



A GLENCORE COMPANY

Report: 2023 Annual Regional Air Quality Monitoring Program Report

Overview: This annual report provides an overview of the 2023 ambient air monitoring results from monitors located in sensitive receptors in the Elk Valley. This report is required under EMA Air Permits 1807, 5352, 6249, 1501 and 4751.

The report was prepared for Teck (as the former operator of EVR) by RWDI.

For More Information:

If you have questions regarding this report, please:

- Phone: 1-236-484-2200
- Email: info@evr.com

TECK COAL LTD.
REGIONAL
AIR QUALITY MONITORING PROGRAM
SPARWOOD, BC

2023 ANNUAL REPORT

RWDI #2402755

March 27, 2024

SUBMITTED TO

Tapashree Tah

Lead, Air Monitoring & Compliance

Teck Coal Limited

T: 250.425.8229

tapashree.tah@teck.com

SUBMITTED BY

Trudi Trask, P. Eng.

Air Quality Specialist

trudi.trask@rwdi.com

Matthew Sawycky, B.Sc.

Senior Project Manager / Associate

mts@rwdi.com

RWDI

Suite 280 - 1385 West 8th Avenue

Vancouver, BC, V6H 3V9

T: 604.730.5688



EXECUTIVE SUMMARY

Teck Coal Ltd. (Teck) operates four open pit coal mine operations: Elkview Operations (EVO), Line Creek Operations (LCO), Greenhills Operations (GHO) and Fording River Operations (FRO) and one open pit coal mine operation in care & maintenance in the Elk Valley: Coal Mountain (CMm). Each mine is authorized by permits issued by the British Columbia Ministry of Environment & Climate Change Strategy (BC ENV) under the *Environmental Management Act* to discharge emissions to the air. These permits also require a Regional Air Quality Monitoring Program (RAQMP) that allows for an ongoing assessment of the efficacy of monitoring and to provide annual reporting summarizing the state of air quality and meteorology in the region.

This report covers results of monitoring in 2023 of the following parameters: particulate matter 10 micrometers in diameter and smaller (PM₁₀), particulate matter 2.5 micrometers in diameter and smaller (PM_{2.5}), nitrogen dioxide (NO₂) and ozone (O₃) at the five (5) stations that are part of the RAQMP, namely, Hosmer, Sparwood Centennial Square (EV_SCS), Whispering Winds Trailer Park (EV_WWTP), Elkford Rocky Mountain Elementary School (GH_ERMES), and Line Creek (LC_02). Results of the monitoring were compared to British Columbia Ambient Air Quality Objectives (BC AAQO).

2023 data suggest that 24-hour PM₁₀ and PM_{2.5} exceedances or excursions were most frequent during the months of May and August. A Weight of Evidence (WOE) analysis, explained in Canadian Council of Ministers of the Environment Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (2012), was done to account for these exceedances and excursions using satellite images to indicate that smoke from wildfires was a major contributor to these events. Exceedances of these parameters outside this period were rare, except at LC_02. Hosmer, EV_SCS, EV_WWTP and LC_02 were found to exceed the annual objective for PM_{2.5}. No exceedances of the ambient objectives for NO₂ or O₃ were recorded.

Annual particulate concentrations at all stations increased in 2023. It is expected that the smoke from wildfires and drought conditions which limited dust mitigation actions were major contributors to these increased concentrations.

The completeness requirements of 75% for annual and 60% for quarterly data were met at EV_SCS, EV_WWTP, GH_ERMES and LC_02. stations. Hosmer is not required to meet these completeness objectives, as it is not part of any mine site permit. For reference, PM₁₀ at Hosmer, did not meet 60% completeness for the third quarter data set. This was a result of instrument malfunction and the unit being removed for annual maintenance.

Meteorological monitoring at four (4) sites shows winds to be influenced by the topography, which also generate upslope winds manifested as higher mean wind speeds in the afternoon. Precipitation totals on average were greatly reduced in comparison to the 30-year normal, however are within one standard deviation of the 30-year mean except in January 2023 when rainfall was less than half the expected amount. The reduced precipitation resulted in Level 4 and Level 5 drought conditions within the Elk Valley throughout the summer (Government of British Columbia, 2023). Positive temperature anomalies were observed in May with monthly averages greater than one standard deviation from the 30-year normal.



TABLE OF CONTENTS

1	INTRODUCTION	1
2	MONITORING LOCATIONS	3
3	AIR QUALITY MONITORING RESULTS	6
3.1	Annual Averages	6
3.2	Exceedances and Excursions	6
3.3	PM₁₀	7
3.4	PM_{2.5}	10
3.5	Nitrogen Dioxide (NO₂)	12
3.6	Ozone (O₃)	13
3.7	Inter-annual Variability	15
	3.7.1 PM ₁₀	15
	3.7.2 PM _{2.5}	16
3.8	Data Completeness	17
	3.8.1 PM ₁₀	17
	3.8.2 PM _{2.5}	17
	3.8.3 Gases	17
	3.8.4 Meteorological Parameters	17
4	METEOROLOGY RESULTS	18
4.1	Wind Speed and Direction	18
4.2	Precipitation	19
4.3	Air Temperature	20
5	MANAGEMENT OF AIR QUALITY	22
5.1	Excursions and Exceedances	22
	5.1.1 PM ₁₀ Events.....	22
	5.1.2 PM _{2.5} Events.....	22
	5.1.3 Smoke from Wildfires	22
5.2	Public Air Quality Feedback	24
5.3	Fugitive Dust Management Plans	25
6	RECOMMENDATIONS	26
7	GENERAL STATEMENT OF LIMITATIONS	27
8	REFERENCES	28



LIST OF TABLES

Table 1:	Applicable BC Ambient Air Quality Objectives.....	2
Table 2:	Locations of stations in the Regional Air Quality Monitoring Program.....	3
Table 3:	Parameters measured at each station in the Regional Air Monitoring Program.	5
Table 4:	Annual hourly average concentrations in 2023.....	6
Table 5:	Excursions and exceedances in 2023.	7

LIST OF FIGURES

Figure 1:	Location of Teck’s operations and regional monitoring locations in the Elk Valley.....	4
Figure 2:	Daily averaged PM ₁₀ concentrations.....	8
Figure 3:	Polar concentration plots of PM ₁₀ concentrations (µg/m ³) in 2023.....	9
Figure 4:	Daily averaged PM _{2.5} concentrations in 2023.	10
Figure 5:	Polar concentration plots of PM _{2.5} concentrations (µg/m ³) in 2023.	11
Figure 6:	Daily 1-hour maximum (D1HM) NO ₂ concentrations from EV_SCS in 2023.	12
Figure 7:	One-hour averages of O ₃ at EV_SCS in 2023.....	13
Figure 8:	Rolling 8-hour averages of O ₃ at EV_SCS in 2023.	14
Figure 9:	Time series of annual average PM ₁₀ concentrations.....	15
Figure 10:	Time series of annual average PM _{2.5} concentrations.	16
Figure 11:	Wind roses at the stations in the RAQMP for 2023.....	18
Figure 12:	Mean hourly wind speed at the RAQMP stations in 2023.....	19
Figure 13:	Monthly precipitation totals at GHO_ERMES in 2023 compared to the 30-year mean at the ECCC Weather Station in Sparwood.....	20
Figure 14:	Daily averaged temperature for RAQMP Stations.....	21

APPENDICES

Appendix A:	Air Quality Data Summary Tables
Appendix B:	List of Days with PM ₁₀ Exceedances in 2023
Appendix C:	List of Days with PM _{2.5} Excursions in 2023
Appendix D:	Maps of Extent of Smoke from Wildfires affecting RAQMP
Appendix E:	List of Air Monitoring Stations in the Elk Valley



Tapashree Tah

Tapashree Tah, M.S.
Air Monitoring and Compliance, Lead
Teck Coal Ltd.

Trudi Trask

Trudi Trask, P. Eng., B.A.Sc.
(Licence Number 32220)
Air Quality Specialist
RWDI AIR Inc.



1 INTRODUCTION

Teck Coal Limited (Teck) operates four (4) active open pit coal mines (the Sites) and one (1) closed mine in care and maintenance in the Elk Valley (Figure 1). The Elk Valley is characterized by rugged terrain and localized mountain weather patterns, which define the dispersion of pollutants in the region. The communities of Elkford and Sparwood, both with populations of more than 2,500, are in the vicinity of the Sites.

Each mine is authorized by the following permits issued by the British Columbia Ministry of Environment & Climate Change Strategy (BC ENV) under the *Environmental Management Act* to discharge emissions to the air:

- Coal Mountain Operations (CMm) – PA-4751
- Elkview Operations (EVO) – PA-1807
- Fording River Operations (FRO) – PA-1501
- Greenhills Operations (GHO) – PA-6249
- Line Creek Operations (LCO) – PA-5352

Site permits contain a condition which states: *Regional Air Quality Monitoring Program*:

The Permittee must implement the most recent version of the approved Regional Air Quality Monitoring Program. This program must be implemented under the direction of a qualified professional.

The permittee must cause a qualified professional to update the Regional Air Quality Monitoring Program at least every three years. The permittee must submit the updated Regional Air Quality Monitoring Program to the director for approval.

An Annual Regional Air Quality Monitoring Program Report must be submitted to the director in accordance with the most recent approved version of the Regional Air Quality Monitoring Program.

The Regional Air Quality Monitoring Program (RAQMP) aims to satisfy this condition. The monitoring program uses an Adaptive Management Framework to allow for continual assessment and adjustment of the program to ensure it continues to efficiently meet objectives over time.

This report satisfies the requirements of the RAQMP by presenting the results of air quality and meteorological monitoring conducted by Teck in the Elk Valley under the RAQMP. It integrates and supplements the reporting by each Site as required by their individual permits.

This report includes information on:

- results above provincial or federal ambient air quality objectives or guidelines and,
- temporal trends in ambient air quality concentrations.



As required to provide context for the ambient monitoring results, this report also includes:

- public feedback to visibility or nuisance dusting issues,
- changes in Teck mining operations that may impact air quality,
- changes in Teck’s dust management plan, and
- changes in Teck’s ambient monitoring program.

As part of the adaptive management framework, this annual report will also make recommendations to adjust the RAQMP where needed. The RAQMP renewal is due on June 30, 2024, for a 3-year cycle.

The criteria air contaminants (CACs) measured at these stations covered by the RAQMP include:

- Particulate matter smaller than 10 µm in diameter (PM₁₀)
- Particulate matter smaller than 2.5 µm in diameter (PM_{2.5})
- Nitrogen dioxide (NO₂)
- Ozone (O₃)

Monitoring results are compared to British Columbia Ambient Air Quality Objectives (BC AAQO) for each air contaminant in Table 1. With exceptions noted below, any value above the objectives for these contaminants is called an exceedance at a station. For PM_{2.5}, the BC AAQO is applied to the 98th percentile. The 1-hour NO₂ objective is based on the annual 98th percentile of the daily 1-hour maximum averaged over 3 consecutive years, while the 8-hour objective for O₃ is based on the annual 4th-highest daily 8-hour value averaged over 3 consecutive years. For these contaminants at these averaging periods, a value above the BC AAQO is referred to as an excursion, and an exceedance only occurs if these specific ranks or percentiles are above the BC AAQO.

Table 1: Applicable BC Ambient Air Quality Objectives.

Contaminant	BC AAQO (µg/m ³)			
	1-Hour	8-Hour	24-Hour	Annual
PM _{2.5}			25 ^[1]	8
PM ₁₀			50	
NO ₂	113 ^[2]			32
O ₃	160	123 ^[3]		

Notes:

- [1] Applies to the 98th percentile.
 - [2] Applies to the 98th percentile of daily 1-hour maximum over three years.
 - [3] Applies to 4th-highest daily 8-hour maximum averaged over three consecutive years.
- Blank cells mean there is no BC AAQO at that averaging period for that contaminant.



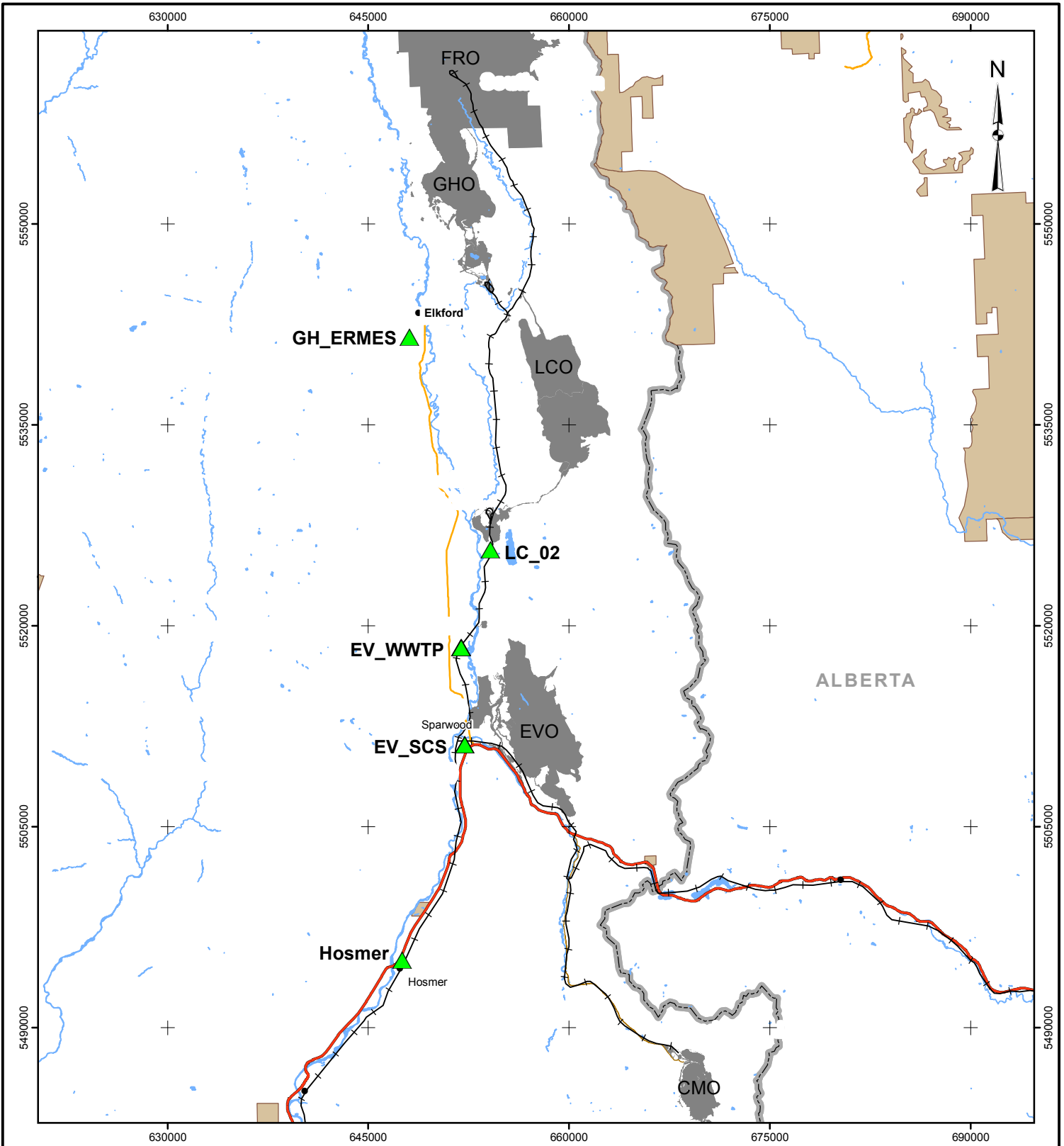
2 MONITORING LOCATIONS

Air quality and meteorological monitoring is conducted at the Sites and in three communities in the Elk Valley. Teck operates several continuous air monitoring stations, whose results are used for research and guiding fugitive dust management plans.

This section describes the five stations and parameters that are included in the RAQMP. Figure 1 presents the locations of the monitoring stations, whose coordinates are listed in Table 2. Table 3 lists the parameters measured at each of the monitoring stations.

Table 2: Locations of stations in the Regional Air Quality Monitoring Program.

