

## TRANS MOUNTAIN PIPELINE SUMAS TERMINAL

ABBOTSFORD, BRITISH COLUMBIA

### **2025 ANNUAL AIR QUALITY AND METEOROLOGICAL MONITORING REPORT**

RWDI #2602729

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# 1 SUMMARY

This report summarizes ambient air measurements made at the Trans Mountain Sumas Terminal (ST) Air Quality Monitoring (AQM) station during the operational period from January 1, 2025, to December 31, 2025. This monitoring program addresses the requirements of the Canada Energy Regulator (CER) Condition 79 for the Trans Mountain Expansion Project (TMEP or Project).

The objective of the ST AQM program during the operational period was to monitor the ambient air quality in the vicinity of ST and compare the results to the applicable Ambient Air Quality Objectives (AAQOs). The ST AQM station is located in the municipality of Abbotsford, so the ambient measurements were compared to the British Columbia (BC) AAQOs and supplemented with values from Alberta where none exist in BC. The monitoring methods follow the Air Emissions Management Plan for the Sumas and Burnaby Terminals (Trans Mountain 2017, CER Condition 79, Filing ID [A84102](#), Approval [85838](#)) and the Ambient Air Quality Monitoring Plan (AQMP) for the Westridge Marine Terminal, Burnaby Terminal, and Sumas Terminal (Trans Mountain 2020).

The ST AQM station continuously monitors the following air quality parameters: particulate matter less than 2.5 microns (PM<sub>2.5</sub>), nitrogen oxides (NO<sub>x</sub>, NO, NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), total reduced sulphurs (TRS), ozone (O<sub>3</sub>), black carbon (BC), visibility, benzene, toluene, ethylbenzene, and xylene (BTEX). The ST AQM station also continuously monitors the following meteorological parameters: wind speed, wind direction, ambient temperature, relative humidity, barometric pressure, and precipitation. Data validity for all parameters, except xylenes was in the statistically significant acceptable range of greater than 75% for the monitoring period.

Throughout the period from January 1, 2025, to December 31, 2025, there were three (3) exceedances of the AAQOs reported specifically, exceeding the 24-hour rolling average AAQO of 25 µg/m<sup>3</sup> for PM<sub>2.5</sub>. The exceedances were attributed to wildfire smoke in the region during early September. There were no exceedances of the annual AAQOs for PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub>, or benzene.

Overall, monitoring indicates ST operations are not likely having an adverse impact on local or regional ambient air quality.



