

British Columbia
Oil & Gas Research and Innovation Society



Farmington Air Quality Monitoring Station
Site Report

April 1, 2023 – March 31, 2024

PROJECT CONTACT INFORMATION

BC Oil & Gas Research Innovation Society
Richard Slocomb
Fund Manager
PO Box 9331 Stn Prov Govt
Victoria, BC V8W 9N3
Office: (250) 220-1418
info@bcogris.ca

BC Oil & Gas Commission Contacts
Laurie Welch
Executive Director, Resource Development & Environment
Kelowna, BC
Office: (250) 980-6066
Laurie.Welch@bcogc.ca

Operational and Reporting Contacts
James Strain
Tropospheric Measurement Systems Inc.
7500 Hector Road, Port Alberni, BC V9Y 9E8
Office: 250-723-4027
Mobile: 250-731-4027
jstrain@tmsys.ca

AIR QUALITY REPORT SUMMARY

The following Air Quality Data report summarizes the monitoring results from the Farmington Air Quality Monitoring Station (AQMS) near Farmington, BC for the period of April 1, 2023, until March 31, 2024. The Farmington AQMS has been in operation since December 2017. Parameters monitored include continuous monitoring for Ozone (O₃), Nitrogen Oxide (NO), Nitrogen Dioxide (NO₂), Total Oxides of Nitrogen (NO_x), Sulphur Dioxide (SO₂), and Total Reduced Sulphur (TRS). The recorded (RAW) data is available from the BC Air Data Archive under the station name “Farmington Community Hall”. All recorded data has been validated by Tropospheric Measurement Systems Inc. (TMS). This report is based entirely on validated data.

Meteorological parameters for wind speed, direction, temperature, and humidity are also recorded at the Farmington AQMS and results are contained in the BC Ambient Air Quality Archive. This report does not include information for the meteorological parameters monitored.

For the Farmington AQMS Deployment, the following were the significant reporting and operational events for the monitoring stations.

Operational times less than 90 percent

- For the April 1st, 2023, to March 31st, 2024, monitoring period there were no operational times less than 90%. Capture percentages by instrument parameter are summarized below. Reported capture percentages for the previous periods (2018-2023) are included.

Parameter	TRS	SO ₂	NO	NO ₂	NO _x	O ₃
Capture (%) (2023-2024)	95.4	97.3	99.2	99.2	99.2	97.5
Capture (%) (2022-2023)	94.5	98.8	99.0	99.0	99.0	99.1
Capture (%) (2021-2022)	92.6	93.4	93.6	93.6	93.6	93.6
Capture (%) (2020-2021)	92.9	95.1	95.1	95.1	95.1	95.1
Capture (%) (2019-2020)	92.1	94.1	95.4	95.4	95.4	94.8
Capture (%) (2018-2019)	99.4	89.8	97.7	97.7	97.7	70.6

Concentrations more than Ambient Air Quality Objectives

- For the April 1st, 2023, to March 31st, 2024, monitoring period there was one (1) 8-hour rolling average Ozone concentration (May 5th, 2023, at 17:00) that was higher than the current BC Ambient Air Quality Objective metric of 62 ppb. Achievement with the BC AAQO for ozone is based on the annual 4th highest daily 8-hr maximum averaged over 3 consecutive calendar years. None of the other measured parameters exceeded the objectives.
- Parameters measured with no associated objective have objective listed as “n/a”
- Complete list of objectives for British Columbia are available at.
 - o <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/aqotable.pdf>

Parameter	TRS (ppb)	SO ₂ (ppb)	NO (ppb)	NO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)
Max 1-hr (2023-2024)	4.4	7.2	53.7	27.4	65.0	70.4
Max 1-hr (2022-2023)	1.3	6.9	58.7	28.0	81.7	58.6
Max 1-hr (2021-2022)	3.4	9.2	44.5	22.6	54.7	69.2
Max 1-hr (2020-2021)	36.9	16.7	70.4	24.2	68.3	55.6
Max 1-hr (2019-2020)	2.1	13.9	51.3	22.9	59.6	58.1
Max 1-hr (2018-2019)	2.4	44.5	58.3	47.2	91.5	63.9
1-hour Obj	5 (PCO)	70 (CAAQS)	n/a	60 (CAAQS)	n/a	82 (NAAQS)
Max 24-hr (2023-2024)	0.6	1.6	13.1	18.4	31.5	43.5
Max 24-hr (2022-2023)	1.1	1.6	12.6	15.1	25.6	42.7
Max 24-hr (2021-2022)	3.1	1.8	8.3	13.2	18.6	43.8
Max 24-hr (2020-2021)	2.5	3.8	4.2	13.0	17.3	46.4
Max 24-hr (2019-2020)	1.9	1.5	10.5	11.0	14.5	47.8
Max 24-hr (2018-2019)	2.1	4.5	15.0	17.8	31.4	51.8
24-hour Obj	2 (PCO)	n/a	n/a	n/a	n/a	n/a
Max 8-hr (2023-2024)						62.5
Max 8-hr (2022-2023)						55.2
Max 8-hr (2021-2022)						63.5
Max 8-hr (2020-2021)						52.1
Max 8-hr (2019-2020)						53.7
Max 8-hr (2018-2019)						60.4
8-hour Obj	n/a	n/a	n/a	n/a	n/a	62 (CAAQS)

Monitoring Notes

- Site calibrations and station maintenance occurred on June 14th, 2023, September 2nd, 2023, December 12th, 2023, and March 20th, 2024.
- The TRS analyzer had a thermal oxidizer failure from August 3rd, 2022, until August 18th, 2022. The station converter was repaired and brought back online.
- BC Ministry of Environment Site Audits occurred on May 17th, 2023, August 16th, 2023 and November 23rd, 2023. Audit results are available <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=43336>
 - o SO₂ and TRS analyzers failed audit on May 17th, 2023 and during the reaudit on August 16th, 2023
 - During the June 14th service of the station, both the SO₂ and TRS analyzers were found to have significant blockage of the sample flow system, causing discrepancy between sampling and the internal quality control check permeation tubes.
 - During the September 2nd service, additional maintenance was performed to bring analyzers back into specification.
 - o TRS again failed the audit on November 23rd, 2023.
 - Service on December 12th found the instrument to be within specification.