Station ID and Name		Latitude (°N)	Longitude (°W)	Elevation (m)
Hosmer	Hosmer	49.590260	114.959234	1057
EV_SCS	Sparwood Centennial Square	49.732786	114.88766	1138
EV_WWTP	Whispering Winds Trailer Park	49.798506	114.888639	1160
LC_02	Line Creek Continuous (Near Grave Lake)	49.873617	114.842284	1301
GH_ERMES	Elkford Rocky Mountain Elementary School	50.007794	114.933420	1333



LEGEND

- ▲ AIR MONITORING STATION
- CITY / TOWN / COMMUNITY
- + CANADIAN PACIFIC RAILWAY
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- ROAD
- BRITISH COLUMBIA / ALBERTA PROVINCIAL BOUNDARY
- MINE OPERATIONS
- PROVINCIAL PARK
- WATERBODY



REFERENCE

Provincial Boundary and communities obtained from The Atlas of Canada, Natural Resources Canada. Alberta Hydrography obtained from CanVec, Government of Canada, Natural Resources Canada. BC Hydrography, Dominion Coal Blocks and project data obtained from Teck Coal Limited. Roads obtained from Geobase. Provincial parks and Railroad data obtained from Geogratis. Projection: UTM Zone 11 Datum: NAD 83

PROJECT	<p>TECK COAL REGIONAL AIR MONITORING PROGRAM</p>		
TITLE	<p>AIR MONITORING STATIONS</p>		
	PROJECT No. 12-1349-0003	SCALE AS SHOWN	REV. 0
	DESIGN DR 03 Jan. 2014		FIGURE 1
	GIS DJH 16 Mar. 2017		
	CHECK ABS 16 Mar. 2017		
	REVIEW TAD 16 Mar. 2017		



Table 3: Parameters measured at each station in the Regional Air Monitoring Program.

Station ID and Name		Air Quality				Meteorology				
		PM ₁₀	PM _{2.5}	NO ₂	O ₃	Wind Speed and Direction	Temperature	Relative Humidity	Barometric Pressure	Precipitation
Hosmer	Hosmer	✓	✓			✓	✓	✓	✓	
EV_SCS	Sparwood Centennial Square	✓	✓	✓	✓	✓	✓	✓		
EV_WWTP	Whispering Winds Trailer Park	✓	✓			✓	✓	✓		
LC_02 ^[1, 2]	Line Creek Continuous (Near Grave Lake)	✓ ^[1]	✓ ^[1]			✓	✓	✓		
GH_ERMES ^[3]	Elkford Rocky Mountain Elementary School	✓	✓			✓	✓			✓

Notes:

- [1] PM₁₀ and PM_{2.5} are measured at LC_02 using a DustTrak. Other stations use Thermo 5030i SHARP units.
- [2] LC_02 started monitoring wind speed, wind direction, temperature and relative humidity from July 2022.
- [3] GH_ERMES upgraded the PM_{2.5} (5030i) and PM₁₀ (5014i) as of September 26, 2023.

A comprehensive list of all the monitoring stations operated by Teck Coal Limited in the Elk Valley, including the parameters measured at each station, is provided in Appendix E. The list includes the monitoring objectives at each station, and whether the monitoring is a requirement of the RAQMP, a permit condition, or if it is being done independently by Teck Coal.



3 AIR QUALITY MONITORING RESULTS

This section discusses results of air quality monitoring at the five stations in 2023 for comparison with applicable BC AAQO. Additional statistics on concentrations and data completeness are provided in Appendix A.

3.1 Annual Averages

Annual hourly average concentrations are presented in Table 4. Hosmer, EV_SCS, EV_WWTP and LC_02 were found to exceed the annual objective for PM_{2.5}. The elevated concentrations at Hosmer (background) indicate that the elevated concentrations at all stations are a regional effect based on the wildfires and drought conditions experienced throughout the year. The annual hourly average NO₂ concentration was 32% of the objective.

Table 4: Annual hourly average concentrations in 2023.

Station ID	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	NO ₂ (µg/m ³)
	-	BC AAQO = 8 µg/m ³	BC AAQO = 32 µg/m ³
Hosmer	10.6	8.3	-
EV_SCS	20.1	9.0	10.1
EV_WWTP	12.7	8.5	-
GH_ERMES	11.9	7.9	-
LC_02	18.6	17.6	-

Note: Values in boldface are above applicable objective. NO₂ is monitored only at EV_SCS.

3.2 Exceedances and Excursions

Concentrations that are above a BC AAQO are either exceedances or excursions. If the BC AAQO is defined as the maximum, any value above it is an exceedance. This applies to 24-hour PM₁₀ concentrations, and to annual averages. If the BC AAQO of a pollutant is defined as a percentile averaged typically over three years, any value above the BC AAQO is referred to as an excursion. This applies to daily average PM_{2.5} and to 1-hour NO₂ concentrations.

A summary of exceedances and excursions is found in Table 5. Exceedances and excursions at all stations are discussed later.



Table 5: Excursions and exceedances in 2023.

Station Name	Contaminant	Averaging period	Applicable BC AAQO	Excursions or exceedances ^[4]	
				Number	Percentage of days ^[3]
Hosmer	PM ₁₀	24 hours	50 µg/m ³	2	1%
	PM _{2.5}	24 hours	25 µg/m ^{3[1]}	16	5%
EV_SCS	PM ₁₀	24 hours	50 µg/m ³	15	4%
	PM _{2.5}	24 hours	25 µg/m ³	19	5%
	NO ₂	1 hour	113 µg/m ^{3[2]}	0	0%
	O ₃	8 hours	123 µg/m ³	0	0%
EV_WWTP	PM ₁₀	24 hours	50 µg/m ³	8	2%
	PM _{2.5}	24 hours	25 µg/m ³	17	5%
GH_ERMES	PM ₁₀	24 hours	50 µg/m ³	7	2%
	PM _{2.5}	24 hours	25 µg/m ³	14	4%
LC_02	PM ₁₀	24 hours	50 µg/m ³	22	6%
	PM _{2.5}	24 hours	25 µg/m ³	53	15%

Notes:

- [1] The 24-hour PM_{2.5} BC AAQO is based on 98th percentile of daily values.
- [2] The 24-hour NO₂ BC AAQO is based on the Canadian Ambient Air Quality Standard (CAAQS) of 113 µg/m³ applied to the 98th percentile of daily 1-hour maxima averaged over 3 years.
- [3] Percentage based on number of valid readings.
- [4] Exceedances are concentrations that are greater than the BC AAQO in cases where the BC AAQO is based on the maximum value. Excursions are values that are above the BC AAQO in cases where the BC AAQO is based on a percentile.

3.3 PM₁₀

Figure 2 shows the time series of the 24-hour average PM₁₀ concentrations at the five (5) stations. The highest concentrations occurred in mid-May and mid-August when exceedances are seen at all stations.

Polar concentration plots depicting hourly concentrations averaged by wind speed and direction at each station are provided in Figure 3. The distance from the center of each coloured bar forming each wedge indicates the wind speed.

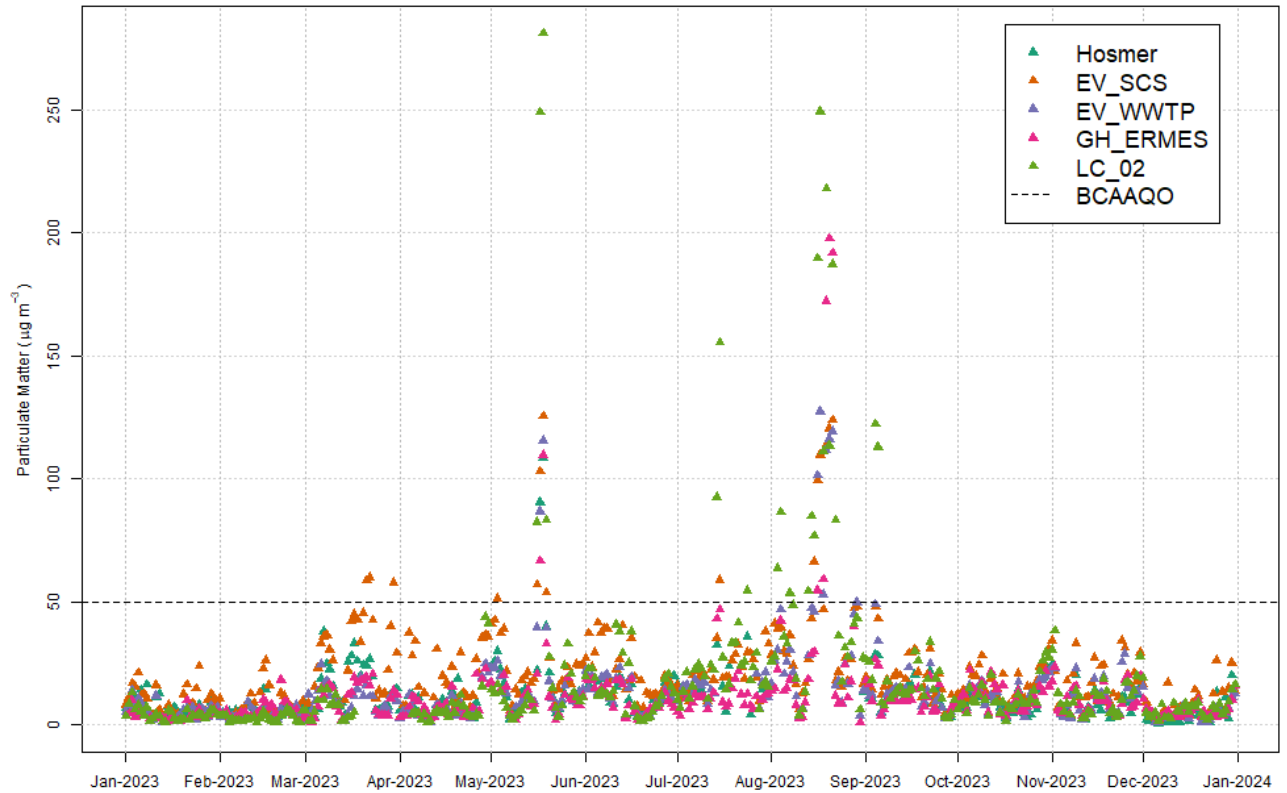


Figure 2: Daily averaged PM₁₀ concentrations.

Note: Dashed line indicates BC AAQO of 50 µg/m³.

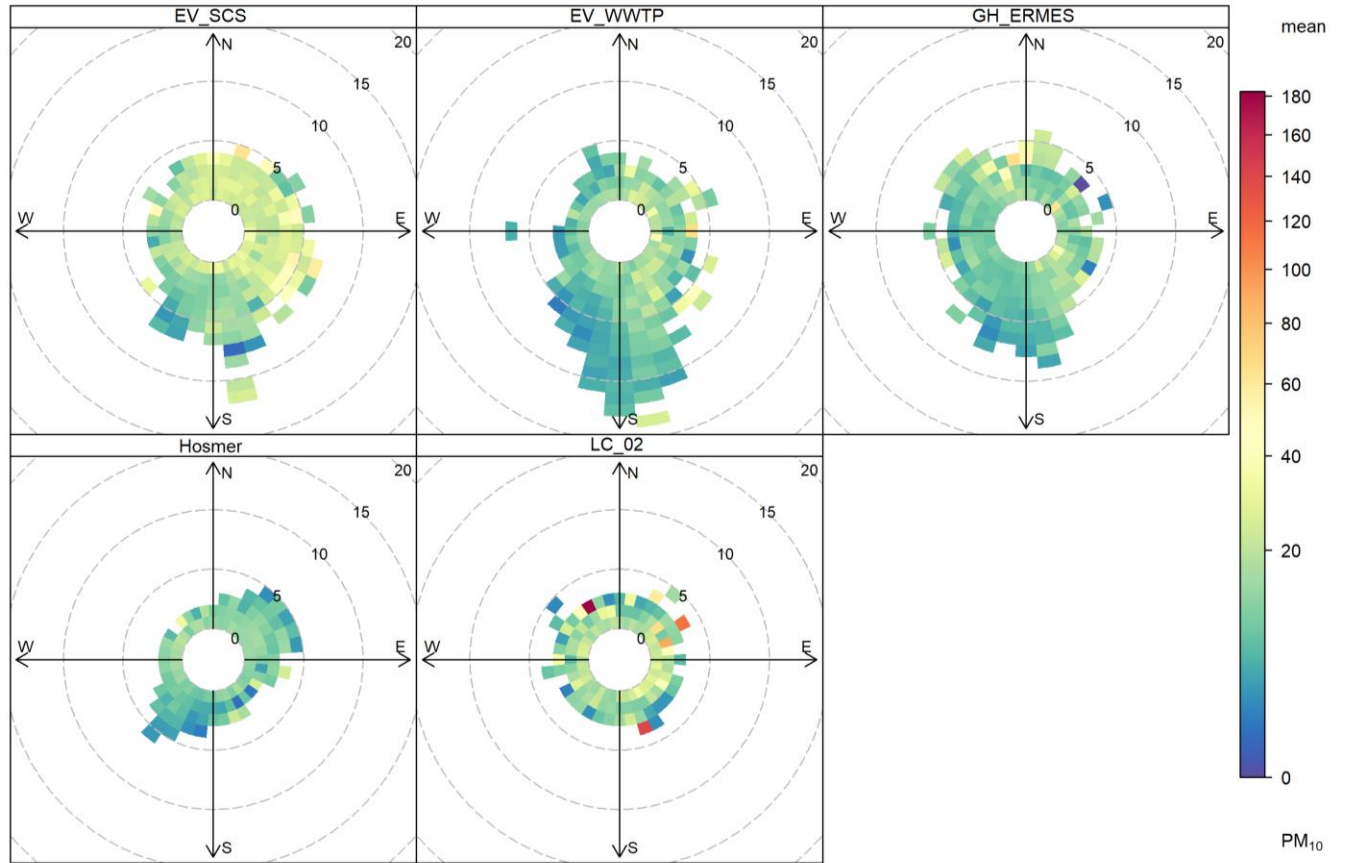


Figure 3: Polar concentration plots of PM₁₀ concentrations (µg/m³) in 2023.



3.4 PM_{2.5}

Figure 4 shows the time series of the 24-hour average PM_{2.5} concentrations at the five (5) stations. The highest values occurred in mid-May and mid-August when excursions are also seen at all other stations.

From the polar concentration plots in Figure 5 the highest average concentrations occurred at LC_02, where winds speeds are typically low, with no specific wind direction causing the maximum, indicating widespread sources.

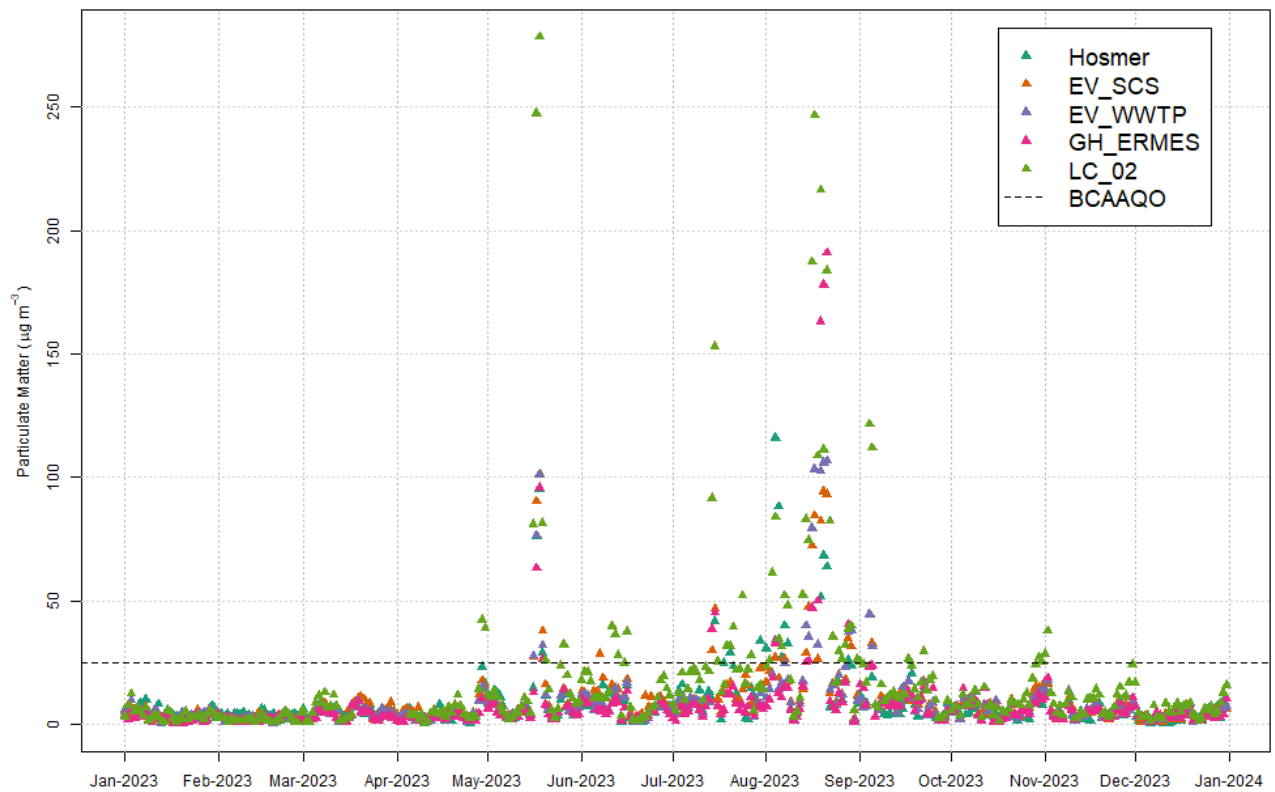


Figure 4: Daily averaged PM_{2.5} concentrations in 2023.