## 2 BACKGROUND

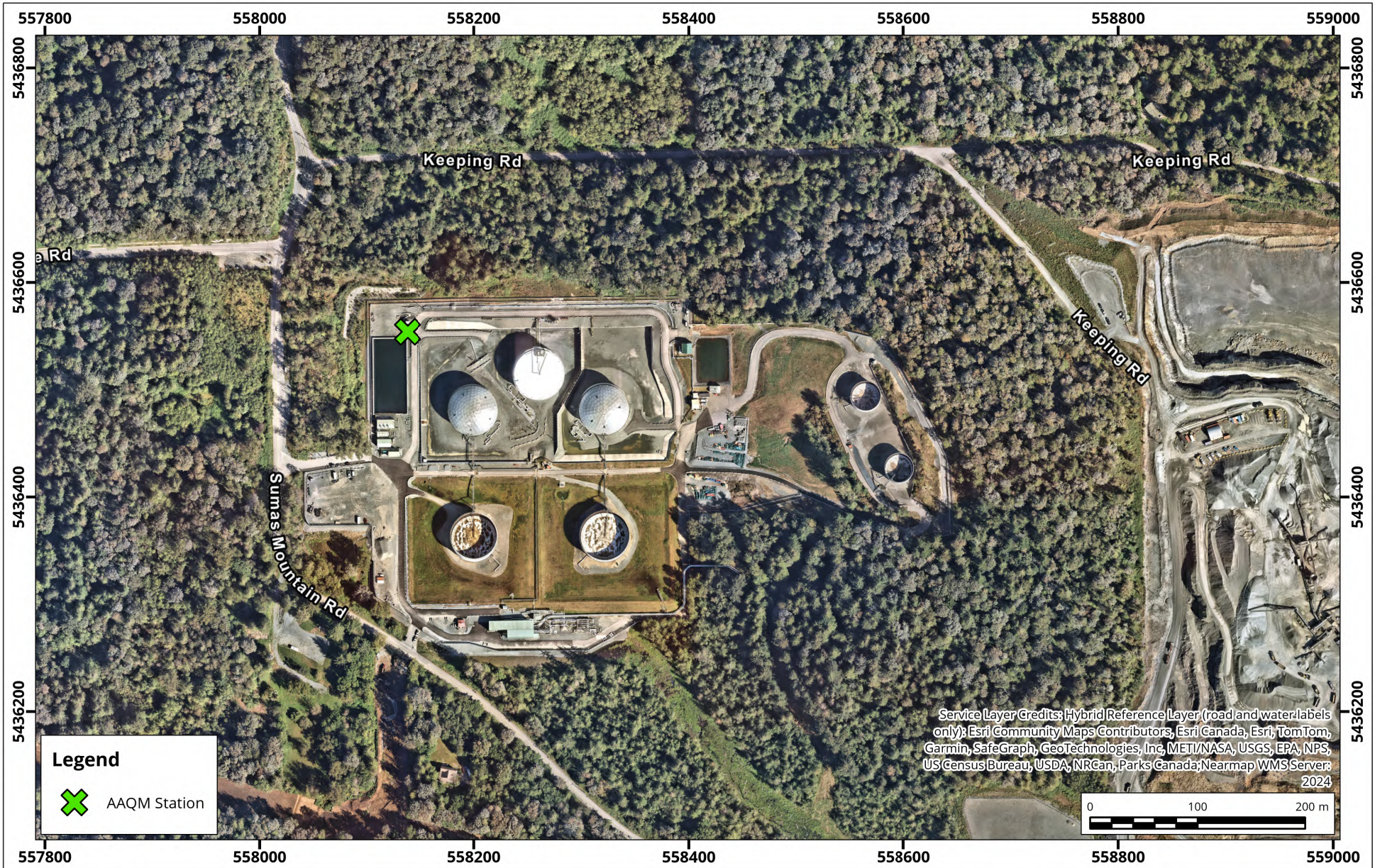
### 2.1 Geographical Area

The location of the ST AQM station is shown in **Figure 1**. The ST AQM station is in the northwest corner of the ST at 36969 Keeping Rd, Abbotsford, located within a depression in the upper section of Sumas Mountain. The surrounding land use around ST is a mixture of forest, residential and quarry areas. Mature trees directly surround the property. To the north and west lies a mix of rural properties and subdivisions, and forested lands. There are two quarries and aggregate suppliers located to the south and southeast.

### 2.2 Air Emission Sources

The ST is a storage facility located along the Trans Mountain Pipeline System within the Lower Mainland. The emission sources at ST include VOCs from five storage tanks and routine engine testing of the emergency generators and diesel fire water pumps.

The two quarry and aggregate suppliers to the south and southeast are expected to be emission sources of particulate matter.



## Air Quality Monitoring Station Location Sumas Terminal

Map Projection: NAD 1983 UTM Zone 10N  
Trans Mountain Pipeline - Abbotsford, B.C.



Drawn by: PIP Figure: 1

Approx. Scale: 1:5,000

Date Revised: Feb 26, 2025

Project #: 2105728





### 3 MONITORING INSTRUMENTS

The ST AQM station is equipped with air quality and meteorological monitoring instruments shown in Table 1. The ambient air quality and meteorological parameters being monitored are recorded at 1-minute and 60-minute intervals, as per British Columbia Field Sampling Manual’s requirement, on a Campbell Scientific CR1000x datalogger. The data is stored on the datalogger but is also pushed to a central database for processing and backup. Data is automatically checked using an automated diagnostic observation tool called HORNET and by a technician daily to ensure maximum uptime and data quality of the monitoring parameters. As required by CER Condition 79, the hourly raw data is also publicly available on the Envision data platform and accessible through the Trans Mountain website.

**Table 1. Air Quality and Meteorological Monitoring Instrumentation**

Instrument	Parameters measured	Units
Thermo Sharp 5030i	Particulate Matter <sub>2.5</sub> (PM <sub>2.5</sub> )	µg/m <sup>3</sup>
Thermo 42iQTL	Nitric Oxide/Nitrogen Dioxide/Total Nitrogen Oxides (NO/NO <sub>2</sub> /NO <sub>x</sub> )	ppb
Thermo 43iQTL	Sulphur Dioxide (SO <sub>2</sub> )	ppb
Thermo 49iQ	Ozone (O <sub>3</sub> )	ppb
Thermo 43iQTL with CDN101	Total Reduced Sulphur (TRS)	ppb
AMA GC 5000	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	ppb
Nikira OEA	Visibility	km
CSCC Field Camera	Visibility	N/A
Magee AE-33 Aethalometer	Black Carbon (BC)	ng/m <sup>3</sup>
R.M. Young 5305-10-L	Wind speed and wind direction	m/s and Degrees
Ott Pluvio	Precipitation	mm
Vaisala HC2-S3-L	Relative humidity and air temperature	% and °C
CS 106	Barometric pressure	mb

The gas analyzers (Thermo 43iQTL, 43iQTL with CDN101, and 49iQ) are zero and span checked daily using the internal zero (charcoal and/or Purafil cartridge) and span (permeation wafer in an internal permeation oven) system, referred to as the IZS system. The AMA GC 5000 and Thermo 42iQTL are also zero and span checked daily, but with certified standard span gas and a dilution system. Automatic IZS checks are performed daily, and the checks consist of a zero and span check followed by a purge over a 30 min time period. These checks provide

a way to monitor daily performance of the analyzer. The IZS checks are not for calibration purposes but are a diagnostic tool to identify instrument drift. Monthly calibration visits are undertaken to perform full range linear calibrations and maintenance for all the analyzers.