Validation Notes

- Validation is performed using both BC MOE and USEPA validation criteria. Validation is performed on 5-minute average values for each parameter and then used to calculate 1-hour, 24-hour and 8-hour rolling average periods.
- Internal instrument performance checks occur on 25-hour cycles. These checks include challenging the instrument against zero gas and a verified elevated target concentration. These performance checks are reviewed as part of regular data oversight to assure they are within specification for instrument operation.

Table of Contents

Project Contact Information	i
Air Quality Report Summary	ii
Monitoring Site Location	1
Satellite View of Monitoring Location	1
Site View Images	2
Monitoring Data Summaries	3
<i>1-Hour Data Summary</i>	3
<i>24-Hour Data Summary</i>	3
<i>8-Hour Rolling Data Summary</i>	3
Parameter Trend Graphs	4
<i>Total Reduced Sulphur (TRS)</i>	4
<i>Sulphur Dioxide (SO₂)</i>	5
<i>Nitrogen Oxide (NO)</i>	6
<i>Nitrogen Dioxide (NO₂)</i>	7
<i>Oxides of Nitrogen (NO_x)</i>	8
<i>Ozone (O₃)</i>	9

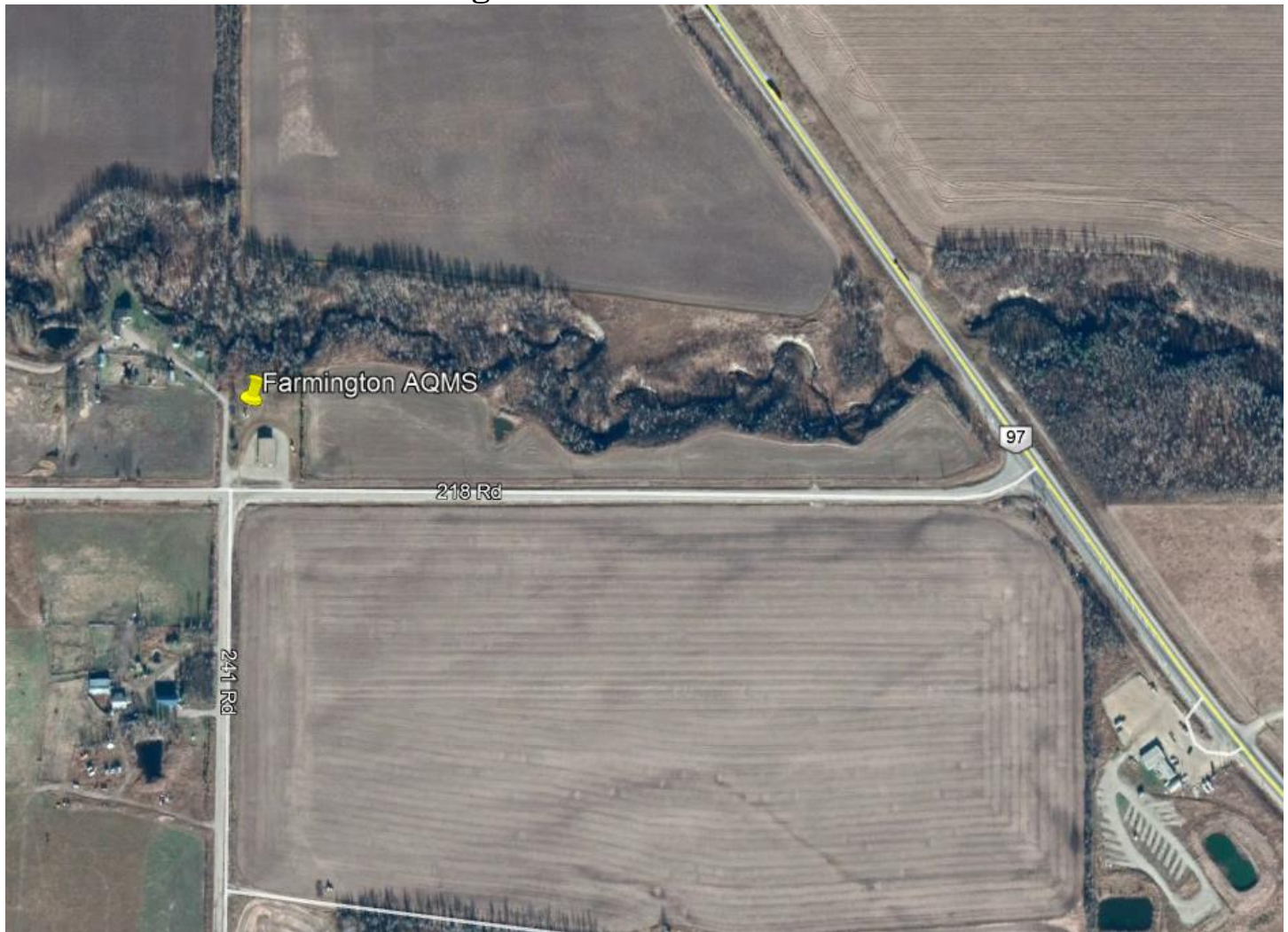
MONITORING SITE LOCATION

The monitoring site location is near the Farmington Community Hall located near Farmington, BC.

The site elevation is approximately 698m, the location is approximately.