Note: Dashed line indicates BC AAQO of 25 µg/m³.

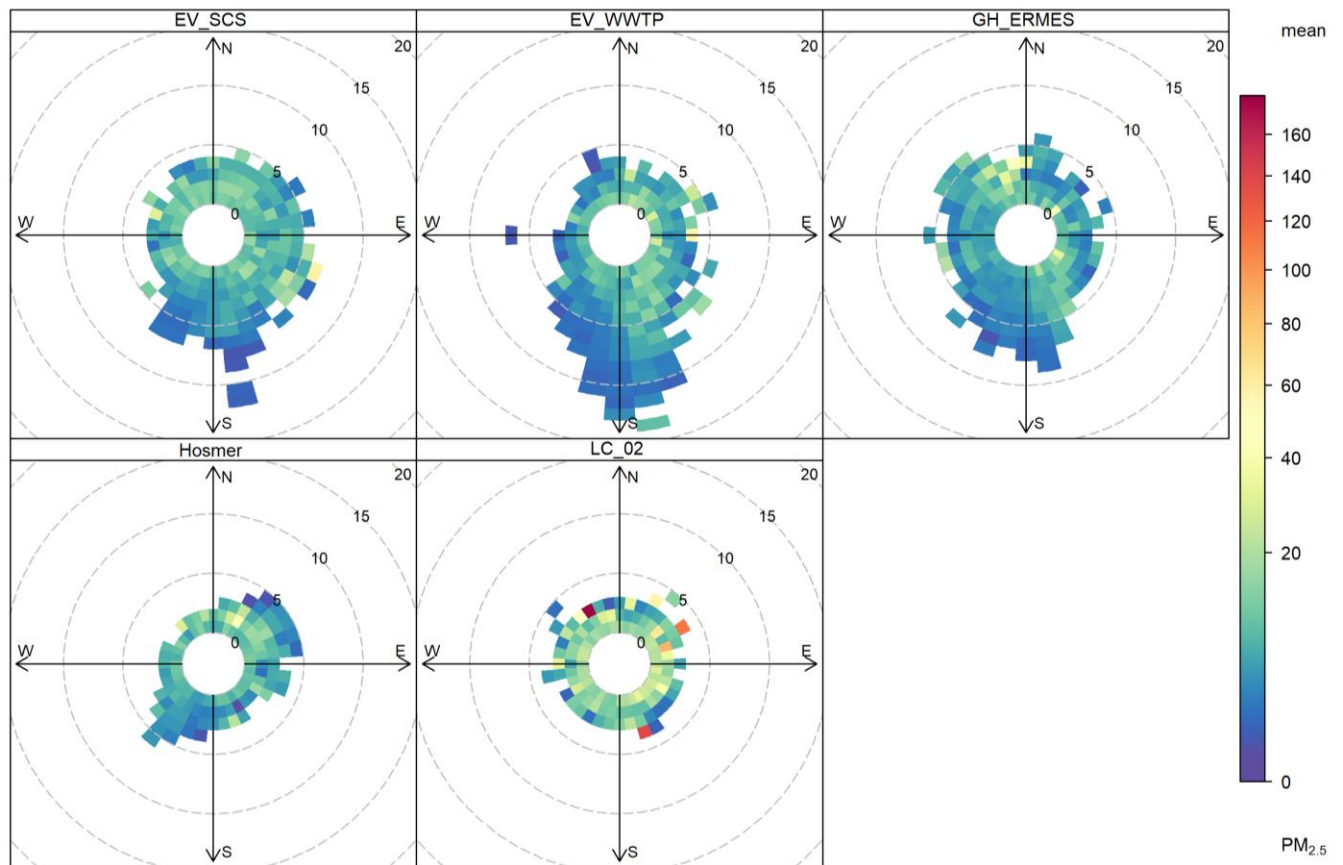


Figure 5: Polar concentration plots of PM_{2.5} concentrations (µg/m³) in 2023.



3.5 Nitrogen Dioxide (NO₂)

Figure 6 shows the time series of the daily 1-hour maximum concentration of NO₂ at the EV_SCS station in 2023. All the values are well below the BC AAQO.

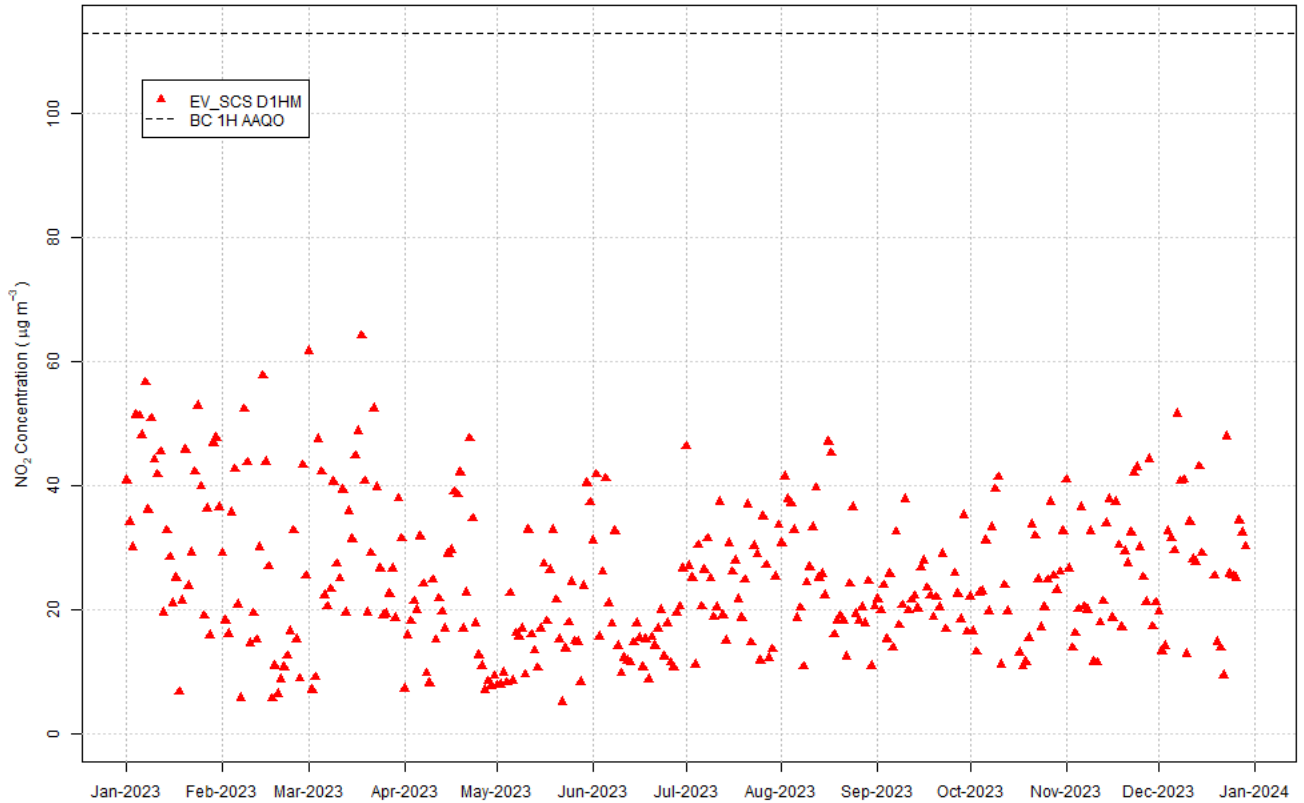


Figure 6: Daily 1-hour maximum (D1HM) NO₂ concentrations from EV_SCS in 2023.

Note: Dashed line indicates BC 1-hour AAQO of 113 µg/m³.



3.6 Ozone (O₃)

One-hour and 8-hour rolling average concentrations of O₃ are presented in Figure 7 and Figure 8 respectively. There were no readings above the BC AAQO at both averaging periods for this parameter.

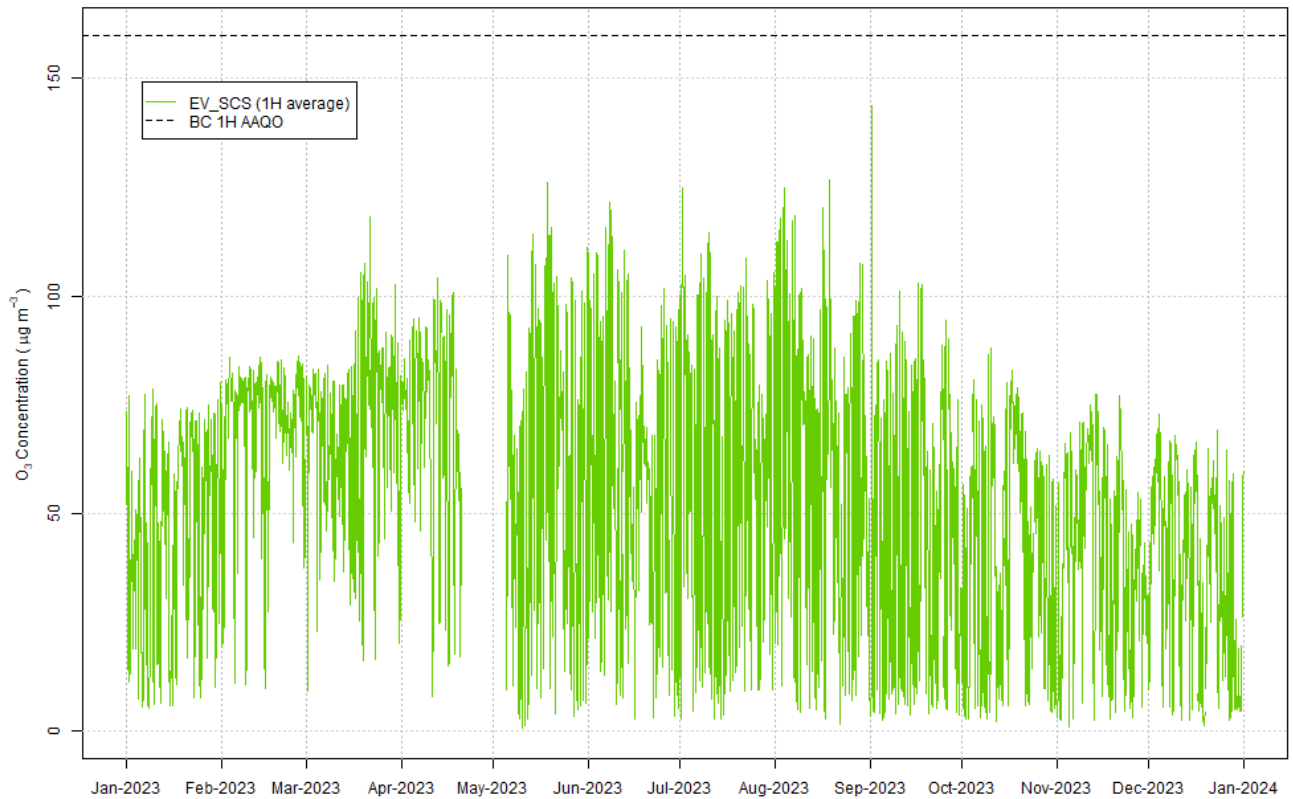


Figure 7: One-hour averages of O₃ at EV_SCS in 2023.

Note: Dashed line indicates 1-hour BC AAQO of 160 µg/m³.

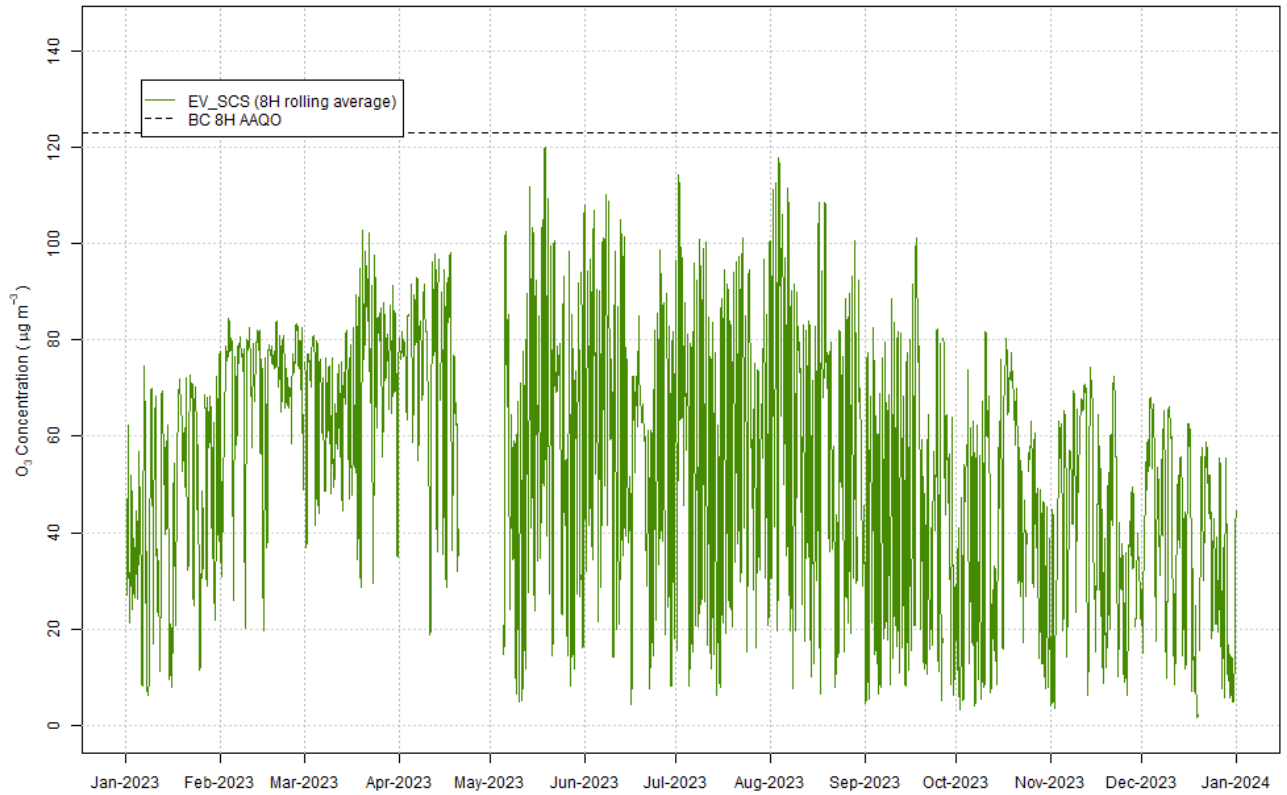


Figure 8: Rolling 8-hour averages of O₃ at EV_SCS in 2023.

Note: Dashed line indicates 8-hour BC AAQO of 123 µg/m³.



3.7 Inter-annual Variability

An examination of inter-annual variability in annual average concentrations of PM₁₀ and PM_{2.5} at all stations is presented below.

The BC Wildfire Season Summary states “the 2023 wildfire season has been the most destructive in British Columbias recorded history” (Government of British Columbia, 2023). This could suggest why there was an increase in almost all PM₁₀ and PM_{2.5} annual concentrations recorded by the RAQMP stations in 2023. There were two fires within the Elk Valley and when comparing the statistics of area burned in 2023 (2.84 million ha) to 2022 (133,437 ha) and 2021 (868,000 ha), it is clear the wildfire spread in 2023 was more profound (Government of British Columbia, 2023). Smoke impact is further discussed in section 5.1.3.

