	27	22	23	35	54	61	52
PM10	9	6	8	10	16	20	15
NO2	0	1	2	1	8	15	28
	26	27	28	29	30	31	
PM2.5	50	41	37	33	34	54	
PM10	14	10	11	12	13	16	
NO2	6	1	5	4	29	2	

PM2.5 AQI is based on the day's 24-hour average.
PM10 AQI is based on the day's 24-hour average.
NO2 AQI is based on the day's highest 1-hour average.

FEBRUARY — Concentration with AQI color code — **2025**

	S	M	T	W	T	F	S
							1
PM2.5							4.3
PM10							10
NO2							4
	2	3	4	5	6	7	8
PM2.5	4.6	8.6	10.5	12.7	17.6	9.3	14.6
PM10	10	16	23	24	29	20	24
NO2	1	4	4	3	3	5	1
	9	10	11	12	13	14	15
PM2.5	10.3	5.7	6.7	1.6	3.7	6.1	6.6
PM10	16	10	9	3	9	9	13
NO2	0	1	2	1	7	2	3
	16	17	18	19	20	21	22
PM2.5	3.6	4.1	7.2	6.8	6.6	5.5	5.7
PM10	8	11	13	11	11	12	10
NO2	2	21	17	3	3	19	5
	23	24	25	26	27	28	
PM2.5	10.7	21.4	19.9	13.1	17.9	4.2	
PM10	19	29	31	29	34	9	
NO2	34	17	14	14	4	8	

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

FEBRUARY — AQI — **2025**

	S	M	T	W	T	F	S
							1
PM2.5							24
PM10							9
NO2							4
	2	3	4	5	6	7	8
PM2.5	26	48	54	58	67	51	61
PM10	9	15	21	22	27	19	22
NO2	1	4	4	3	3	5	1
	9	10	11	12	13	14	15
PM2.5	53	32	37	9	21	34	37
PM10	15	9	8	3	8	8	12
NO2	0	1	2	1	7	2	3
	16	17	18	19	20	21	22
PM2.5	20	23	40	38	37	31	32
PM10	7	10	12	10	10	11	9
NO2	2	20	16	3	3	18	5
	23	24	25	26	27	28	
PM2.5	54	74	71	58	67	23	
PM10	18	27	29	27	31	8	
NO2	32	16	13	13	4	8	

PM2.5 AQI is based on the day's 24-hour average.
PM10 AQI is based on the day's 24-hour average.
NO2 AQI is based on the day's highest 1-hour average.

Figure D11-3: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.

MARCH — Concentration with AQI color code — **2025**

	S	M	T	W	T	F	S
							1
PM2.5							10.6
PM10							21
NO2							3
	2	3	4	5	6	7	8
PM2.5	5.0	9.3	4.9	6.8	1.3	14.6	13.8
PM10	12	17	11	26	4	20	23
NO2	8	7	1	0	2	7	4
	9	10	11	12	13	14	15
PM2.5	5.5	8.9	5.7	10.4	27.0	25.7	11.2
PM10	16	15	11	18	36	33	17
NO2	3	5	3	4	3	11	1
	16	17	18	19	20	21	22
PM2.5	5.3	4.7	4.4	16.1	13.3	3.3	8.9
PM10	13	12	8.4	25	27	7	17
NO2	0	1	5	3	2	3	3
	23	24	25	26	27	28	29
PM2.5	5.1	10.1	4.3	4.5	3.8	7.8	6.3
PM10	12	18	13	12	10	18	17
NO2	2	3	13	5	4	2	0
	30	31					
PM2.5	6.3	7.8					
PM10	17	17					
NO2	-1	1					

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

MARCH — AQI — **2025**

	S	M	T	W	T	F	S
							1
PM2.5							54
PM10							19
NO2							3
	2	3	4	5	6	7	8
PM2.5	28	51	27	38	7	61	60
PM10	11	16	10	24	4	19	21
NO2	8	7	1	0	2	7	4
	9	10	11	12	13	14	15
PM2.5	31	49	32	53	84	82	55
PM10	15	14	10	17	33	31	16
NO2	3	5	3	4	3	10	1
	16	17	18	19	20	21	22
PM2.5	29	26	24	64	59	18	49
PM10	12	11	8	23	25	6	16
NO2	0	1	5	3	2	3	3
	23	24	25	26	27	28	29
PM2.5	28	53	24	25	21	43	35
PM10	11	17	12	11	9	17	16
NO2	2	3	12	5	4	2	0
	30	31					
PM2.5	35	43					
PM10	16	16					
NO2	0	1					

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

APRIL — Concentration with AQI color code — **2025**

	S	M	T	W	T	F	S
			1	2	3	4	5
PM2.5			4.1	7.4	8.8	9.6	8.2
PM10			11	17	19	20	18
NO2			3	1	0	1	0
	6	7					
PM2.5	7.1	-					
PM10	16	-					
NO2	0	-					

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

APRIL — AQI — **2025**

	S	M	T	W	T	F	S
			1	2	3	4	5
PM2.5			23	41	49	52	46
PM10			10	16	18	19	17
NO2			3	1	0	1	0
	6	7					
PM2.5	39	-					
PM10	15	-					
NO2	0	-					

PM2.5 concentration is the day's 24-hour average.
PM10 concentration is the day's 24-hour average. Rounded to whole number.
NO2 concentration is the day's highest 1-hour average. Rounded to the whole number.

Figure D11-4: Monthly data tables displaying air monitors' daily concentrations in the left tables with associated AQI in the right tables.