55.913292°, -120.531641°

Satellite View of Monitoring Location



Site View Images



Panoramic



South View



South-East View



East View



North-East View



North View



North-West View



West View



South-West View

MONITORING DATA SUMMARIES

1-Hour Data Summary

Parameter	TRS	SO2	NO	NO2	NOx	O3
Avg (ppb)	0.0	0.1	0.9	2.7	3.6	23.6
Min (ppb)	0.0	0.0	0.0	0.0	0.0	0.3
Max (ppb)	4.4	7.2	53.7	27.4	65.0	70.4
Number #	8380	8545	8717	8717	8717	8565
Capture (%)	95.4	97.3	99.2	99.2	99.2	97.5
Std Dev.	0.0	0.4	2.5	3.0	4.7	11.6
T _{Min}	8-31-2023 01:00	10-6-2023 18:00	5-19-2023 14:00	6-8-2023 21:00	6-8-2023 22:00	1-25-2024 06:00
T _{Max}	5-19-2023 13:00	2-27-2024 18:00	6-9-2023 03:00	6-9-2023 22:00	6-9-2023 03:00	5-5-2023 16:00

24-Hour Data Summary

Parameter	TRS	SO2	NO	NO2	NOx	O3
Avg (ppb)	0.0	0.1	0.9	2.8	3.7	23.5
Min (ppb)	0.0	0.0	0.0	0.1	0.4	1.5
Max (ppb)	1.1	1.6	12.6	15.1	25.6	42.7
Number #	346	355	361	361	361	353
Capture (%)	94.5	97.0	98.6	98.6	98.6	96.4
Std Dev.	0.0	0.2	1.4	2.1	3.2	7.6
T _{Min}	2024-01-21	2023-06-19	2023-05-22	2024-02-22	2024-02-22	2023-12-30
T _{Max}	2023-05-19	2024-01-15	2023-06-09	2024-01-24	2024-01-24	2023-04-27

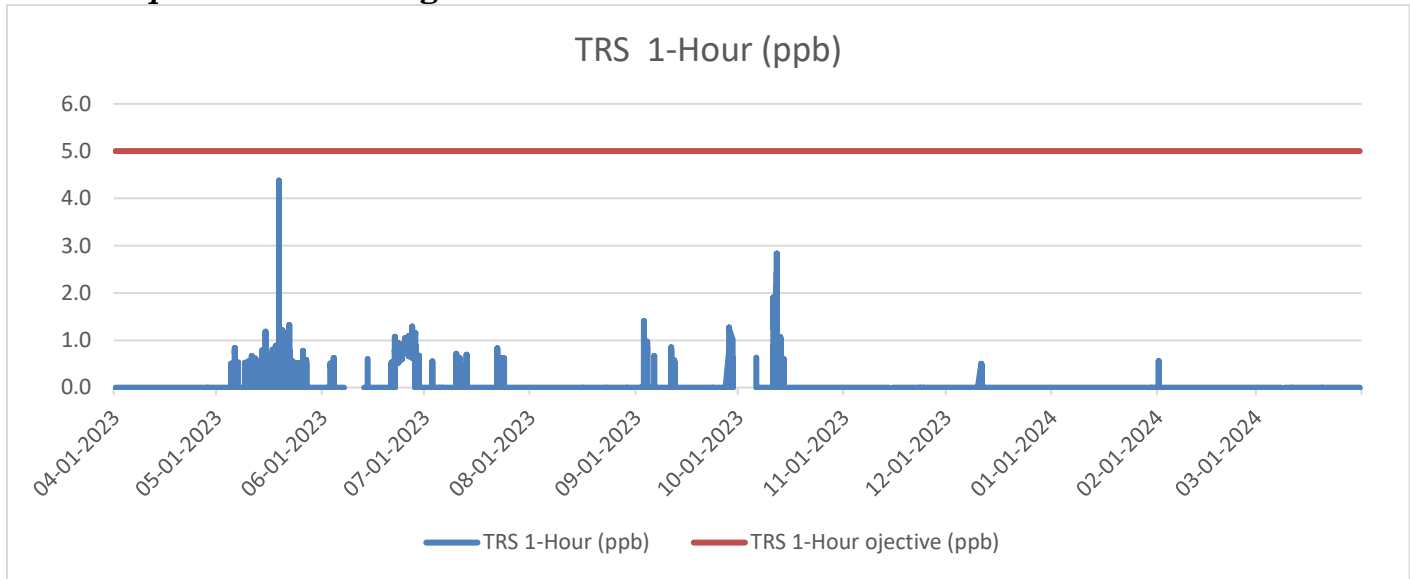
8-Hour Rolling Data Summary

Parameter	O3
Avg (ppb)	23.6
Min (ppb)	0.7
Max (ppb)	62.5
Number #	8531
Capture (%)	97.1
Std Dev.	10.2
T _{Min}	1-25-2024 07:00
T _{Max}	5-5-2023 17:00