### **3.1 PM<sub>2.5</sub>**

The SHARP 5030i is a hybrid nephelometric/radiometric particulate mass monitor capable of providing precise, real-time measurements with a superior detection limit. The SHARP unit incorporates a high sensitivity light scattering photometer whose output signal is continuously referenced to the time-averaged measurement of an integral beta attenuating mass sensor. The SHARP unit also incorporates a dynamic inlet heating system designed to maintain the relative humidity of the air passing through the filter tape to be constant.

The SHARP 5030i monitor is calibrated once a month to ensure accuracy and validity of its data. The PM<sub>2.5</sub> inlet head and sharp cut cyclone are located on the roof of the AQM building. The inlet and cyclone are cleaned routinely to ensure performance. The monthly calibration process consists of the following: zeroing the nephelometer if necessary, calibration of ambient temperature, calibration of barometric pressure, and flow calibration. Instrument mass foil checks are performed quarterly or if diagnostics indicate a requirement to do so in accordance with the BCFM (Section 10 of SOP-05b).

### **3.2 NITROGEN OXIDES**

The Thermo 42iQTL trace level Nitrogen Oxide (NO<sub>x</sub>) analyzer uses chemiluminescence detection, coupled with microprocessor technology to provide sensitivity and stability for ambient air quality applications. The instrument determines real-time concentration of nitric oxide (NO), total nitrogen oxides (NO<sub>x</sub>) (the sum of NO and NO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>). The amount of NO is measured by detecting the chemiluminescence reaction that occurs in the reaction cell when NO molecules are exposed to ozone (O<sub>3</sub>). The NO and O<sub>3</sub> molecules collide in the reaction cell and enter a higher energy state.

When these excited molecules return to a stable energy state, they emit a photon of light which is proportional to the amount of NO in the sample stream of gas entering the analyzer.

To determine the total NO<sub>x</sub> (NO+NO<sub>2</sub>) measurement, sample gas is periodically bypassed through a heated molybdenum converter cartridge that converts any NO<sub>2</sub> molecules in the sample stream into NO (any existing NO molecules in the stream remain as is). The instrument will switch the sample stream through the converter periodically and then through the reaction cell where the same chemiluminescence reaction occurs with ozone.

The resultant response produced is now the sum of NO and converted NO<sub>2</sub>, producing a NO<sub>x</sub> measurement. The resultant NO<sub>2</sub> determination is the NO<sub>x</sub> measurement subtracted from the NO measurement.

### 3.3 SULPHUR DIOXIDE

The Thermo 43iQTL trace level Sulphur Dioxide (SO<sub>2</sub>) analyzer is a microprocessor-controlled analyzer that determines the concentration of SO<sub>2</sub> in a sample gas drawn through the instrument. In the sample chamber, sample gas is excited by ultraviolet light causing the SO<sub>2</sub> to absorb energy from the light and move to an active state (SO<sub>2</sub>\*). These active SO<sub>2</sub>\* molecules must decay into a stable state back to SO<sub>2</sub>, and when this happens a photon of light is released which is recognized by the instrument as fluorescence. The instrument measures the amount of fluorescence to determine the amount of SO<sub>2</sub> present in the sample gas.

### 3.4 OZONE

Monitoring for Ozone (O<sub>3</sub>) was conducted using a Thermo 49iQ analyzer to provide sensitivity and stability for ambient air quality applications. The instrument determines real-time concentration of O<sub>3</sub> in a sample gas drawn through the instrument. The sample is split into two gas streams using solenoids, one stream is stripped of O<sub>3</sub> by a scrubber to become a reference gas. Each stream is then intermittently stored in two different cells within which the UV light intensities are measured, and the instrument calculates the O<sub>3</sub> concentrations.

### 3.5 TOTAL REDUCED SULPHUR

TRS monitoring used a Thermo 43iQTL Trace level continuous SO<sub>2</sub> analyzer in conjunction with an CDN-101 thermal oxidizer convertor (oxidizer). This instrument is a two-fold device. Sample air first passes through SO<sub>2</sub> scrubber beads to eliminate any SO<sub>2</sub> molecules that might be in the sample air stream. Sample air is then passed through a glass tube surrounded by an oven inside of the oxidizer which is continuously heated to 800°C. It is here where any reduced sulphur compounds are converted into SO<sub>2</sub> molecules. The sample air is then directed to the SO<sub>2</sub> analyzer.

The 43iQTL is a microprocessor-controlled analyzer that determines the concentration of SO<sub>2</sub> in a sample gas drawn through the instrument. In the sample chamber, sample gas is exposed to pulsating ultraviolet light which causes the SO<sub>2</sub> molecules to become excited and enter into a higher energy state.

When the light is shut off during one of the pulse cycles, these excited SO<sub>2</sub> molecules decay into a lower energy state where fluoresced light is emitted proportionally to the SO<sub>2</sub> concentration in the gas stream. This fluorescence is read by a photo-multiplier tube and the instrument reports the concentration of SO<sub>2</sub> in a ratio of 1:1 for TRS.

### 3.6 BTEX

Monitoring of benzene, toluene, ethylbenzene, m, p-xylenes and o-xylene (BTEX) was completed using an AMA Gas Chromatograph (GC) 5000 BTX fitted with a flame ionization detector (FID). An ambient air sample is drawn into the instrument every 15 min and the gaseous eluent is ignited to produce gas-phase ions of the analytes of interest. These ions are detected by an electrode and the integration of the electrical signal produced is calibrated and used to quantify the concentration of each analyte in the sample. An AMA HG 500 ultra-high



purity generator uses deionized water and compressor to generate ultra-high purity Hydrogen (H<sub>2</sub>) as a supply gas for the FID flame and act as a carrier gas for the GC.