3.7.1 PM₁₀

Figure 9 shows the plot of annual average PM₁₀ concentrations at the five stations. GH_ERMES, which has the longest record, has been exhibiting a rising trend since 2011. Annual average PM₁₀ concentrations have increased at LC_02 since the start of its operations, decreasing sharply in 2022 to comparable levels seen in 2019, only to rise again in 2023. All PM₁₀ concentrations in 2023 are higher than concentrations in all other years with the exception of Hosmer and LC_02, which showed a slight increase from 2022. It should be noted that in December of 2021, the PM₁₀ SHARP analyzer at EV_SCS was converted from a 5030i to a 5014i (uses beta detection only, nephelometer was removed) at the request of the BC ENV. As mentioned earlier in section 2 notes a DustTrak is used for PM measurements the LC_02.

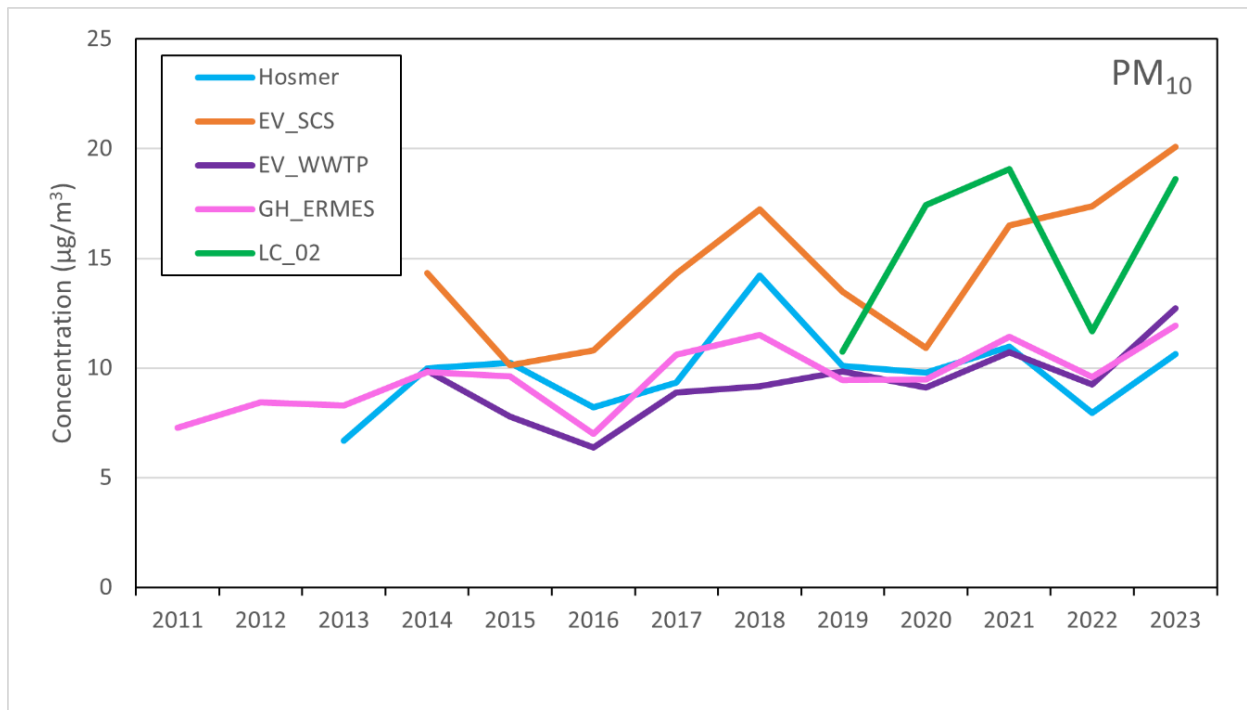


Figure 9: Time series of annual average PM₁₀ concentrations.



3.7.2 PM_{2.5}

PM_{2.5} annual trends are not well-defined in Figure 10. All station PM_{2.5} annual average concentrations greatly increased in 2023 when compared to 2022. All stations, including Hosmer, with exception of GH_ERMES, had the annual average PM_{2.5} concentration above the BC AAQO of 8 µg/m³ in 2023 when rounded to 1 decimal place. LC_02 PM_{2.5} concentrations are elevated in comparison to the other stations, this can be attributed to LC_02 being located nearest to the mine boundary.

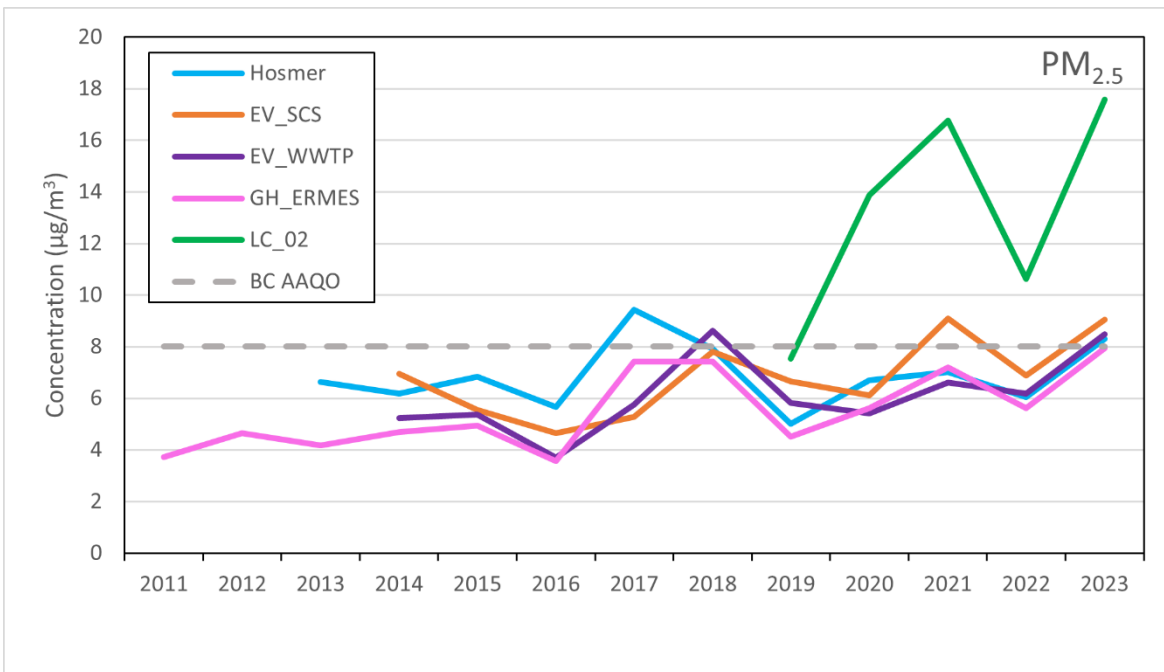


Figure 10: Time series of annual average PM_{2.5} concentrations.

Note: Dashed line indicates the annual BC AAQO of 8 µg/m³.



3.8 Data Completeness

Data completeness is the percentage of valid daily data divided by total daily data in the same time period. Permit conditions state that within each quarter, the daily data should be 60% complete and within each year, the daily data must be 75% complete. Quarterly and annual completeness requirements apply to PM_{2.5} and PM₁₀.

Tables A-1 through A-3 in Appendix A provide the number of valid days of data per time period for PM₁₀, PM_{2.5} and the monitored gaseous parameters. There are no completeness requirements for gaseous parameters, and there are no monthly or hourly completeness requirements for any parameter. The Hosmer Station is not required to meet these completeness objectives, as it is not part of any mine site permit.

3.8.1 PM₁₀

As seen in Table A-1, the annual completeness requirement of 75% and quarterly completeness requirement of 60% for PM₁₀ data was met at EV_SCS, EV_WWTP, GH_ERMES and LC_02. The Hosmer station is not required to meet these completeness objectives, as this station is not part of any mine site permit.

3.8.2 PM_{2.5}

Data completeness for PM_{2.5} is presented in Table A-2 in Appendix A. EV_SCS, EV_WWTP, GH_ERMES and LC_02 stations satisfied the annual completeness requirement of 75% and quarterly completeness requirement of 60% for PM_{2.5} data.

3.8.3 Gases

Data completeness for NO₂ and O₃ are found in Table A-3 in Appendix A. Completeness for all periods was at least 95%, however there are no data completeness requirements under EVO's permit for NO₂ and O₃.

3.8.4 Meteorological Parameters

Data completeness for meteorological parameters is included in Table A-4 in Appendix A. Completeness for Hosmer, EV_SCS, EV_WWTP, GH_ERMES and LC_02 meteorological parameters in 2023 was at least 91%, with exception of the Hosmer barometric pressure (BP) which was only 51% because of an instrument malfunction.

4 METEOROLOGY RESULTS

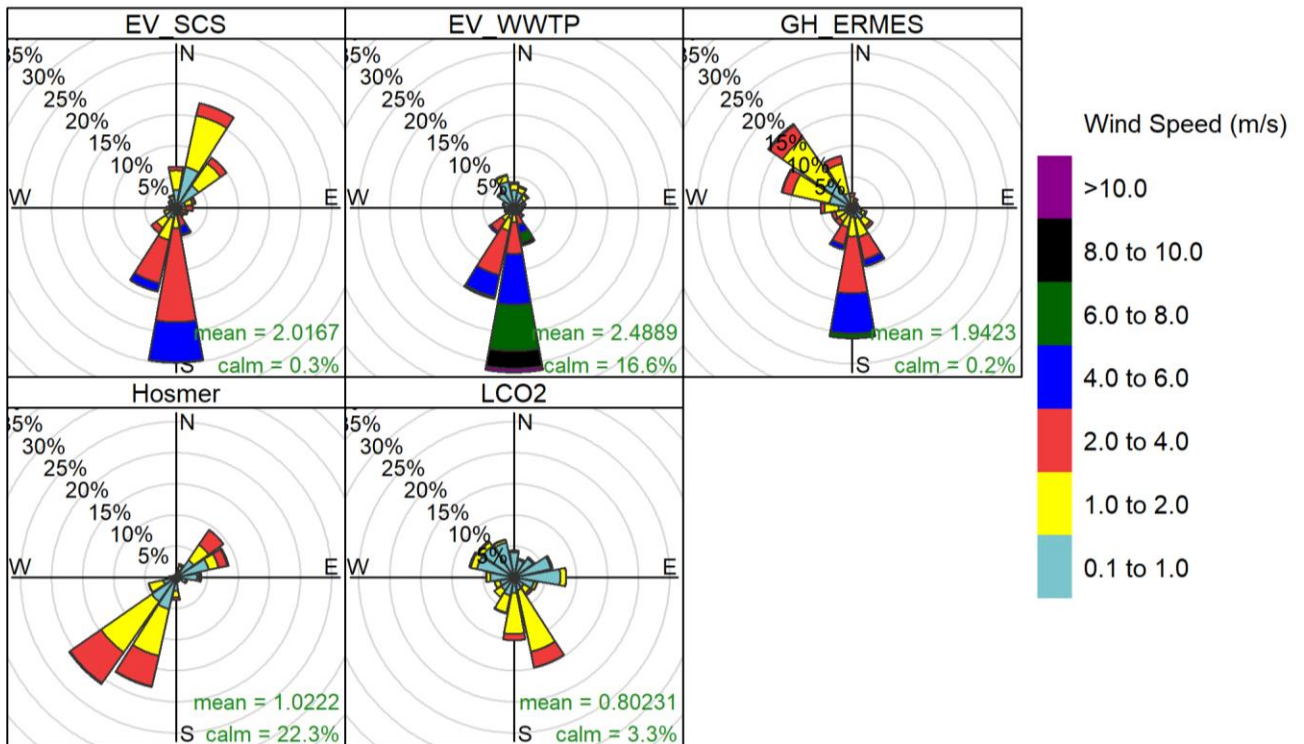
Meteorological results for the RAQMP Stations are listed in the sections below.

4.1 Wind Speed and Direction

Figure 11 shows annual wind roses for the five (5) stations in the RAQMP that collect meteorological data. Winds are predominantly from the South except at Hosmer, where southwesterly winds are the most common. Northwestern winds are also pronounced at GH_ERMES. These flow patterns follow the channeling by the topography.

Of the five (5) stations, winds are weakest at LC_02, whose annual mean wind speed is less than 1 m/s. Winds are strongest at EV_WWTP where winds average nearly 2.5m/s.

None of the five (5) stations show strong monthly or seasonal variation in wind pattern, however all five (5) exhibit a diurnal increase in wind speed peaking at 14:00-16:00, as seen in Figure 12.



Frequency of counts by wind direction (%)

Figure 11: Wind roses at the stations in the RAQMP for 2023.

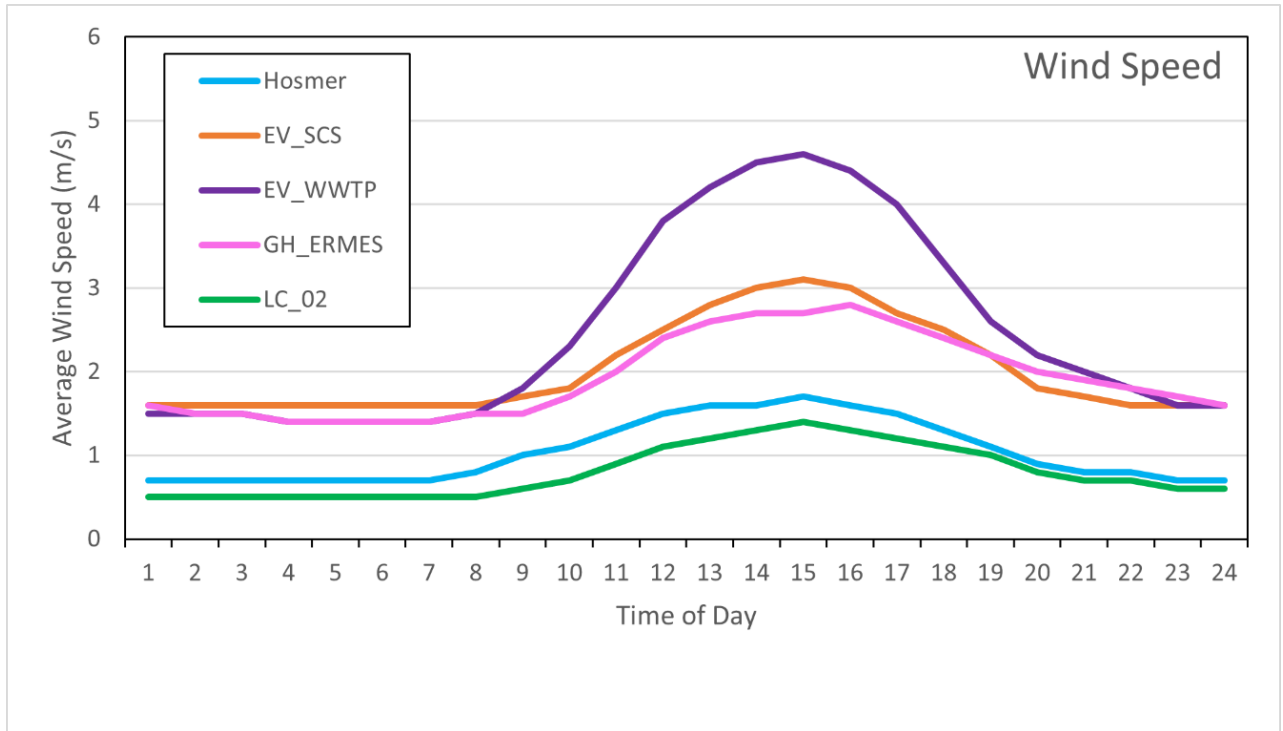


Figure 12: Mean hourly wind speed at the RAQMP stations in 2023.

4.2 Precipitation

Total monthly precipitation in 2023 within the RAQMP, represented by the GH_ERMES station, is shown in Figure 13. The 30-year mean and standard deviation of monthly precipitation totals observed at the Environment and Climate Change Canada meteorological station in Sparwood (1981–2010) are also shown.

Precipitation totals on average were greatly reduced in comparison to the 30-year normal, however are within one standard deviation of the 30-year mean except in January 2023 when rainfall was less than half the expected amount. The reduced precipitation resulted in Level 4 and Level 5 drought conditions within the Elk Valley for several months (July – November) (Government of British Columbia, 2023).