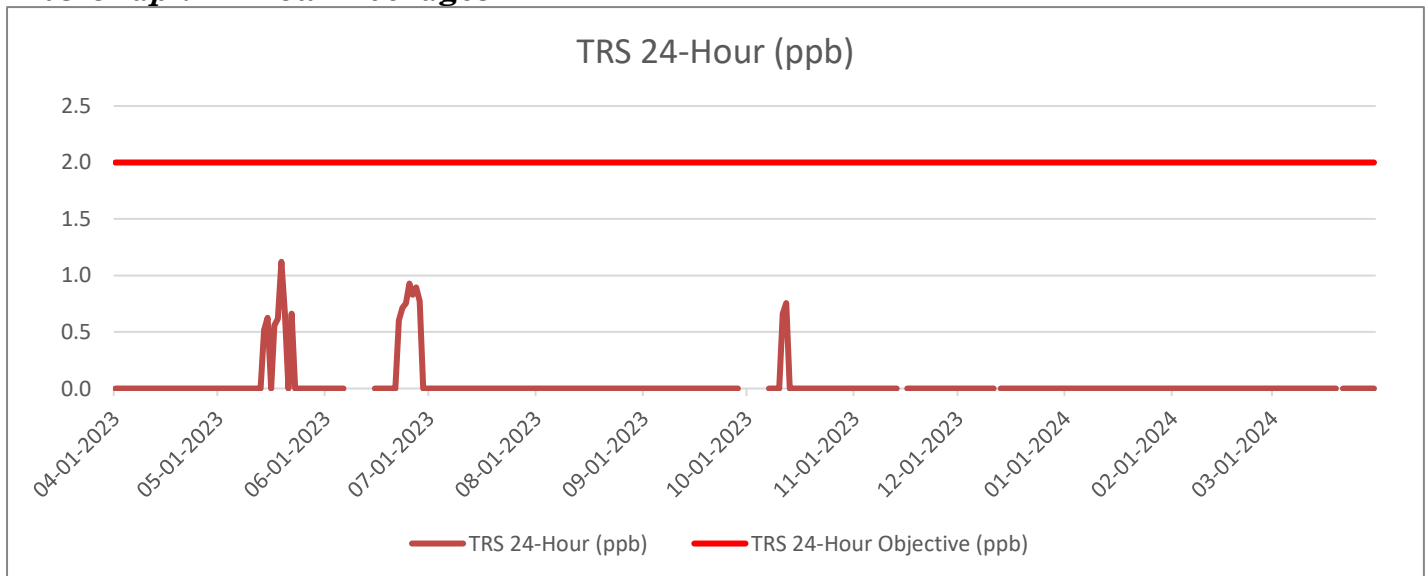
PARAMETER TREND GRAPHS

Total Reduced Sulphur (TRS)