### **3.7 VISIBILITY**

Visibility monitoring was conducted using a Nikira Optical Extinction Analyzer (Model NIK-OEA-52001-C01OP). The instrument combines open-path cavity ringdown measurements with a patented self-referencing system to rapidly measure the optical extinction coefficient of ambient aerosols. Ambient air is drawn into the cavity at ~1 m/s where direct optical extinction coefficient measurement is made. The cavity is closed off to ambient air and purged with filtered air to provide a background measurement to use in a comparison calculation for aerosol optical extinction. A Campbell Scientific CFCC field camera takes photographs of the horizon each hour of the day so the OEA visibility readings can be confirmed by visual records.

### **3.8 BLACK CARBON**

Black carbon (BC) is measured using a Magee Model AE33 Aethalometer which collects aerosol particles continuously by drawing the aerosol laden air stream through a spot on a filter tape. The aerosols were analyzed by the transmission of light through one portion of the filter tape containing the sample compared to an unloaded portion of the filter tape. This analysis relied on 7 wavelengths spanning near infra-red to near ultraviolet. The aethalometer calculates the concentrations of optically absorbing aerosols from the rate of attenuation of light transmitted through the filter. The results of the two sample spots are combined to determine the BC mass concentration. Each month the readings are validated via checking the flow through the unit and the use of neutral density filters measuring the attenuation of each of the wavelengths.

### **3.9 METEOROLOGY**

The Sumas AQM station continuously monitors wind speed (WS) and wind direction (WD) using a 20 m tower mounted R.M. Young Model 5305-10-L Wind Speed/Wind Direction sensor. Relative humidity and temperature are measured using a Vaisala HC2-S3-L probe. Barometric pressure is measured using Model CS 106. Precipitation is measured using an Ott Pluvio, a highly sensitive weight-based measurement system that maximizes capture and quantification of snow and rain, with the attachment of a wind shield and antifreeze inside the collection bucket. Meteorological equipment is physically inspected ranging from 3 months to annually, or more frequently, if data QA/QC indicates the need. Calibrations for these sensors are recertified following manufacturer recommendations (typically every 1 to 2 years).

## 4 SUMMARY OF AMBIENT MEASUREMENTS

Data validity is the percentage of hourly values available over the given period of time that remain after final data quality assurance and control checks (QA/QC). For measured values to be compared to hourly, 8-hour, 24-hour and annual average values there needs to be >75% of the data available for each relevant time period in accordance with the Alberta (AB) and BC AAQO as informed by the Canadian Council of Ministers of the Environment (CCME 2019). Similar requirements exist in Alberta and BC in their respective ambient air monitoring guideline documents.

### 4.1 PM<sub>2.5</sub>

During the period from January 1, 2025, to December 31, 2025, the hourly PM<sub>2.5</sub> data validity was 99.7%. Summary statistics are presented in Appendix Tables A1, A2 and A6. There were three days during September (3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup>) that were over the BC 24-hour AAQO (25 µg/m<sup>3</sup>, compared to 24-hour running average). The three days were during hazy conditions, and these exceedances were likely the result of wildfire smoke, with Air Quality Warnings issued for the region. The maximum 24-hour mean was 36.3 µg/m<sup>3</sup>.

The annual mean was 4.5 µg/m<sup>3</sup>, less than the BC annual AAQO (8 µg/m<sup>3</sup>).

### 4.2 NITROGEN OXIDES

During the period from January 1, 2025, to December 31, 2025, the hourly NO<sub>x</sub> data validity was 99.2%. Summary statistics are presented in Appendix Tables A1, A2 and A6.

Achievement of the BC AAQO for NO<sub>2</sub> is not based on direct comparison to the 1-hour concentration to the AAQO level; rather, it is based on the annual 98<sup>th</sup> percentile of the daily maximum 1-hour concentration averaged over one year. The 98<sup>th</sup> percentile of the daily maximum 1-hour concentrations for 2025 was 35.8 ppb, less than the 1-hour BV AAQO of 60 ppb.

The maximum 1-hour mean of NO<sub>x</sub> was 50.9 ppb, and the maximum 1-hour mean of NO<sub>2</sub> was 21.1 ppb. The annual mean NO<sub>x</sub> concentration was 3.6 ppb. The mean NO<sub>2</sub> concentration was 3.1 ppb, less than the annual NO<sub>2</sub> AAQO (17 ppb).

### 4.3 SULPHUR DIOXIDE

During the period of January 1, 2025, through December 31, 2025, hourly SO<sub>2</sub> data validity was 99.4%. Summary statistics are presented in Appendix Tables A1, A2 and A6.

The highest 1-hour concentration for SO<sub>2</sub> was 1.2 ppb, less than the 1-hour AAQO of 65 ppb. The annual mean concentration was 0.4 ppb, less than the AAQO of 4 ppb.