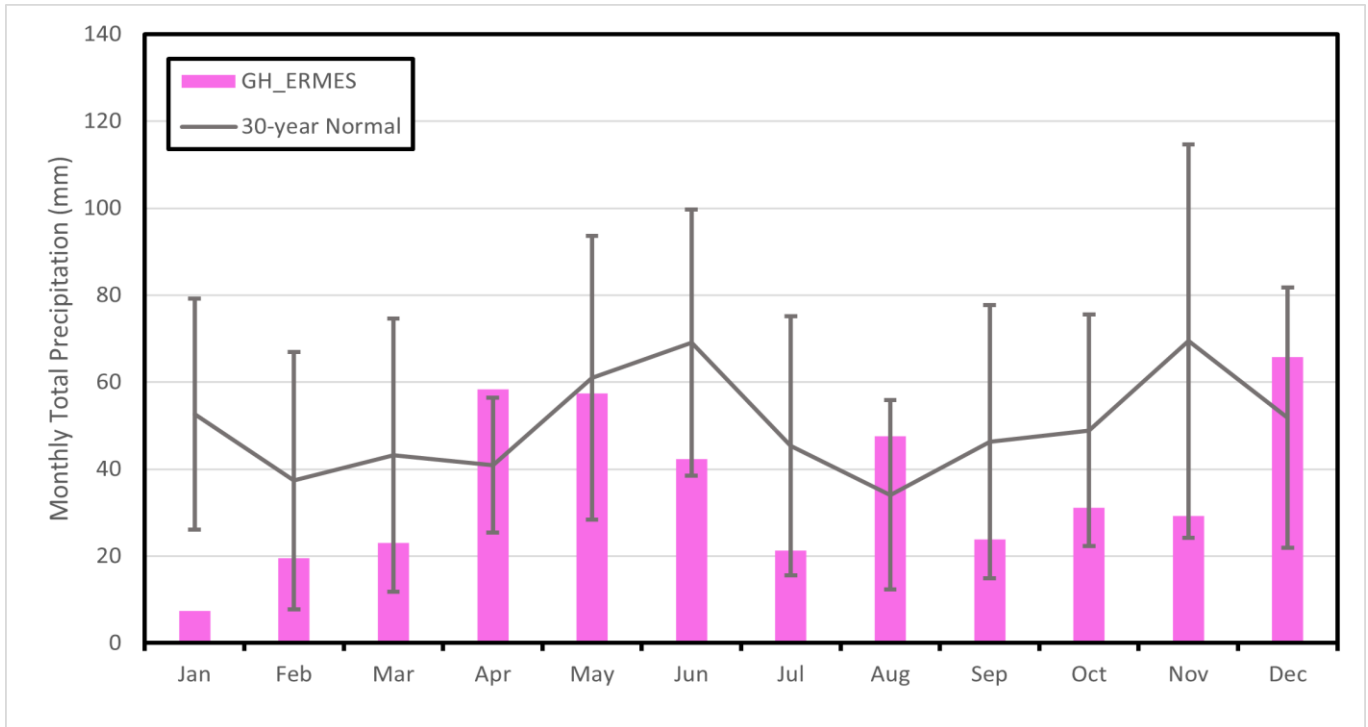


Figure 13: Monthly precipitation totals at GH_ERMES in 2023 compared to the 30-year mean at the ECCC Weather Station in Sparwood.

Note: Error bars indicate standard deviation.

4.3 Air Temperature

Monthly averaged air temperatures are presented in Figure 14 where they are compared to the 30-year mean and standard deviation at Sparwood. Differences between station temperatures are very small with the GH_ERMES monthly average temperature consistently lower than the other stations. The month of May was the only month where most of the stations were greater than one standard deviation of the 30-year normal.

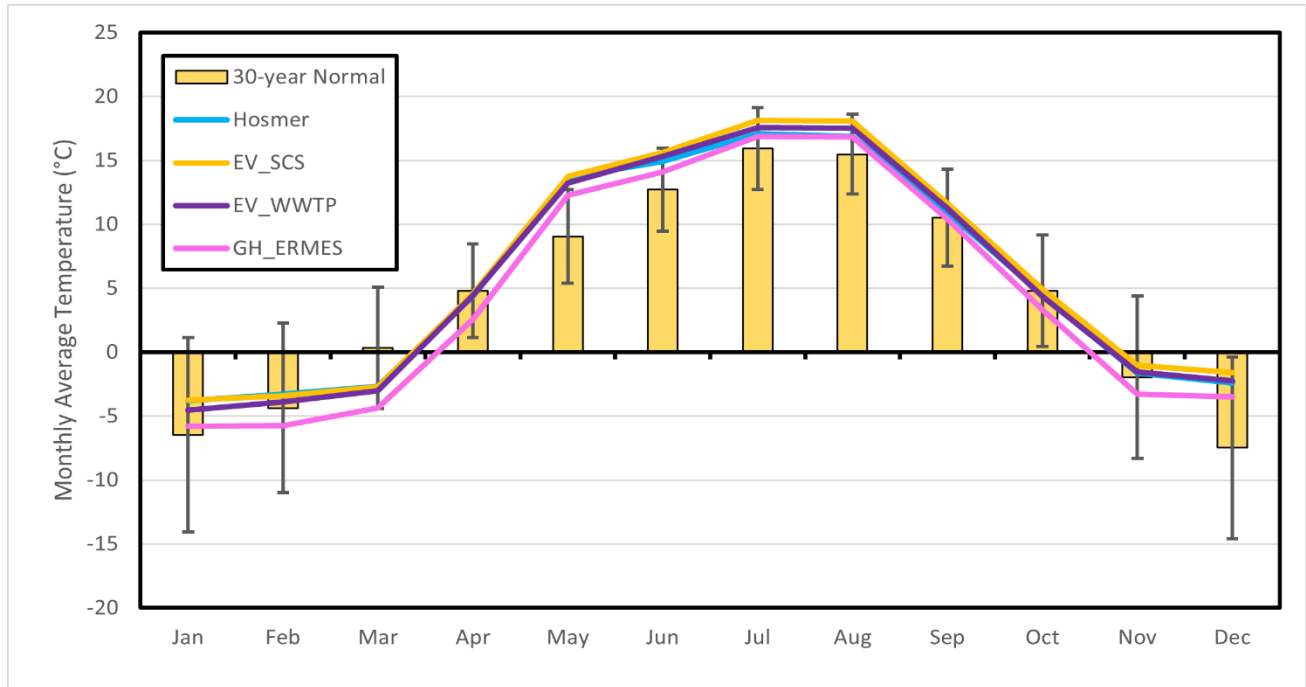


Figure 14: Daily averaged temperature for RAQMP Stations compared to the 30-year mean +/- 1 at the ECCS Station in Sparwood.

Note: Error bars indicate standard deviation.



5 MANAGEMENT OF AIR QUALITY

5.1 Excursions and Exceedances

As required in the monitoring plan, excursions and exceedances resulting from fugitive dust events, wildfires and other causes are discussed in this section. To provide insights into these events, hourly concentrations and pollution rose are plotted together where data are available. List of days with exceedances/excursions are presented in Appendix B for PM₁₀ and Appendix C for PM_{2.5}.

5.1.1 PM₁₀ Events

A list of PM₁₀ exceedances is provided in Table B-1.

All stations registered at least two (2) exceedances of the 24-hour PM₁₀ BC AAQO of 50 µg/m³. The earliest occurred in March and the latest occurred in September, coinciding with periods with high temperatures and low precipitation. Most exceedances occurred in May and August when all the stations registered their highest concentrations of the year. It is expected that drought conditions and heavy smoke from major wildfires in western North American had a major impact on exceedances throughout 2023. Apart from three (3) dates (March 21-22 and March 30) exceedance days coincided with periods in which the RAQMP was affected by wildfire smoke. This observation was made based on maps of smoke extent provided by the U.S. National Oceanic and Atmospheric Administration (2023). The role of wildfires is further discussed in Section 5.1.3 below.

5.1.2 PM_{2.5} Events

A list of PM_{2.5} excursions and daily average concentrations is provided in Table C-1.

All stations registered at least fourteen (14) excursions of the 24-hour BC AAQO of 25 µg/m³. Like PM₁₀, nearly all excursions occurred in May and August. It is expected that drought conditions and heavy smoke from major wildfires in western North American had a major impact on exceedances throughout 2023. Apart from four (4) dates (October 30 – November 2) exceedance days coincided with periods in which the RAQMP was affected by wildfire smoke. This observation was made based on maps of smoke extent provided by the U.S. National Oceanic and Atmospheric Administration (2023). The role of wildfires is further discussed in Section 5.1.3 below.

5.1.3 Smoke from Wildfires

As stated in the Memorandum from the BC ENV to Teck Coal Ltd on August 31, 2022, the influence of wildfires on concentrations should be supported by guidance found in CCME (2012), specifically the section on Weight of Evidence (WOE) analyses. WOE refers to information generated by sources or methods outside the monitoring program that can account for exceedances.



Among the methods listed in the Memorandum and WOE analysis, satellite imagery provides a quick way to explain the elevated concentrations recorded within the RAQMP, particularly those events when more than one station registered an exceedance at the same time. For this purpose, maps created by the Office of Satellite and Product Operations of the National Oceanic and Atmospheric Administration (NOAA) using satellite images to delineate areas covered by smoke were downloaded from the Hazard Mapping System Fire and Smoke Product website (NOAA 2023). Each map indicates the areas with light (green shading), medium (yellow), and heavy smoke (red) within a given day.

To perform WOE analysis, shapefiles of the extent of smoke corresponding to the dates of exceedances or excursions were overlain on a regional map centered on the RAQMP area. A summary of the dates of excursions/exceedances and whether the RAQMP was inside an area with smoke is presented in Table D-1. As seen in the table, all the exceedances or excursions in April, May, June, July, August, and September can be linked to large-scale smoke. The most serious levels were in May and August, when the RAQMP region was inside heavy smoke for multiple weeks at a time. The Sparwood area was put under an Evacuation Alert which started in July and ended in August as a result of the Ladnar Creek wildfire, which began on July 21. One additional wildfire was present within the Elk Valley. These wildfires were a contributing factor to the BCAAQO exceedances.

During this time period, the Elk Valley experienced Level 4 and Level 5 drought conditions from July through November. The level 5 drought condition triggered the voluntary maximum reduction in water use by all water users in the area. Additionally, water usage was restricted by water being used for fighting fires in the region. This greatly impacted the dust mitigation options at site.

All stations recorded their highest PM_{2.5} and PM₁₀ concentrations in August, apart from PM₁₀ at Hosmer. The satellite imagery shows the RAQMP region to be under medium to heavy smoke during these periods for weeks at a time. Areas affected by smoke during that time period included the RAQMP region, British Columbia, a large portion of Alberta and Saskatchewan, Manitoba, Ontario, and large parts of the western United States.



5.2 Public Air Quality Feedback

Teck records and investigates all feedback it receives from the public regarding air quality. Community feedback is received through a Teck Feedback Mechanism, a process which applies to the activities of Teck's coal operations and all personnel, including both employees and contractors. The process allows each of Teck's coal operations to receive feedback from communities about matters related to the operations that are of interest to them (including fugitive dust), and to effectively organize a response to that feedback. Teck's operations in the Elk Valley continue to recognize dust as a primary concern to nearby communities and takes all feedback seriously.

Out of sixty (60) feedback entries received by Teck, forty-two (42) were related to general dust levels or poor visibility in the Elk Valley area (from various operations), thirteen (13) were complaints about dirty vehicles owned either by Teck or its contractors, four (4) were about deposits on Grave Lake, and one (1) complaint regarding habitat loss, wildlife displacement, noise, dust and general concern for those not directly employed by Teck.

For LCO, there were six (6) reportable incidents in 2023 (May 19, May 24, July 12, August 10, August 13, and September 14) related to public comments or LCO environmental department inspections of fugitive dust observed on or near Grave Lake, HiVol invalid sample, or equipment malfunction which resulted in black smoke discharged from the exhaust stack. There were four (4) instances of dust on Grave Lake (May 19, July 12, August 13 and September 14) which resulted in internal investigations being completed, and all events and spill reports were submitted to Emergency Management British Columbia (EMBC) and ENV as a precautionary measure. Three (3) of the four (4) reports were triggered by public feedback. A review of air data and time lapse video for these four (4) instances was completed, and no firm statements could be made on the origin of the dust or time of deposition. The event on May 24 was investigated internally and submitted as a dust spill to EMBC for an unknown quantity. The event on August 10 was due to the HiVol non-continuous sample running for less than the required 85% time period. This resulted in an invalid sample and was reported as a non-compliance.

For FRO, there was one reportable incident in 2023 on August 15 related to fugitive dust. An internal investigation was completed, and it was determined that the incident was a result of drought conditions experienced in the area and unusual wind conditions. The results of the investigation were submitted as a dust spill to EMBC for an unknown quantity.

Teck investigated each complaint, and in instances where the person submitting the feedback identified themselves, responded directly to the person.

The following is a monthly summary of feedback from the community in 2023.

January: One (1) complaint was received this month with regards to a dirty vehicle.

February: One (1) complaint was received this month with regards to dust from EVO Lagoon D.

March: Nine (9) complaints were received this month, eight (8) with regards to general dust in Elk Valley particularly being deposited on homes and balconies and one (1) with regards to a dirty vehicle.

April: Two (2) complaints were received this month with regards to dirty vehicles and the locations of the carwashes on-site.



- May:** Thirty-five (35) complaints/feedback were received this month. Twenty-eight (28) complaints/feedback were received during the 2023 BRE open house with regards to general dust, dirty vehicles, habitat loss, wildlife displacement, noise and general concern for those not directly employed by Teck. Five (5) complaints were with regards to general dust. A complaint was registered from a resident whose travel trailer needed to be professionally cleaned because of coal dust and Teck agreed to pay for the service. An additional complaint was with regards to a coal train in Chilliwack that was overloaded creating dust. After an investigation it was confirmed that the train was not carrying Teck's coal. The mayor of Sparwood indicated that he has received several complaints regarding the dust coming from Elkview and that the residents are concerned about the confidence that something would be done. Teck provided a response from the Manager of Social Responsibility. Two (2) complaints were with regards to a "coal dust sheen" on Grave Lake. LCO sent a team down to assess, however no signs of surface dust were present, a follow-up inspection was completed the next week with no evidence of coal dust or a film on the lake. It was reported as a precautionary spill to EMBC.
- June:** One (1) complaint was received this month with regards to dirty vehicles and the locations of the carwashes on-site.
- July:** Four (4) complaints were received this month, two (2) complaints were received with regards to dirty vehicles one (1) complaints with regards to dust on deck furniture and one (1) complaint with regards to the water quality at Grave Lake. LCO sent a team down to assess, however the substance had sunk to the bottom of the lake. It was reported as a precautionary spill to EMBC.
- August:** Four (4) complaints/feedback were received this month, two (2) complaints were received with regards to cleaning of their house/lodge, one (1) complaint was received with regards to a dirty vehicle and one (1) feedback was received inquiring about providing custom pressure washing.
- September:** Two (2) complaints were received this month with regards to coal mud being tracked into a building and dust at Grave Lake.
- November:** One (1) complaint was received this month with regards to a dirty vehicle.

5.3 Fugitive Dust Management Plans

Updated Fugitive Dust Management Plans (FDMPs) were submitted to BC ENV in 2022 and early 2023 addressing follow up comments received from the BC ENV in 2022. The FDMPs follow the Guidance on "Developing a Fugitive Dust Management Plan for Industrial Projects (BC EMPR and BC ENV, 2018)". These updated plans address questions from BC ENV and include Trigger Action Response Plans (TARPs) for fugitive dust sources, details of the Community Feedback process at Teck, and the effect of fugitive dust on Human Health. Teck continues to finalize the FDMPs for all Teck facilities in the Elk Valley. Updated plans addressing comments from BC ENV are due in 2025 (for EVO, GHO and FRO) and 2026 (LCO).



6 RECOMMENDATIONS

The RAQMP completed its prescribed 5-year review in December 2021. Because the monitoring program is achieving its objectives, no changes to the monitoring locations, equipment or schedules are recommended at this time. The review period has been revised to 3 years for the next review which is due on June 30, 2024.



7 GENERAL STATEMENT OF LIMITATIONS

This report entitled “TECK COAL LTD. REGIONAL AIR QUALITY MONITORING PROGRAM: 2023 Annual Report”, dated March 27, 2024, was prepared by RWDI AIR Inc. (“RWDI”) for Teck Coal Ltd. (“Client”). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein (“Project”). This report was prepared using scientific principles, published methodologies and professional judgment in assessing available information and data. The findings presented within this document are based on available data within the limits of the existing information, budgeted scope of work, and schedule. The conclusions contained in this report are based on the information available to RWDI when this report was prepared; subsequent changes made by the Client after the date of this report have not been reflected in the conclusions.