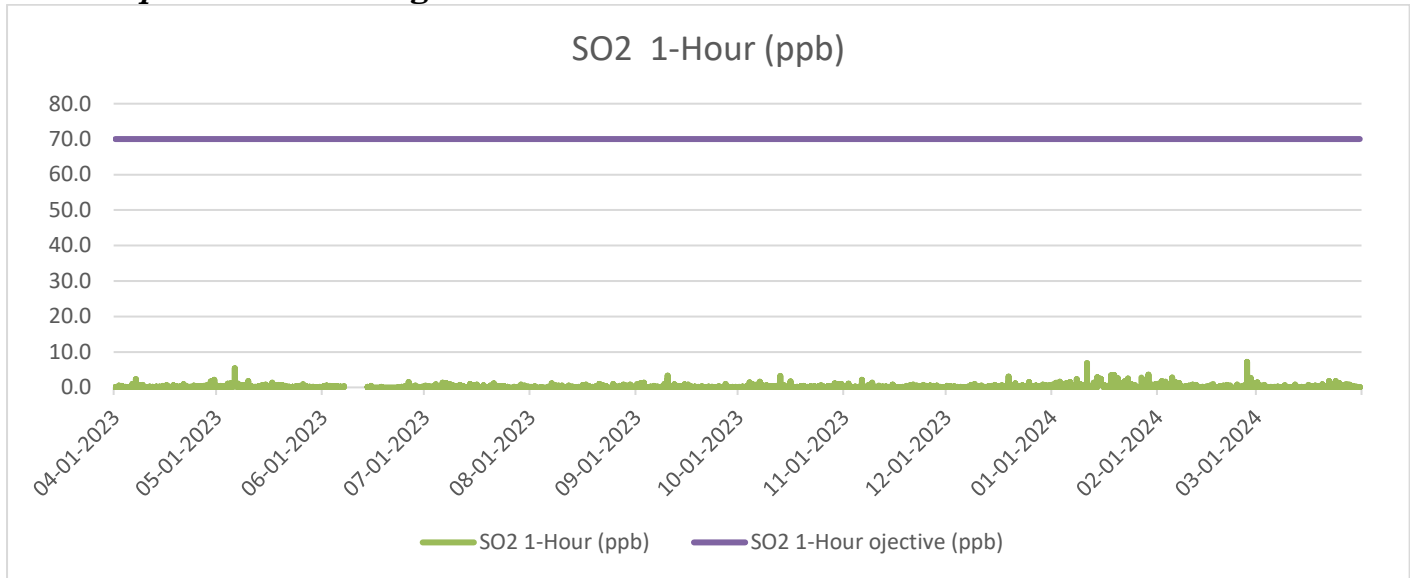
TRS Graph 1-Hour Averages



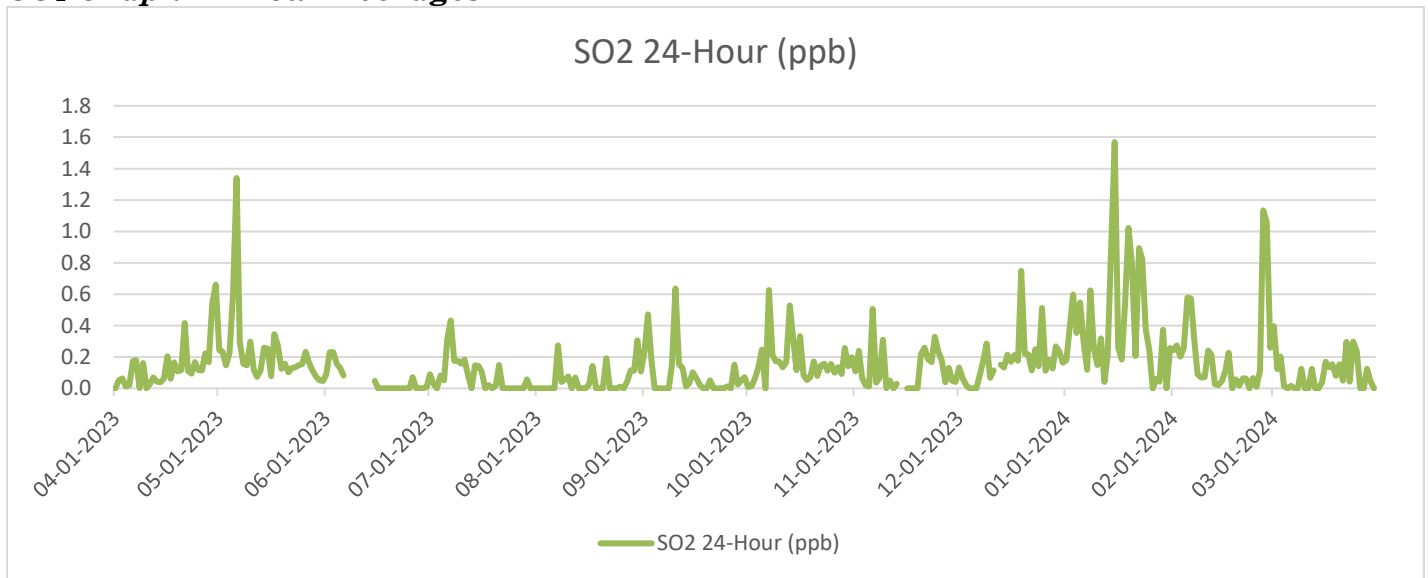
TRS Graph 24-Hour Averages



Sulphur Dioxide (SO₂)