## 4.4 OZONE

During the period of January 1, 2025, through December 31, 2025, the hourly O<sub>3</sub> data validity was 94.1%. Summary statistics are presented in Appendix Tables A1, A2 and A6.

The maximum 1-hour and 8-hour values were 78.3 and 54.2 ppb, respectively, both less than their respective AAQOs.

## 4.5 TOTAL REDUCED SULPHUR

During the period of January 1, 2025, through December 31, 2025, the hourly TRS data validity was 99.0%. Summary statistics are presented in Appendix Tables A1, A2 and A6. There were no measured 1-hour average events exceeding the BC Pollution Control Objective (PCO) of 5 ppb (also listed as AAQO). The annual highest 1-hour mean was 2.1 ppb. None of the 24-hour average TRS readings exceeded the BC PCO (AAQO) of 2 ppb; the maximum 24-hour TRS value recorded was 1.0 ppb.

## 4.6 BTEX

During the period of January 1, 2025, through December 31, 2025, the hourly BTEX data validity was 84.9% except for xylenes which had data availability of 70.4%. Summary statistics are presented in Appendix Tables A3, A4 and A6. A poor calibration in July caused the O-xylene measurements to be invalidated, resulting in the xylene readings (sum of MP-xylene and O-xylene), also needing to be invalidated.

Trans Mountain compares measured benzene, toluene, ethylbenzene and xylenes values to the Alberta AAQOs, as BC does not have objectives for these pollutants.

There were no events that were over the benzene, toluene, ethylbenzene, or xylene 1-hour and 24-hour AAQOs during the period from January 2025 to December 2025. The maximum 1-hour mean values of benzene, toluene, ethylbenzene and xylene were 6.9 ppb, 10.5 ppb, 2.1 ppb, 8.0 ppb, less than their respective AAQOs. The annual mean value of benzene was 0.1 ppb, less than the annual AAQO of 0.9 ppb.

## 4.7 VISIBILITY

During the period of January 1, 2025, through December 31, 2025, the hourly visibility data validity was 99.8%. Summary statistics are presented in Appendix Table A5. The minimum 1-hour mean monthly values were measured in September of 2025 (7.2 km). The mean annual value was 336.4 km.

Images are captured by a camera every hour onsite and can be made available for future reference. There are no criteria in BC for visibility. Based on a theoretical distance provided by the manufacturer, RWDI invalidates data over 15,000 km to eliminate extreme values.



## 4.8 BLACK CARBON

During the period of January 1, 2025, through December 31, 2025, the hourly black carbon data validity was 99.5%. Summary statistics are presented in Appendix Table A5. August 2025 had the highest 1-hour mean of 9741.8 ng/m<sup>3</sup>. The annual mean value was 192.7 ng/m<sup>3</sup>. There are no BC or AB AAQOs for black carbon.

## 4.9 METEOROLOGY

During the period of January 1, 2025, through December 31, 2025, the hourly meteorological valid data was above 99%. Summary statistics are presented in Appendix Tables A7 and A8. The ambient temperature, barometric pressure, precipitation, and relative humidity sensors are connected to the same data logger in the AQM station and the short downtime events were due to updates to the logger program.

A wind rose, which visually plots the joint frequencies of wind speed and wind direction, is shown in **Figure 2** for 2025.

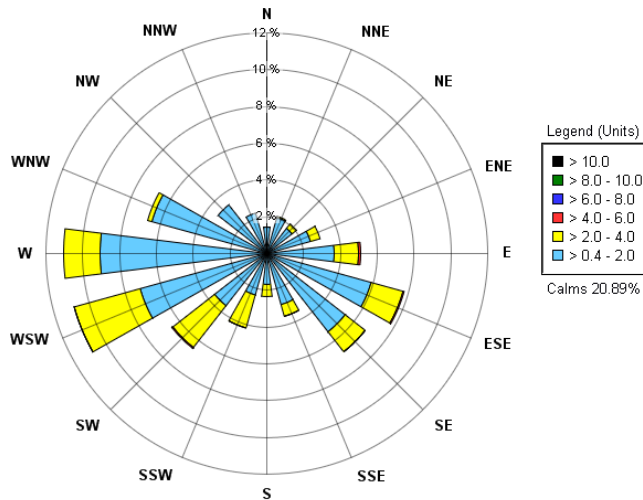


Figure 2 Sumas Terminal Wind Rose - January 2025 to December 2025



## 5 DISCUSSION

Data validity for most parameters met the minimum data completeness criteria acceptable range of > 75% over the year, with the exception of xylenes. Due to a failed calibration, the O-xylene and xylene only had a 70.2% availability. When possible, the ST AQM station data were compared with the Metro Vancouver Burnaby Kensington Park, Burnaby Mountain, and Abbotsford Airport AQM stations, and the Trans Mountain Burnaby Terminal AQM station. Comparison of the same hourly readings showed a close agreement in measurements, suggesting that a reliable data set was achieved at the Sumas Terminal.