This report was prepared for the exclusive use of Teck Coal Ltd. and the BC ENV. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. RWDI accepts no responsibility for damages, if any, suffered by any third party as result of decisions made or actions based on this report.



8 REFERENCES

BC Ministry of Environment and Climate Change Strategy. 2021. British Columbia Ambient Air Quality Objectives.

British Columbia Ministries of Energy, Mines and Petroleum Resources and British Columbia Ministry of Environment and Climate Change Strategy. 2018. Developing a Fugitive Dust Management Plan for Industrial Projects. Accessed 2022-03-23.

Canadian Council of Ministers of the Environment (2012). Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone. Accessed February 2023. https://ccme.ca/en/res/pn1483_gdad_eng-secured.pdf.

Government of British Columbia. 2023. 2023 Drought Information Portal. <https://governmentofbc.maps.arcgis.com/apps/MapSeries/index.html?appid=838d533d8062411c820eef50b08f7ebc>

Government of British Columbia. 2023. 2023 Wildfire Season Summary. <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary>

National Oceanic and Atmospheric Administration, 2023. Hazard Mapping System Fire and Smoke Product: Fire Data Search and Retrieval. <https://www.ospo.noaa.gov/Products/land/hms.htm>. Accessed February 2023.

Teck Coal. 2021. Regional Air Quality Monitoring Program.

APPENDIX A

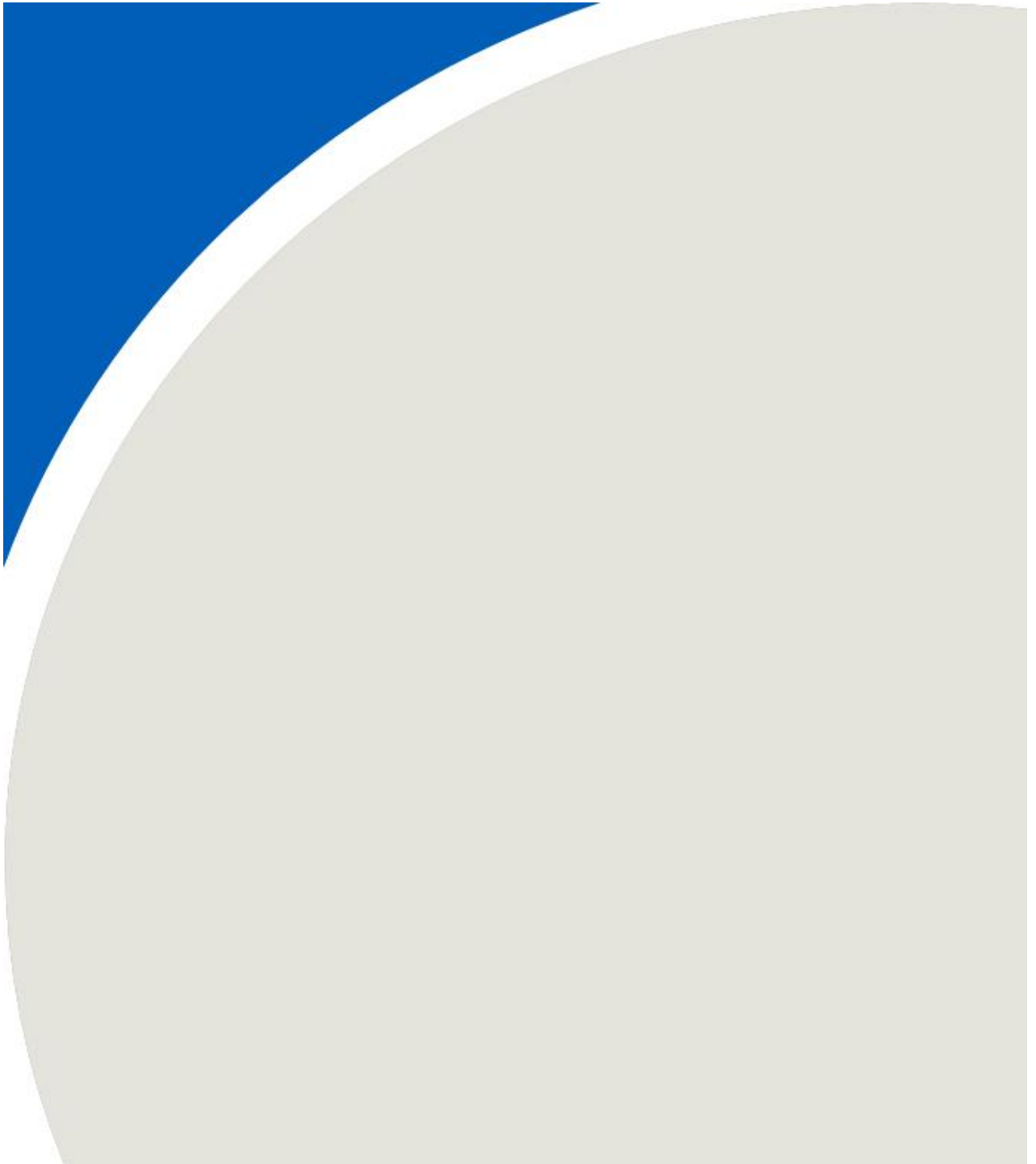




Table A-1: 2023 PM₁₀ Data Validity Statistics by Station

Period	Period (Month / Quarter / Year)	Hosmer ^[2]		EV_SCS		EV_WWTP		GH_ERMES		LC_02	
		Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)
Valid monitoring days per month	January (31)	31	100%	31	100%	31	100%	31	100%	31	100%
	February (28)	28	100%	28	100%	28	100%	27	96%	28	100%
	March (31)	30	97%	31	100%	31	100%	30	97%	17	55%
	April (30)	26	87%	29	97%	30	100%	30	100%	26	87%
	May (31)	27	87%	31	100%	30	97%	29	94%	31	100%
	June (30)	28	93%	30	100%	30	100%	28	93%	30	100%
	July (31)	14	45%	31	100%	18	58%	31	100%	31	100%
	August (31)	3	10%	31	100%	31	100%	28	90%	31	100%
	September (30)	28	93%	30	100%	27	90%	28	93%	30	100%
	October (31)	31	100%	31	100%	31	100%	31	100%	31	100%
	November (30)	30	100%	30	100%	30	100%	29	97%	30	100%
	December (31)	28	90%	31	100%	31	100%	31	100%	31	100%
Valid monitoring days per quarter ^[1]	Q1 (90)	89	99%	90	100%	90	100%	88	98%	76	84%
	Q2 (91)	81	89%	90	99%	90	99%	87	96%	87	96%
	Q3 (92)	45	49%	92	100%	76	83%	87	95%	92	100%
	Q4 (92)	89	97%	92	100%	92	100%	91	99%	92	100%
Valid monitoring days per year ^[1]	2023 (365)	304	83%	364	100%	348	95%	353	97%	347	95%
Valid monitoring hours per quarter	Q1 (2160)	2118	98%	2146	99%	2148	99%	2074	96%	1831	85%
	Q2 (2184)	1941	89%	2154	99%	2151	98%	2083	95%	2099	96%
	Q3 (2208)	1259	57%	2195	99%	1845	84%	2051	93%	2208	100%
	Q4 (2208)	2103	95%	2190	99%	2193	99%	2150	97%	2204	100%
Valid monitoring hours per year	2023 (8760)	7421	85%	8685	99%	8337	95%	8358	95%	8342	95%

Notes: [1]: Permit conditions state that within each quarter, the daily data should be 60% complete and within each year, the daily data must be 75% complete.

[2]: Hosmer is not subject to any operation's permit and does not have a minimum completeness requirement.



Table A-2: 2023 PM_{2.5} Data Validity Statistics by Station

Period	Period (Month / Quarter / Year)	Hosmer ^[2]		EV_SCS		EV_WWTP		GH_ERMES		LC_02	
		Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)	Days / Hours	Percent Complete (%)
Valid monitoring days per month	January (31)	27	87%	31	100%	31	100%	31	100%	31	100%
	February (28)	28	100%	28	100%	28	100%	28	100%	28	100%
	March (31)	30	97%	31	100%	31	100%	30	97%	17	55%
	April (30)	30	100%	30	100%	30	100%	30	100%	26	87%
	May (31)	31	100%	28	90%	31	100%	30	97%	31	100%
	June (30)	28	93%	29	97%	30	100%	28	93%	30	100%
	July (31)	26	84%	31	100%	18	58%	31	100%	31	100%
	August (31)	21	68%	31	100%	31	100%	28	90%	31	100%
	September (30)	28	93%	30	100%	30	100%	28	93%	30	100%
	October (31)	22	71%	31	100%	31	100%	31	100%	31	100%
	November (30)	20	67%	30	100%	30	100%	29	97%	30	100%
	December (31)	30	97%	31	100%	31	100%	31	100%	31	100%
Valid monitoring days per quarter ^[1]	Q1 (90)	85	94%	90	100%	90	100%	89	99%	76	84%
	Q2 (91)	89	98%	87	96%	91	100%	88	97%	87	96%
	Q3 (92)	75	82%	92	100%	79	86%	87	95%	92	100%
	Q4 (92)	72	78%	92	100%	92	100%	91	99%	92	100%
Valid monitoring days per year ^[1]	2023 (365)	321	88%	361	99%	352	96%	355	97%	347	95%
Valid monitoring hours per quarter	Q1 (2160)	2067	96%	2146	99%	2150	100%	2126	98%	1831	85%
	Q2 (2184)	2091	96%	2095	96%	2161	99%	2146	98%	2099	96%
	Q3 (2208)	1846	84%	2175	99%	1917	87%	2105	95%	2208	100%
	Q4 (2208)	1835	83%	2190	99%	2198	100%	2188	99%	2204	100%
Valid monitoring hours per year	2023 (8760)	7839	89%	8606	98%	8426	96%	8565	98%	8342	95%

Notes: [1]: Permit conditions state that within each quarter, the daily data should be 60% complete and within each year, the daily data must be 75% complete.

[2]: Hosmer is not subject to any operation's permit and does not have a minimum completeness requirement.



Table A-3: 2023 NO₂ and O₃ EV_SCS Station Data Validity Statistics

Period	Period (Month / Quarter / Year)	NO ₂ (Hours)	Percent Complete (%)	O ₃ (Hours)	Percent Complete (%)
Valid monitoring hours per month	January (744)	738	99%	738	99%
	February (672)	668	99%	668	99%
	March (744)	741	100%	741	100%
	April (720)	703	98%	442	61%
	May (744)	740	99%	644	87%
	June (720)	713	99%	713	99%
	July (744)	740	99%	740	99%
	August (744)	740	99%	740	99%
	September (720)	678	94%	714	99%
	October (744)	678	91%	734	99%
	November (720)	714	99%	715	99%
	December (744)	644	87%	737	99%
Valid monitoring hours per quarter	Q1 (2160)	2147	99%	2147	99%
	Q2 (2184)	2156	99%	1799	82%
	Q3 (2208)	2158	98%	2194	99%
	Q4 (2208)	2036	92%	2186	99%
Valid monitoring hours per year	2023 (8760)	8497	97%	8326	95%

Notes: NO₂ and O₃ monitoring is not included under EVO's permit and are not subject to data completeness requirements.



Table A-4: 2023 Meteorological Station Data Validity Statistics by Station

Period	Period (Year)	Station	Wind Speed and Direction		Temperature		Relative Humidity		Barometric Pressure		Precipitation	
			Hours	Percent Complete (%)	Hours	Percent Complete (%)	Hours	Percent Complete (%)	Hours	Percent Complete (%)	Hours	Percent Complete (%)
Valid monitoring hours per year	2023 (8760)	Hosmer	8647	99%	8760	100%	7999	91%	4482	51%	N/A	N/A
		EV_SCS	8715	99%	8750	100%	8467	97%	N/A	N/A	N/A	N/A
		EV_WWTP	8355	95%	8760	100%	8760	100%	N/A	N/A	N/A	N/A
		GH_ERMES	8651	99%	8745	100%	N/A	N/A	N/A	N/A	8745	100%
		LC_02	8753	99%	8753	100%	8753	100%	N/A	N/A	N/A	N/A

Notes: N/A – Station does not report this data.



Table A-5: 2023 PM₁₀ Concentrations Averaged by Period and Station

	Period	Hosmer ($\mu\text{g}/\text{m}^3$)	EV_SCS ($\mu\text{g}/\text{m}^3$)	EV_WWTP ($\mu\text{g}/\text{m}^3$)	GH_ERMES ($\mu\text{g}/\text{m}^3$)	LC_02 ($\mu\text{g}/\text{m}^3$)
Annual Hourly Mean	2023	10.6	20.1	12.7	11.9	18.6
Annual Hourly Standard Deviation	2023	13.2	26.0	22.5	30.1	44.0
Annual Daily Mean	2023	10.5	20.1	12.8	11.8	18.6
Annual Daily Standard Deviation	2023	10.2	18.0	16.7	19.0	34.5
Daily average by day of week	Monday	9.5	20.4	13.7	13.5	19.3
	Tuesday	10.2	20.1	11.8	9.2	17.2
	Wednesday	11.9	21.4	12.2	10.0	18.3
	Thursday	13.1	22.9	15.0	12.0	22.9
	Friday	10.9	20.3	12.4	12.7	18.3
	Saturday	9.1	18.6	12.1	12.8	19.2
	Sunday	8.7	17.1	12.1	11.9	15.2
Daily average by season	Spring (MAM)	14.5	25.1	12.3	11.4	17.9
	Summer (JJA)	13.4	28.9	23.2	20.0	36.5
	Autumn (SON)	10.1	17.2	11.8	10.9	15.0
	Winter (DJF)	5.6	9.0	5.1	5.0	4.5



Table A-6: 2023 PM_{2.5} Concentrations Averaged by Period and Station

	Period	Hosmer (µg/m ³)	EV_SCS (µg/m ³)	EV_WWTP (µg/m ³)	GH_ERMES (µg/m ³)	LC_02 (µg/m ³)
Annual Hourly Mean	2023	8.3	9.0	8.5	7.9	17.6
Annual Hourly Standard Deviation	2023	16.4	18.1	19.9	27.4	43.6
Annual Daily Mean	2023	8.2	9.1	8.5	7.8	17.6
Annual Daily Standard Deviation	2023	12.7	13.3	14.2	17.9	34.2
Daily average by day of week	Monday	8.0	10.1	9.8	9.9	18.3
	Tuesday	7.0	8.4	7.6	5.6	16.2
	Wednesday	6.5	9.0	7.8	6.3	17.5
	Thursday	8.5	10.3	10.0	7.5	21.8
	Friday	9.4	8.6	7.6	7.9	17.2
	Saturday	9.6	9.1	7.9	8.9	18.0
	Sunday	8.2	8.5	8.5	8.5	14.2
Daily average by season	Spring (MAM)	7.4	8.3	7.3	5.9	17.0
	Summer (JJA)	16.1	17.1	16.8	15.9	35.2
	Autumn (SON)	6.3	7.8	7.5	7.1	13.6
	Winter (DJF)	3.6	3.2	3.4	2.7	4.1



Table A-7: 2023 NO₂ and O₃ EV_SCS Station Concentrations Averaged by Period

	Period	EV_SCS	
		NO ₂ (µg/m ³)	O ₃ (µg/m ³)
Annual Hourly Mean	2023	9.9	53.7
Annual Hourly Standard Deviation	2023	8.6	27.9
Annual Daily ^[1] Mean	2023	25.1	75.0
Annual Daily ^[1] Standard Deviation	2023	11.7	19.2
Daily average ^[1] by day of week	Monday	24.6	74.7
	Tuesday	24.3	74.7
	Wednesday	26.7	74.1
	Thursday	27.2	72.7
	Friday	25.1	74.4
	Saturday	24.3	77.8
	Sunday	23.7	76.8
Daily average ^[1] by season	Spring (MAM)	23.7	86.5
	Summer (JJA)	23.1	88.5
	Autumn (SON)	24.4	62.4
	Winter (DJF)	29.7	64.1

Notes:

Where conversions have been made between ppb and µg/m³, calculations have been based on 25°C and 1 atm

[1] Refers to daily 1-hour maximum concentration for NO₂ and daily 8-hour maximum for O₃.