SO₂ Graph 1-Hour Averages

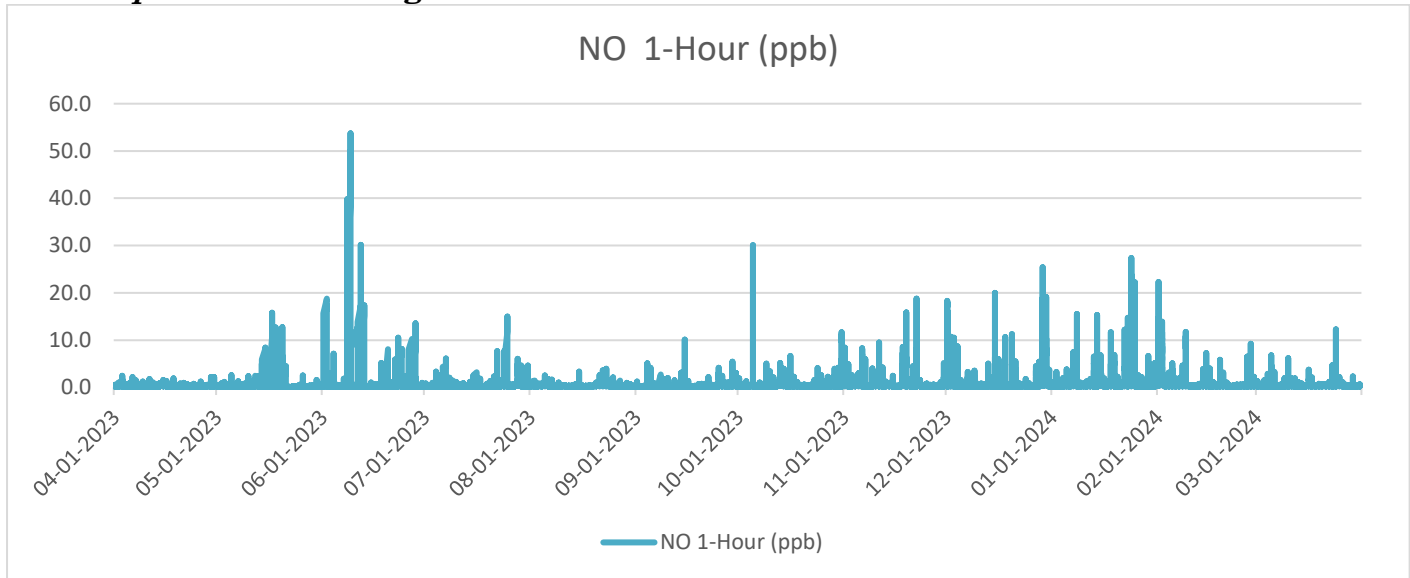


SO₂ Graph 24-Hour Averages

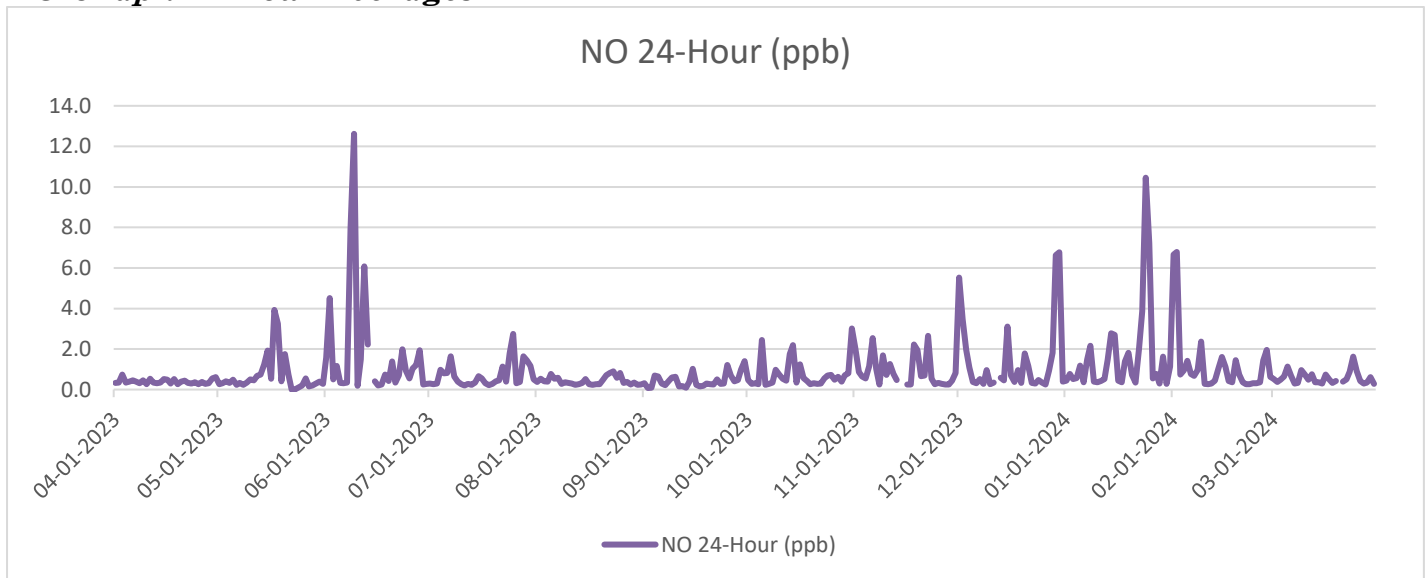


Nitrogen Oxide (NO)