Throughout the period from January 1, 2025, to December 31, 2025, there was three (3) exceedances above the BC 24-hour average AAQO of 25  $\mu\text{g}/\text{m}^3$  for  $\text{PM}_{2.5}$  on September 3, 4 and 5, 2025. Metro Vancouver issued an air quality advisory for the region, and the exceedances were attributed to wildfire smoke. There were no exceedances of the BC annual AAQOs for  $\text{PM}_{2.5}$ ,  $\text{NO}_2$ ,  $\text{SO}_2$ , or benzene.

## 6 REFERENCES

Trans Mountain Pipeline, 2017. Air Emissions Management Plan for Sumas and Burnaby Terminals. Trans Mountain Expansion Project. CER Condition 79.

Trans Mountain Pipeline, 2020. Ambient Air Quality Monitoring Plan for the Westridge Marine Terminal, Burnaby Terminal and Sumas Terminal. Trans Mountain Expansion Project.

## 7 GENERAL STATEMENT OF LIMITATIONS

This report entitled Sumas Terminal 2025 Annual Air Quality and Meteorological Monitoring Report was prepared by RWDI AIR Inc. ("RWDI") for Trans Mountain ("Client"). The findings and conclusions presented in this report have been prepared for Trans Mountain 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 Trans Mountain. 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.

A large decorative graphic on the left side of the page. It features a blue triangular shape at the top left, which is partially overlapped by a white curved line. Below this line is a large, light grey curved shape that fills most of the lower half of the page.

# APPENDIX A

**Table A1. Trans Mountain Sumas Maximum 1-hour and Maximum 24-hour Summary Statistics**

Sumas Terminal 2025 Statistics	Maximum 1-Hour Mean							Maximum 24-Hour Mean						
Compound	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	NO <sub>2</sub>	SO <sub>2</sub>	TRS	O <sub>3</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	NO <sub>2</sub>	SO <sub>2</sub>	TRS	O <sub>3</sub>
Units	µg/m <sup>3</sup>	ppb						µg/m <sup>3</sup>	ppb					
<b>AAQO</b>	—	—	—	<b>60<sup>[1]</sup></b>	<b>65<sup>[2]</sup></b>	<b>5<sup>[3]</sup></b>	<b>82</b>	<b>25<sup>[4]</sup></b>	—	—	—	—	<b>2<sup>[4]</sup></b>	—
January	39.3	48.2	27.1	21.1	0.7	2.1	41.0	9.5	13.6	3.8	10.6	0.4	1.0	31.5
February	15.7	23.8	8.8	18.1	0.5	1.4	N/A	6.8	10.2	1.7	8.5	0.5	1.0	N/A
March	22.1	26.2	14.6	15.7	0.5	1.6	46.5	9.0	6.1	1.6	4.9	0.4	0.8	41.0
April	18.5	15.9	5.0	11.0	0.7	0.9	46.9	8.0	4.5	0.8	4.0	0.5	0.5	39.8
May	16.6	12.5	4.5	10.0	0.6	0.7	59.5	7.2	4.0	0.6	3.8	0.4	0.3	37.9
June	15.9	14.4	6.4	9.9	0.7	0.7	61.4	10.6	4.4	1.1	3.4	0.4	0.2	32.7
July	18.1	22.0	11.6	11.3	1.0	0.9	62.1	9.0	5.4	1.3	4.6	0.6	0.3	39.6
August	33.2	21.0	11.8	13.8	0.9	0.8	76.1	17.2	11.0	2.3	8.8	0.5	0.3	39.3
September	75.7	21.2	12.2	11.3	0.9	1.2	78.3	<b>36.3</b>	6.5	1.4	5.2	0.4	0.3	30.8
October	24.2	29.0	9.4	19.7	0.8	1.0	48.4	9.1	8.7	1.3	7.4	0.5	0.6	35.9
November	13.1	50.9	36.1	16.4	0.5	0.8	50.3	6.0	7.9	2.9	6.2	0.5	0.5	41.2
December	22.2	26.9	9.4	18.3	1.2	0.8	49.8	9.0	7.5	1.8	6.1	0.5	0.7	44.3
Annual	75.7	50.9	36.1	21.1	1.2	2.1	78.3	<b>36.3</b>	13.6	3.8	10.6	0.6	1.0	44.3

**Notes:**

— No AAQO available

<sup>[1]</sup> British Columbia 1-hour NO<sub>2</sub> AAQO based on 98<sup>th</sup> percentile of daily maximum 1-hour concentrations averaged over 3 consecutive years.

<sup>[2]</sup> British Columbia 1-hour SO<sub>2</sub> AAQO based on 99<sup>th</sup> percentile of daily maximum 1-hour concentrations averaged over 3 consecutive years.

<sup>[3]</sup> British Columbia 1-hour and 24-hour average TRS Pollution Control Objectives (AAQO).

<sup>[4]</sup> British Columbia 24-hour PM<sub>2.5</sub> AAQO based on annual 98<sup>th</sup> percentile of daily average, over one year.

N/A- Not available: Data validity is below 75%.