Table A-8: 2023 PM₁₀ Concentration Percentiles by Station

Averaging period	Percentile	Hosmer (µg/m ³)	EV_SCS (µg/m ³)	EV_WWTP (µg/m ³)	GH_ERMES (µg/m ³)	LC_02 (µg/m ³)
Hourly	0	0.0	0.0	0.0	0.0	0.0
	10	1.4	2.9	1.7	1.6	1.7
	25	3.2	6.8	3.6	3.5	3.6
	50	6.9	13.7	7.6	6.8	8.1
	75	13.4	24.5	14.5	12.7	17.0
	90	22.9	40.6	24.4	21.6	34.0
	95	30.2	56.8	35.2	29.6	51.7
	98	48.2	88.9	64.2	56.8	148.1
	100	149.3	662.0	517.4	955.7	781.1
Daily	0	0.5	1.4	0.7	0.8	0.7
	10	3.0	4.6	2.9	3.0	2.3
	25	4.6	9.1	4.7	4.4	4.2
	50	7.9	15.7	8.5	7.8	8.8
	75	13.7	25.9	14.6	13.8	17.9
	90	19.9	38.6	23.0	18.5	33.5
	95	24.7	46.6	30.5	23.0	72.7
	98	32.2	64.6	55.0	46.5	124.8
	100	108.6	125.4	127.2	197.7	281.3



Table A-9: 2023 PM_{2.5} Concentration Percentiles by Station

Averaging period	Percentile	Hosmer (µg/m ³)	EV_SCS (µg/m ³)	EV_WWTP (µg/m ³)	GH_ERMES (µg/m ³)	LC_02 (µg/m ³)
Hourly	0	0	0.1	0.0	0	0
	10	0.8	1.1	1.0	0.9	1.4
	25	1.8	2.3	2.0	1.8	3.1
	50	4.0	5.0	4.3	3.6	7.1
	75	8.4	9.3	8.3	7.2	15.3
	90	17.1	17.0	15.5	13.1	32.5
	95	27.9	25.7	25.0	21.0	49.5
	98	51.7	54.2	51.8	46.6	146.3
	100	279.8	411.8	502.0	824.4	768.6
Daily	0	0.5	0.7	0.3	0.3	0.6
	10	1.7	1.7	1.8	1.4	2.0
	25	2.9	3.2	2.9	2.5	3.6
	50	4.8	5.6	4.9	4.2	7.8
	75	8.2	9.8	8.8	7.5	16.2
	90	14.8	16.3	14.1	12.1	32.1
	95	24.7	26.3	23.7	17.3	70.6
	98	47.7	47.3	44.4	44.8	123.9
	100	115.9	101.3	106.6	190.8	278.5

Table A-10: 2023 EV_SCS Station NO₂ and O₃ Concentration Percentiles

Averaging period	Percentile	EV_SCS	
		NO ₂ (µg/m ³)	O ₃ (µg/m ³)
Hourly	0	0.0	0.6
	10	2.2	12.9
	25	3.7	30.6
	50	7.2	56.9
	75	13.5	75.1
	90	21.2	88.1
	95	27.7	97.0
	98	35.3	104.8
	100	64.1	277.0
		Daily 1-hour Maximum	Daily 8-hour Maximum
Daily	0	5.1	16.2
	10	11.1	48.2
	25	16.5	63.1
	50	22.8	77.0
	75	32.6	88.5
	90	41.9	99.0
	95	46.9	104.2
	98	51.6	111.2
	100	64.1	120.1
	4 th highest ⁽¹⁾	-	98.3

Notes:

Where conversions have been made between ppb and µg/m³, calculations have been based on 25°C and 1 atm

⁽¹⁾ Provided for comparison with BC AAQO of 123 µg/m³ for the daily 8-hour maximum O₃ concentration.



Table A-11: 2023 PM_{2.5} 98th Percentile of Daily Average Concentration by Station

Station Name	98 th percentile of daily averaged PM _{2.5} (µg/m ³)
Hosmer	47.7
EV_SCS	47.3
EV_WWTP	44.4
GH_ERMES	44.8
LC_02	123.9

Note: Values in boldface are above the BC AAQO of 25 µg/m³.

APPENDIX B

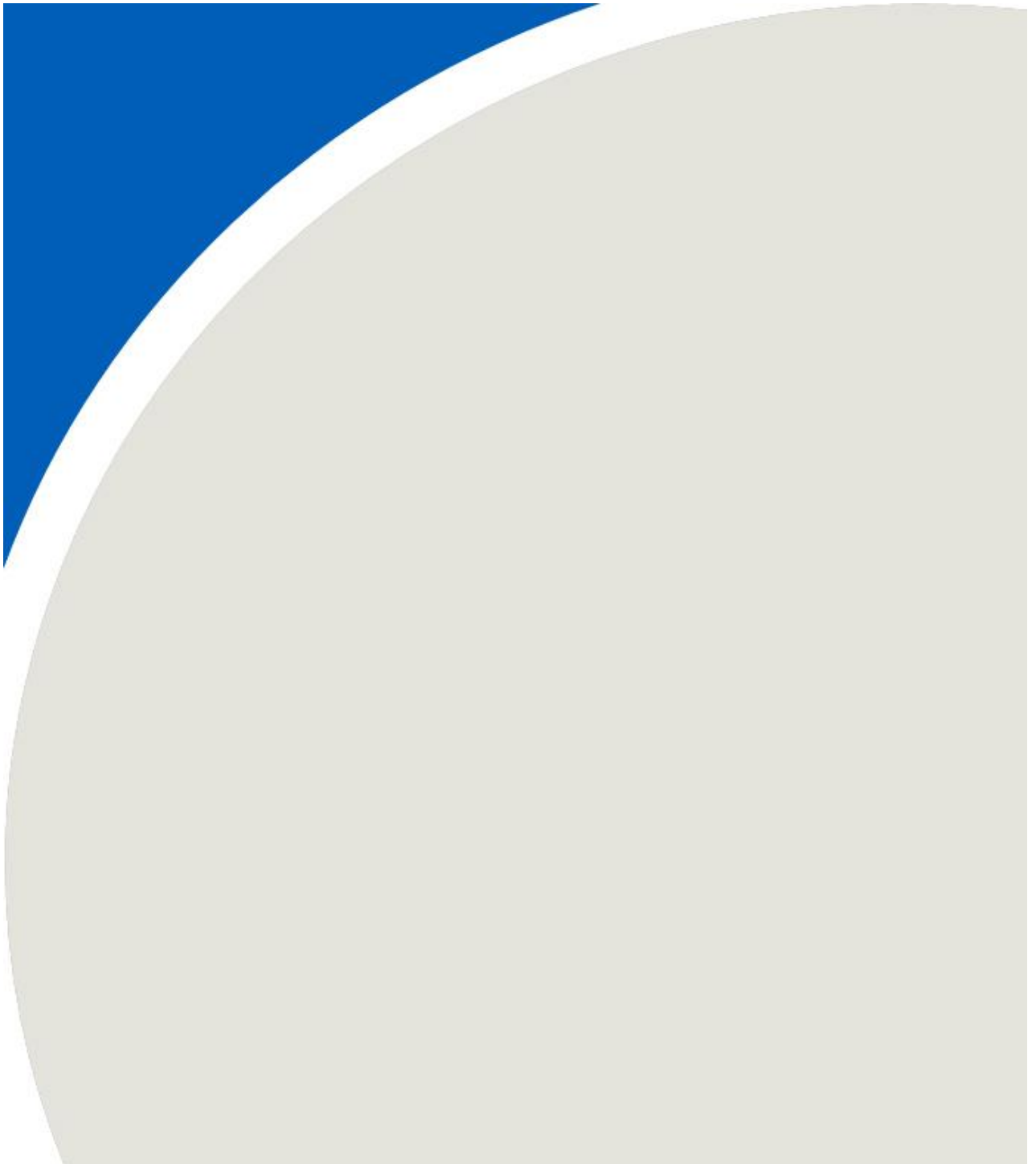


Table B-1: List of Days with PM₁₀ Exceedances in 2023

Station Name	Date	PM ₁₀ Concentration µg/m ³
Hosmer	17-May-23	90.3
	18-May-23	108.6
EV_SCS	21-Mar-23	58.4
	22-Mar-23	59.7
	30-Mar-23	57.6
	3-May-23	51.2
	16-May-23	56.8
	17-May-23	102.9
	18-May-23	125.4
	19-May-23	53.6
	15-Jul-23	58.8
	15-Aug-23	66.3
	16-Aug-23	99.3
	17-Aug-23	109.6
	19-Aug-23	114.2
	20-Aug-23	120.3
21-Aug-23	123.9	
EV_WWTP	17-May-23	86.5
	18-May-23	115.6
	16-Aug-23	101.4
	17-Aug-23	127.2
	18-Aug-23	53.0
	19-Aug-23	111.8
	20-Aug-23	115.9
	21-Aug-23	119.4
GH_ERMES	17-May-23	66.6
	18-May-23	109.7
	16-Aug-23	54.6
	18-Aug-23	59.1
	19-Aug-23	172.3
	20-Aug-23	197.7
	21-Aug-23	191.8

2023 ANNUAL REPORT
REGIONAL AIR QUALITY MONITORING PROGRAM: APPENDIX B
RWDI #2402755

Station Name	Date	PM ₁₀ Concentration µg/m ³
LC_02	16-May-23	82.2
	17-May-23	249.0
	18-May-23	281.3
	19-May-23	83.1
	14-Jul-23	92.6
	15-Jul-23	155.3
	24-Jul-23	54.5
	3-Aug-23	63.6
	4-Aug-23	86.4
	7-Aug-23	53.4
	13-Aug-23	54.2
	14-Aug-23	84.8
	15-Aug-23	76.7
	16-Aug-23	189.7
	17-Aug-23	249.4
	18-Aug-23	111.2
	19-Aug-23	217.9
	20-Aug-23	113.5
	21-Aug-23	187.2
	22-Aug-23	83.0
4-Sep-23	122.2	
5-Sep-23	112.8	

APPENDIX C

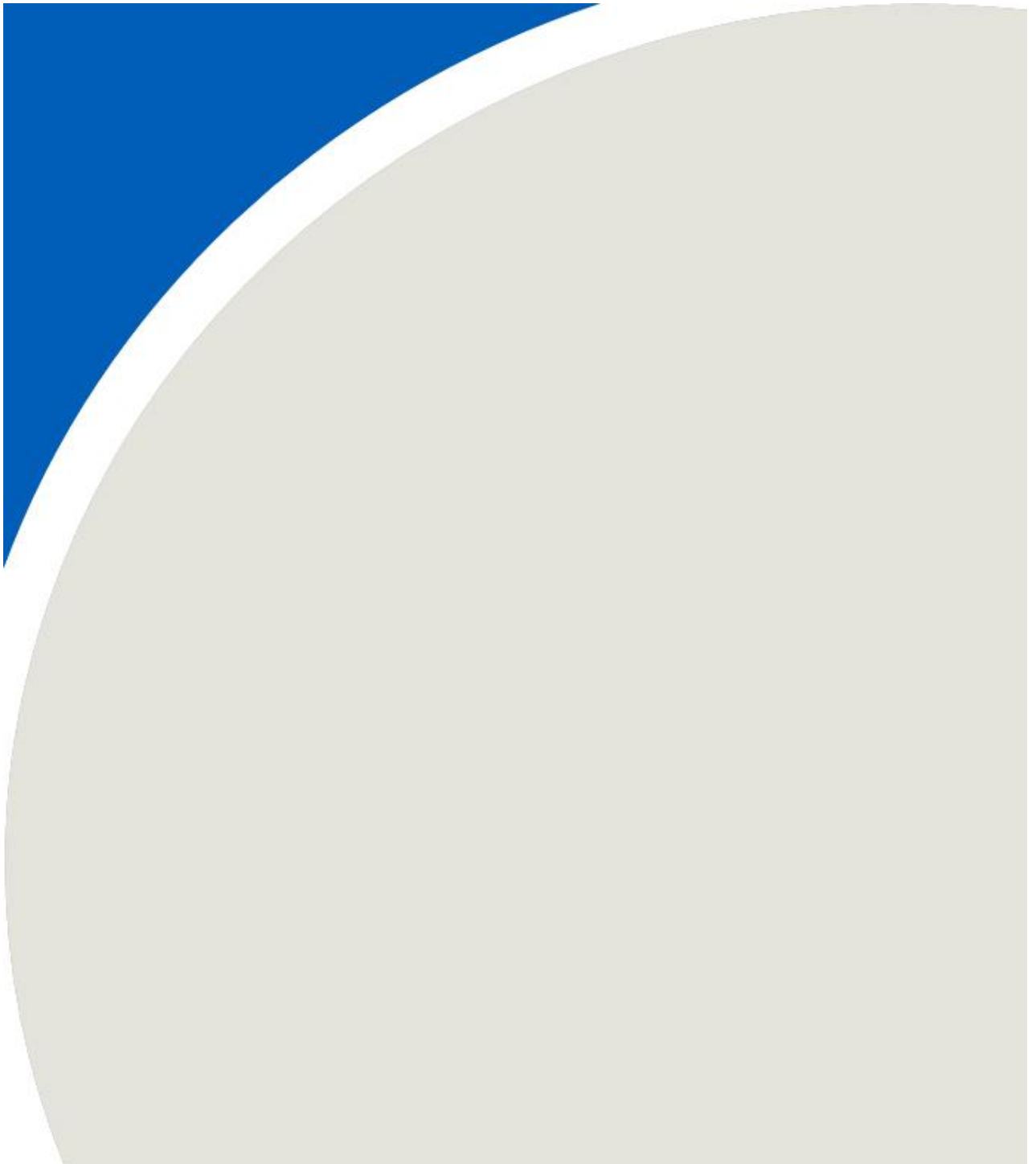


Table C-1: List of Days with PM_{2.5} Excursions in 2023

Station Name	Date	PM _{2.5} Concentration µg/m ³
Hosmer	17-May-23	76.2
	18-May-23	95.2
	19-May-23	29.0
	15-Jul-23	41.8
	20-Jul-23	28.9
	30-Jul-23	34.5
	1-Aug-23	30.5
	4-Aug-23	115.9
	5-Aug-23	88.2
	6-Aug-23	27.2
	7-Aug-23	39.8
	8-Aug-23	32.6
	19-Aug-23	51.7
	20-Aug-23	68.4
	21-Aug-23	63.8
	28-Aug-23	26.2
EV_SCS	16-May-23	27.1
	17-May-23	90.3
	18-May-23	101.3
	19-May-23	37.7
	14-Jul-23	29.9
	15-Jul-23	46.8
	4-Aug-23	27.0
	14-Aug-23	28.8
	15-Aug-23	47.5
	16-Aug-23	72.5
	17-Aug-23	84.4
	18-Aug-23	26.3
	19-Aug-23	90.6
	20-Aug-23	94.3
	21-Aug-23	93.1
	28-Aug-23	35.0
	29-Aug-23	31.5
4-Sep-23	44.7	
5-Sep-23	32.7	

2023 ANNUAL REPORT
REGIONAL AIR QUALITY MONITORING PROGRAM: APPENDIX C
RWDI #2402755

Station Name	Date	PM _{2.5} Concentration µg/m ³
EV_WWTP	16-May-23	27.7
	17-May-23	76.5
	18-May-23	101.2
	19-May-23	32.0
	4-Aug-23	34.1
	14-Aug-23	39.9
	15-Aug-23	35.4
	16-Aug-23	79.3
	17-Aug-23	103.3
	18-Aug-23	32.2
	19-Aug-23	102.3
	20-Aug-23	105.8
	21-Aug-23	106.6
	28-Aug-23	37.2
	29-Aug-23	38.2
	4-Sep-23	44.5
	5-Sep-23	31.5
GH_ERMES	17-May-23	63.2
	18-May-23	95.8
	19-May-23	26.5
	14-Jul-23	38.6
	15-Jul-23	45.1
	4-Aug-23	32.9
	14-Aug-23	25.1
	15-Aug-23	25.5
	16-Aug-23	46.9
	18-Aug-23	49.9
	19-Aug-23	163.2
	20-Aug-23	178.0
	21-Aug-23	190.8
28-Aug-23	40.3	