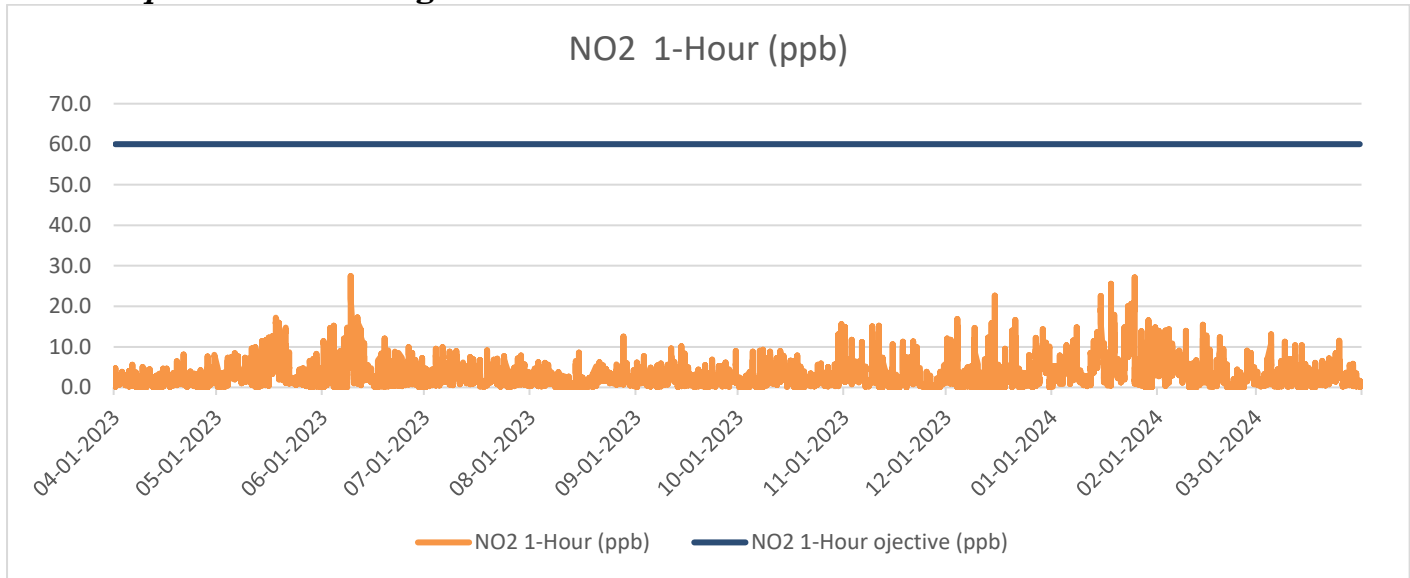
NO Graph 1-Hour Averages



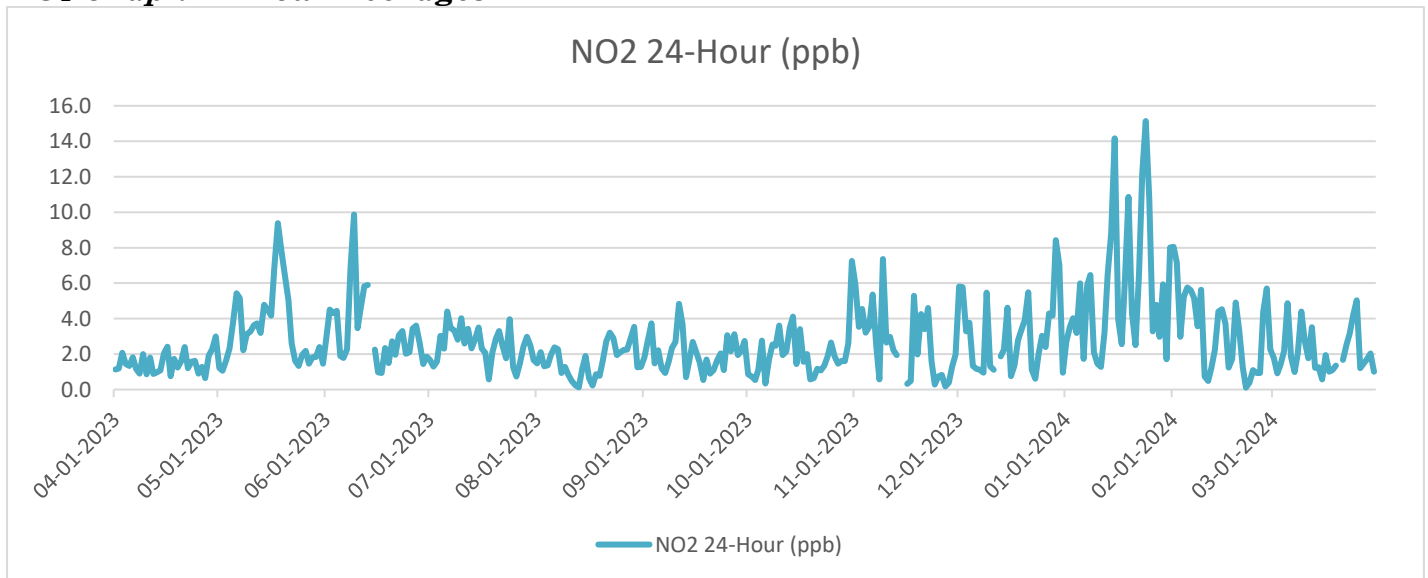
NO Graph 24-Hour Averages



Nitrogen Dioxide (NO₂) NO₂ Graph 1-Hour Averages

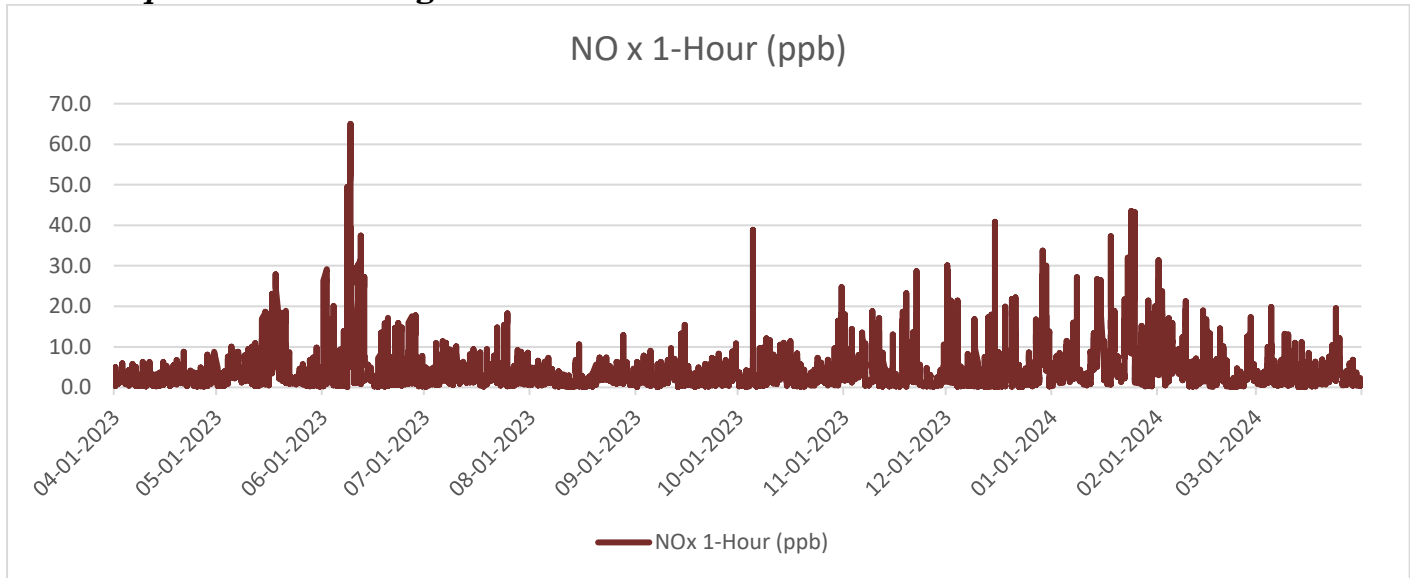


NO₂ Graph 24-Hour Averages

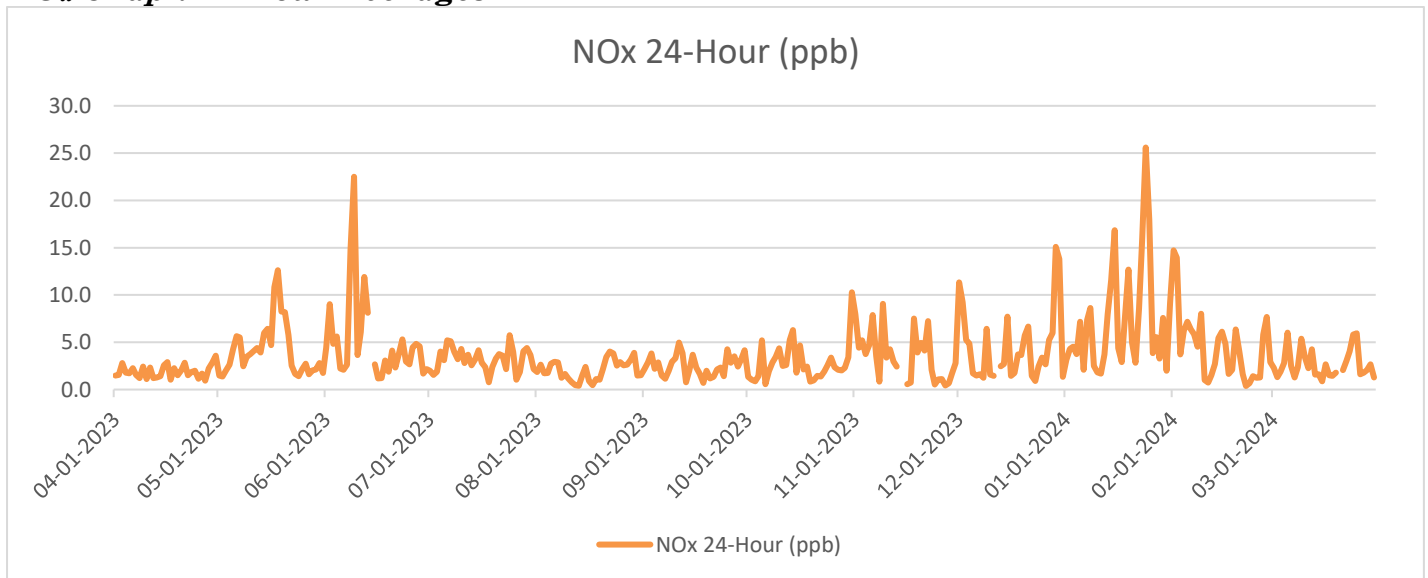