**Bold text indicates an exceedance of AAQO**

PM<sub>2.5</sub> (particulate matter less than 2.5 microns); NO<sub>x</sub>, NO, NO<sub>2</sub> (nitrogen oxides); SO<sub>2</sub> (sulphur dioxide); TRS (total reduced sulphurs); O<sub>3</sub> (ozone)

**Table A2. Trans Mountain Sumas Monthly Mean and Valid Data Summary Statistics**

Sumas Terminal 2025 Statistics	Monthly Mean							Valid Data						
Compound	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	NO <sub>2</sub>	SO <sub>2</sub>	TRS	O <sub>3</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	NO <sub>2</sub>	SO <sub>2</sub>	TRS	O <sub>3</sub>
Units	µg/m <sup>3</sup>	ppb						Percentage of Time (hourly)						
AAQO	8 <sup>[1]</sup>	—	—	17 <sup>[1]</sup>	4 <sup>[1]</sup>	—	—							
January	3.6	6.0	1.1	4.9	0.3	0.8	17.5	99.7	97.7	97.7	97.7	98.9	98.8	98.8
February	2.6	4.1	0.4	3.7	0.4	0.8	N/A	99.7	99.4	99.4	99.4	99.6	99.4	44.3
March	2.2	3.1	0.5	2.7	0.3	0.7	27.6	99.7	99.5	99.5	99.5	99.6	95.0	98.9
April	4.2	2.6	0.3	2.3	0.4	0.1	30.5	99.6	99.6	99.6	99.6	99.4	99.6	98.8
May	4.0	2.5	0.3	2.3	0.4	0.1	30.6	99.6	99.6	99.6	99.6	99.5	99.3	98.4
June	5.5	2.8	0.4	2.4	0.3	0.1	25.6	99.7	99.3	99.3	99.3	99.6	99.4	98.8
July	5.7	3.4	0.6	2.8	0.4	0.1	25.3	99.7	99.6	99.6	99.6	99.6	99.6	98.4
August	7.5	3.8	0.6	3.3	0.4	0.1	22.4	99.7	99.6	99.6	99.6	99.6	99.6	98.5
September	9.3	4.1	0.7	3.4	0.3	0.1	18.8	99.3	98.5	98.5	98.5	98.6	99.4	98.6
October	3.6	3.6	0.4	3.3	0.4	0.4	25.3	100.0	99.3	99.3	99.3	99.5	99.3	98.9
November	3.4	3.2	0.5	2.8	0.4	0.4	27.2	99.4	98.9	98.9	98.9	98.9	99.3	98.9
December	2.4	3.4	0.4	3.0	0.4	0.5	30.0	99.7	99.6	99.6	99.6	99.6	98.9	98.5
Annual	4.5	3.6	0.5	3.1	0.4	0.3	25.5	99.7	99.2	99.2	99.2	99.4	99.0	94.1

**Notes:**

— No AAQO available

N/A- Not available: Data validity is below 75%.

<sup>[1]</sup> British Columbia AAQO annual average of 1-hour concentrations, over one year.

PM<sub>2.5</sub> (particulate matter less than 2.5 microns); NO<sub>x</sub>, NO, NO<sub>2</sub> (nitrogen oxides); SO<sub>2</sub> (sulphur dioxide); TRS (total reduced sulphurs); O<sub>3</sub> (ozone)

**Table A3. Trans Mountain Sumas Maximum 1-hour and Maximum 24-hour BTEX Summary Statistics**

Sumas Terminal 2025 Statistics	Maximum 1-Hour Mean				Maximum 24-Hour Mean			
Compound	Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Toluene	Ethylbenzene	Xylenes
Units	ppb				ppb			
<b>AAQO</b>	<b>9<sup>[1]</sup></b>	<b>499<sup>[1]</sup></b>	<b>460<sup>[1]</sup></b>	<b>530<sup>[1]</sup></b>	—	<b>106<sup>[2]</sup></b>	—	<b>161<sup>[2]</sup></b>
January	3.5	7.6	2.1	8.0	0.8	2.4	0.7	2.8
February	4.2	9.3	2.0	6.2	0.6	1.7	0.6	2.3
March	3.8	6.5	1.3	4.8	0.5	1.3	0.4	1.5
April	1.5	6.9	1.8	4.6	0.3	0.9	0.2	0.7
May	0.2	0.8	0.7	0.8	0.1	0.2	0.2	0.1
June	0.5	0.8	0.8	1.1	0.1	0.2	0.1	0.3
July	6.9	10.5	1.4	N/A	0.1	0.3	0.1	N/A
August	1.5	4.3	1.2	N/A	0.1	0.3	0.1	N/A
September	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
October	0.5	1.7	0.5	1.1	0.1	0.6	0.1	0.3
November	0.3	2.1	0.5	1.4	0.1	0.7	0.1	0.4
December	0.9	4.7	1.1	3.5	0.2	1.1	0.2	0.6
Annual	6.9	10.5	2.1	8.0	0.8	2.4	0.7	2.8

**Notes:**

— No AAQO available

<sup>[1]</sup> Alberta 1-hour AAQO. British Columbia does not have an AAQO.

<sup>[2]</sup> Alberta 24-hour AAQO. British Columbia does not have an AAQO.

N/A- Not available: Data validity is below 75%.