2023 ANNUAL REPORT
REGIONAL AIR QUALITY MONITORING PROGRAM: APPENDIX C
RWDI #2402755

Station Name	Date	PM _{2.5} Concentration µg/m ³
LC_02	29-Apr-23	42.2
	30-Apr-23	38.8
	16-May-23	81.0
	17-May-23	247.5
	18-May-23	278.5
	19-May-23	81.4
	20-May-23	25.8
	26-May-23	32.1
	11-Jun-23	39.7
	12-Jun-23	36.3
	13-Jun-23	28.0
	16-Jun-23	37.4
	14-Jul-23	91.4
	15-Jul-23	152.9
	16-Jul-23	25.4
	19-Jul-23	31.8
	20-Jul-23	31.7
	21-Jul-23	39.4
	24-Jul-23	52.0
	27-Jul-23	27.8
	2-Aug-23	25.8
	3-Aug-23	61.3
	4-Aug-23	83.8
	5-Aug-23	34.6
	6-Aug-23	31.3
	7-Aug-23	52.2
	8-Aug-23	48.0
	13-Aug-23	52.4
	14-Aug-23	83.2
	15-Aug-23	74.6
16-Aug-23	187.2	
17-Aug-23	246.6	
18-Aug-23	108.7	
19-Aug-23	216.3	
20-Aug-23	111.3	
21-Aug-23	183.6	
22-Aug-23	82.3	
23-Aug-23	35.4	

2023 ANNUAL REPORT
REGIONAL AIR QUALITY MONITORING PROGRAM: APPENDIX C
RWDI #2402755

Station Name	Date	PM _{2.5} Concentration µg/m ³
	25-Aug-23	29.7
	26-Aug-23	26.3
	27-Aug-23	32.0
	28-Aug-23	38.6
	29-Aug-23	39.9
	31-Aug-23	26.5
	1-Sep-23	25.3
	4-Sep-23	121.4
	5-Sep-23	112.0
	17-Sep-23	26.4
	22-Sep-23	29.7
	30-Oct-23	27.1
	31-Oct-23	25.4
	1-Nov-23	28.6
	2-Nov-23	37.7

APPENDIX D

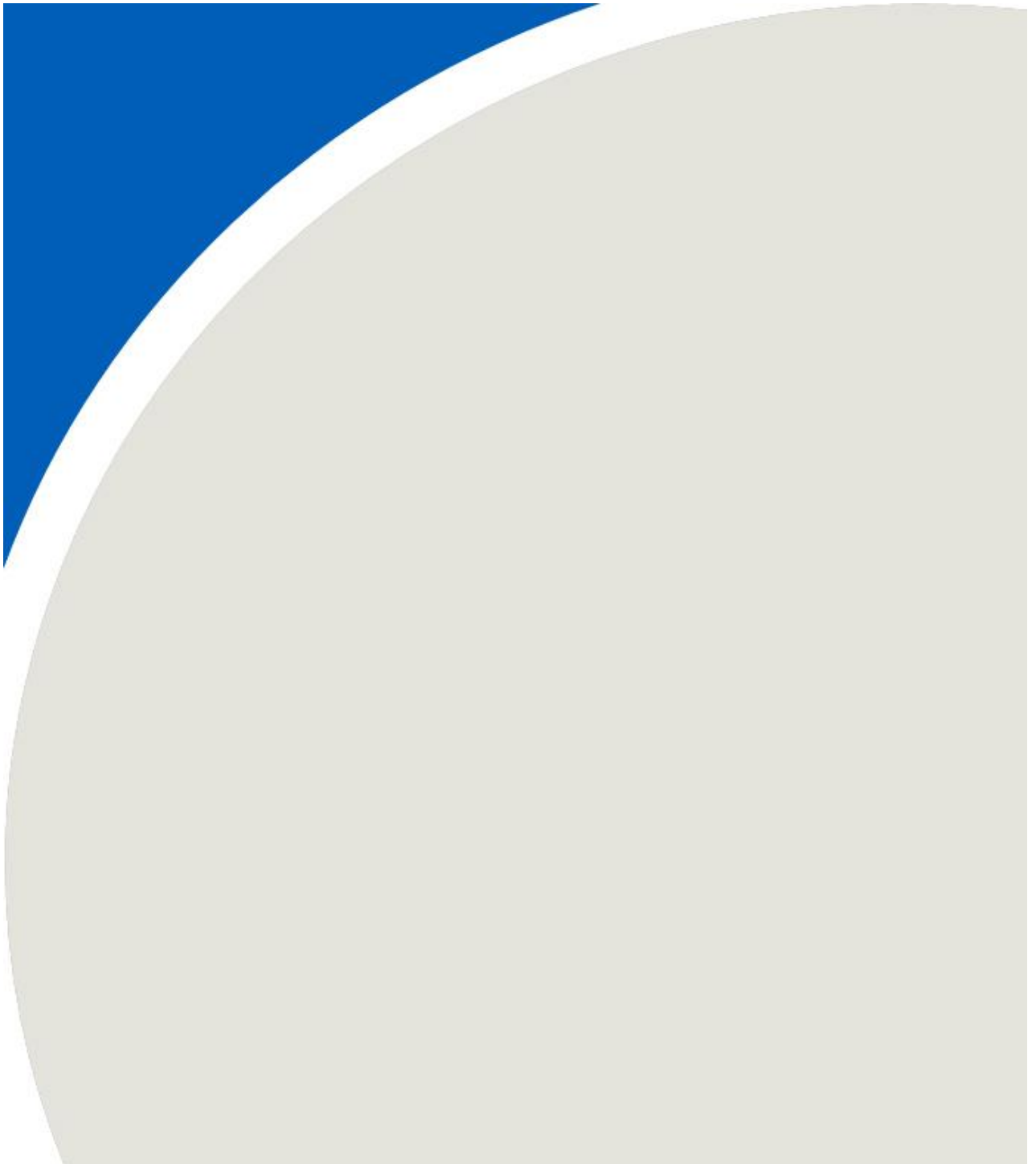


Table D-1: Days with PM₁₀ exceedance or PM_{2.5} excursion and large-scale smoke from wildfires affecting the RAQMP.

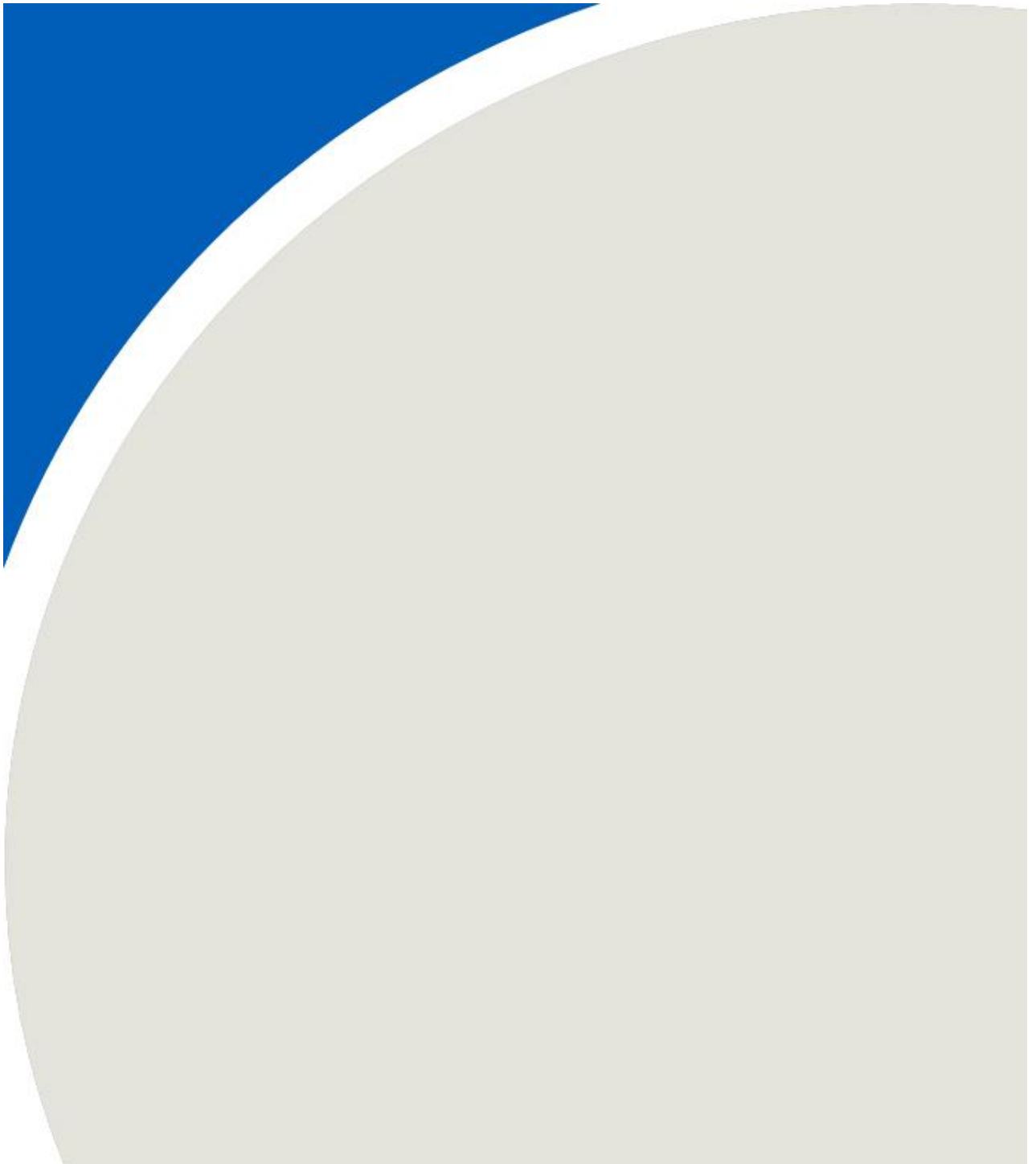
Date of Exceedance/Excursion	Station Name					Smoke Present in RAQMP
	Hosmer	EV_SCS	EV_WWTP	GH_ERMES	LC_02	
21-Mar-23		x				
22-Mar-23		x				
30-Mar-23		x				
29-Apr-23					x	✓
30-Apr-23					x	✓
03-May-23		x				✓
16-May-23		x	x		x	✓
17-May-23	x	x	x	x	x	✓
18-May-23	x	x	x	x	x	✓
19-May-23	x	x	x	x	x	✓
20-May-23					x	✓
26-May-23					x	✓
11-Jun-23					x	✓
12-Jun-23					x	✓
13-Jun-23					x	✓
16-Jun-23					x	✓
14-Jul-23		x		x	x	✓
15-Jul-23	x	x		x	x	✓
16-Jul-23					x	✓
19-Jul-23					x	✓
20-Jul-23	x				x	✓
21-Jul-23					x	✓
24-Jul-23					x	✓
27-Jul-23					x	✓
30-Jul-23	x					✓
1-Aug-23	x					✓
2-Aug-23					x	✓
3-Aug-23					x	✓
4-Aug-23	x	x	x	x	x	✓
5-Aug-23	x				x	✓
6-Aug-23	x				x	✓
7-Aug-23	x				x	✓
8-Aug-23	x				x	✓
13-Aug-23					x	✓
14-Aug-23		x	x	x	x	✓

**2023 ANNUAL REPORT
REGIONAL AIR QUALITY MONITORING PROGRAM: APPENDIX D**

RWDI #2402755

15-Aug-23		x	x	x	x	✓
16-Aug-23		x	x	x	x	✓
17-Aug-23		x	x		x	✓
18-Aug-23		x	x	x	x	✓
19-Aug-23	x	x	x	x	x	✓
20-Aug-23	x	x	x	x	x	✓
21-Aug-23	x	x	x	x	x	✓
22-Aug-23					x	✓
23-Aug-23					x	✓
25-Aug-23					x	✓
26-Aug-23					x	✓
27-Aug-23					x	✓
28-Aug-23	x	x	x	x	x	✓
29-Aug-23		x	x		x	✓
31-Aug-23					x	✓
1-Sep-23					x	✓
4-Sep-23		x	x		x	✓
5-Sep-23		x	x		x	✓
17-Sep-23					x	✓
22-Sep-23					x	✓
30-Oct-23					x	
31-Oct-23					x	
1-Nov-23					x	
2-Nov-23					x	

APPENDIX E





Operation	Station Name	Station location (Latitude, Longitude)	Permit, RAQMP, or independent	Monitoring Objectives	Air quality								Meteorology										
					TSP	PM ₁₀	PM _{2.5}	NO ₂	CO	SO ₂	O ₃	PAH	Wind speed and direction	Air temperature	Relative Humidity	Barometric Pressure	Precipitation	Snow depth	Snow Water Equivalent	Net radiation	Incoming Solar Radiation		
Fording River	Aspoil	50.19797°N, 114.88866°W	Independent	Monitoring meteorological parameters across the mine										X	X	X		X	X				
	Brownie	50.19916°N, 114.81633°W	Independent	Monitoring meteorological parameters across the mine										X	X	X		X	X		X		
	South Station (E297832)	50.14868°N, 114.85660°W	Permit (1501)	Monitoring meteorological parameters across the mine		X									X	X	X	X	X				X
Greenhills	Office (E297170)	50.08483°N, 114.87085°W	Permit (6249)	Monitoring meteorological parameters across the mine										X	X	X	X	X					
	Pumphouse Greenhills Creek (E206190)	50.04490°N, 114.85612°W	Permit (6249)	Monitoring Particulate concentrations and temperature	X										X								
	Elkford Rocky Mountain Elementary School (GH_ERMES / E290310)	50.007794°N, 114.933420°W	Permit (6249) and RAQMP	Monitoring particulate concentrations and met parameters in and around Elkford	X	X	X							X	X			X					
Line Creek	LCO Plant Continuous (LCO1)	49.88685°N, 114.84479°W	Independent	Monitoring particulate concentrations and meteorological parameters in and around plant	X	X	X							X	X	X							
	Plant Hi Vol (E206189) ⁽¹⁾	49.891055°N, 114.845795°W	Permit (5352)	Monitoring TSP concentrations around the plant	X																		
	LCO Plant Weather (E297050)	49.891053°N, 114.845684°W	Permit (5352)	Monitoring meteorological parameters in the vicinity of the plant										X	X	X		X					
	MSA Hi Vol (E304612) ⁽¹⁾	49.954°N, 114.753°W	Permit (5352)	Monitoring TSP concentrations around the plant	X																		
	MSA Weather Station (E297052)	49.953°N, 114.753°W	Permit (5352)	Monitoring meteorological parameters in the vicinity of the plant										X	X	X		X					
	Line Creek Continuous - Near Grave Lake (LC_02 E326931)	49.874703°N, 114.839622°W	Permit (5352)	Monitoring particulate concentrations in and around local community and Grave Lake.	X	X	X							X	X	X							



Operation	Station Name	Station location (Latitude, Longitude)	Permit, RAQMP, or independent	Monitoring Objectives	Air quality							Meteorology										
					TSP	PM ₁₀	PM _{2.5}	NO ₂	CO	SO ₂	O ₃	PAH	Wind speed and direction	Air temperature	Relative Humidity	Barometric Pressure	Precipitation	Snow depth	Snow Water Equivalent	Net radiation	Incoming Solar Radiation	
Elkview	Whispering Winds Trailer Park (EV_WWTP / E0250184)	49.79851°N, 114.88864°W	Permit (1807) and RAQMP	Monitoring particulate concentrations and met parameters in and around local community	X	X	X							X	X	X						
	Sparwood Heights (SH)	49.75541°N, 114.88604°W	Independent	Monitoring particulate concentrations and met parameters in and around local community	X	X	X							X	X	X	X	X				
	Michel Creek Road Residences (MCRR)	49.74288°N, 114.87084°W	Independent	Monitoring particulate concentrations and met parameters in and around local community	X	X	X							X	X	X						
	Sparwood Centennial Square (EV_SCS / E262137)	49.732786°N, 114.88766°W	Permit (1807) and RAQMP	Monitoring particulate concentrations and met parameters in and around local community	X	X	X	X	X	X	X	X	X	X	X	X						X
	Michel By-Products Plant (E206193)	49.70575°N, 114.82867°W	Permit (1807)	Monitoring particulate concentrations and met parameters in and around local community	X	X	X							X	X	X						
	Soil Treatment Facility	49.77284°N, 114.81936°W	Independent	Monitoring meteorological parameters across the mine										X	X			X	X			
	Erickson Creek	49.68871°N, 114.77261°W	Independent	Monitoring meteorological parameters across the mine										X	X			X	X	X		
Coal Mountain (Care and Maintenance)	Andy Good Spoil (E297251)	49.52367°N, 114.68423°W	Permit (4751)	Monitoring particulate concentrations and met parameters in the Michel basin.	X	X	X							X	X			X	X			
	Hosmer Regional Station	49.59026°N, 114.95923°W	Independent	Monitoring background concentration in the Elk Valley and located away from the mine.	X	X	X						X	X	X	X	X					

Note:

(1) TSP at these locations are measured using a Hi-Volume sampler per the National Air Pollution Surveillance schedule.