Oxides of Nitrogen (NO_x)

NO_x Graph 1-Hour Averages

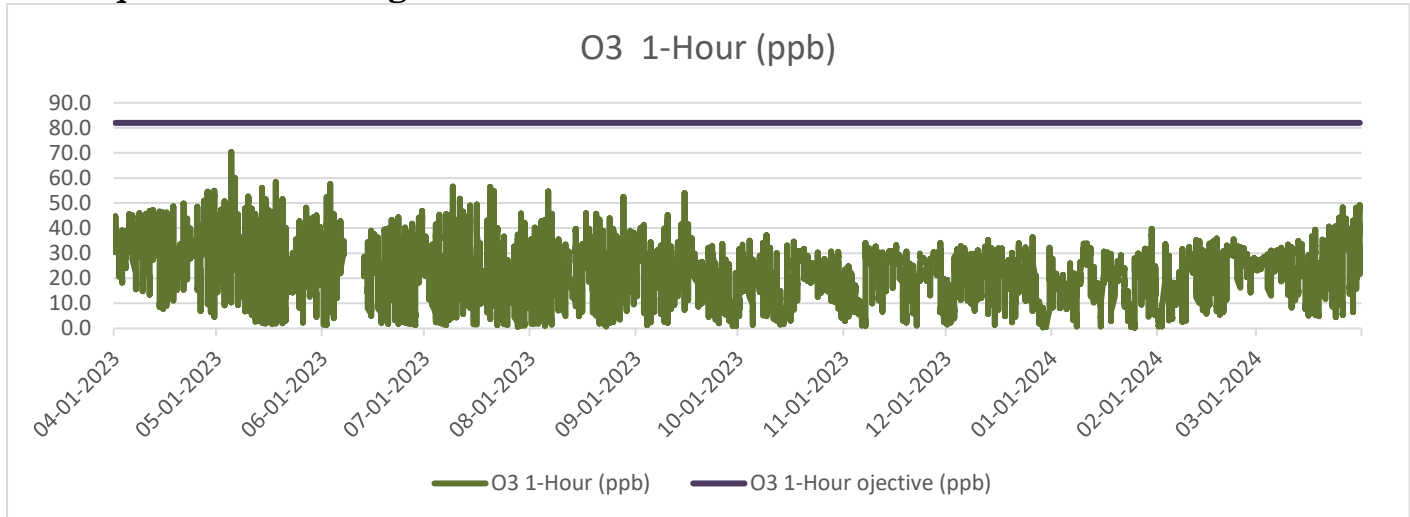


NO_x Graph 24-Hour Averages

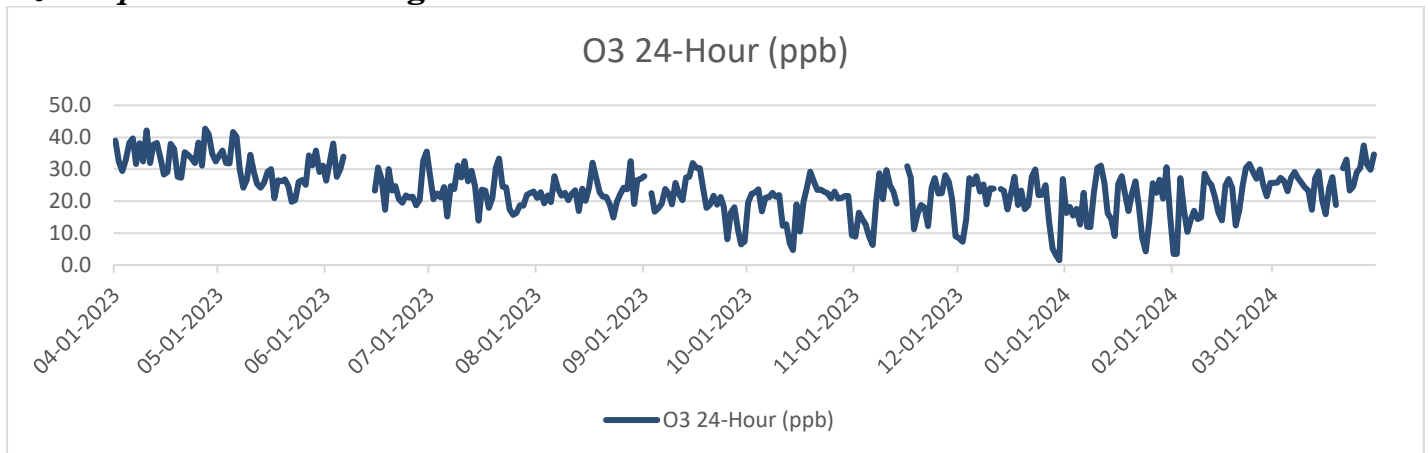


Ozone (O₃)

O₃ Graph 1-Hour Averages



O₃ Graph 24-Hour Averages



O₃ Graph 8-Hour Rolling Averages