**Bold text indicates an exceedance of AAQO**

**Table A4. Trans Mountain Sumas Monthly Mean and Valid Data BTEX Summary Statistics**

Sumas Terminal 2025 Statistics	Monthly Mean				Valid Data			
Compound	Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Toluene	Ethylbenzene	Xylenes
Units	ppb				Percentage of Time (hourly)			
<b>AAQO</b>	<b>0.9<sup>[1]</sup></b>	—	—	—				
January	0.2	0.5	0.2	0.6	95.2	95.2	95.2	95.2
February	0.3	0.9	0.2	0.8	95.8	95.8	95.8	95.8
March	0.2	0.5	0.1	0.5	95.8	95.8	95.8	95.8
April	0.1	0.2	0.1	0.2	95.8	95.8	95.8	95.7
May	0.0	0.1	0.1	0.1	95.8	95.8	95.8	95.8
June	0.1	0.1	0.1	0.1	93.8	93.8	93.8	93.8
July	0.1	0.1	0.0	N/A	81.0	81.0	81.0	9.8
August	0.1	0.2	0.1	N/A	75.3	75.3	75.3	0.0
September	N/A	N/A	N/A	N/A	27.8	27.8	27.8	0.0
October	0.1	0.3	0.1	0.1	76.1	76.1	76.1	76.1
November	0.1	0.3	0.1	0.1	91.3	91.3	91.3	91.3
December	0.1	0.4	0.1	0.2	95.3	95.3	95.3	95.3
Annual	0.1	0.3	0.1	0.3	84.9	84.9	84.9	70.4

**Notes:**

— No AAQO available

N/A- Not available: Data validity is below 75%

<sup>[1]</sup> Alberta annual average AAQO.

**Table A5. Trans Mountain Sumas Maximum 1-hour, Maximum 24-hour, Monthly Mean and Valid Data, Visibility and Black Carbon Summary Statistics**

Sumas Terminal 2025 Statistics	Maximum 1-Hour Mean		Maximum 24-Hour Mean		Minimum 1-Hour Mean	Monthly Mean		Valid Data	
	Compound	BC	Visibility <sup>[1]</sup>	BC	Visibility	Visibility	BC	Visibility	BC
Units	ng/m <sup>3</sup>	km	ng/m <sup>3</sup>	km	km	ng/m <sup>3</sup>	km	Percentage of Time (hourly)	
January	1730.7	1024.6	523.8	336.2	33.3	244.8	177.5	99.6	100.0
February	1172.8	7507.6	354.2	1210.2	77.3	155.8	304.8	99.7	99.9
March	2502.7	5261.3	370.4	829.2	53.9	163.5	348.1	99.3	100.0
April	2076.9	4797.7	452.0	603.2	55.8	180.0	286.2	99.4	100.0
May	792.4	3286.4	344.1	807.2	75.2	167.4	278.0	99.6	99.9
June	603.7	5440.3	386.3	775.4	48.2	172.0	192.7	99.6	100.0
July	797.3	5055.0	364.7	516.1	47.2	182.2	183.9	99.6	99.9
August	9741.8	4045.8	786.6	375.0	27.6	274.4	157.1	99.3	100.0
September	2007.2	4588.3	1193.4	454.8	7.2	328.0	142.5	99.2	99.7
October	1519.6	10309.7	434.2	1631.7	37.1	168.1	589.5	99.5	99.7
November	1662.7	13253.8	379.2	1400.3	77.6	157.0	598.8	99.6	99.7
December	925.3	11028.1	260.5	1813.2	51.7	118.7	777.1	99.2	98.7
Annual	9741.8	13235.8	1193.4	1813.2	49.3	192.7	336.3	99.5	99.8

**Notes:**

<sup>[1]</sup> RWDI uses 15,000 km as a maximum cutoff for visibility.

**Table A6. Trans Mountain Sumas 1-hour and 24-hour Average AAQO exceedances**

Sumas Terminal 2025 Event Statistics	1-Hour Average > AAQO								24-Hour Average > AAQO		
Compound	NO <sub>2</sub>	SO <sub>2</sub>	TRS	O <sub>3</sub>	B <sup>[1]</sup>	T <sup>[1]</sup>	E <sup>[1]</sup>	X <sup>[1]</sup>	PM <sub>2.5</sub>	T <sup>[1]</sup>	X <sup>[1]</sup>
AAQO and Units	60	65	5	82	9	499	460	530	25	106	161
Exceedance Count	ppb								µg/m <sup>3</sup>	ppb	
Exceedance Count	Number > AAQO								Number > AAQO		
January	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	<b>3</b>	0	0
October	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0	0	0	0	0
May to December	0	0	0	0	0	0	0	0	<b>3</b>	0	0

**Notes:**

**Bold text indicates an exceedance of AAQO**

<sup>[1]</sup> B-Benzene, T-Toluene, E-Ethylbenzene, X-Xylenes, AAQO adopted from Alberta.

PM<sub>2.5</sub> (particulate matter less than 2.5 microns); NO<sub>2</sub> (nitrogen oxides); SO<sub>2</sub> (sulphur dioxide); TRS (total reduced sulphurs); O<sub>3</sub> (ozone)

**Table A7. Trans Mountain Sumas Maximum 1-hour and Maximum 24-hour Meteorological Summary Statistics**

2025 Meteorological Statistics	Maximum 1-Hour Mean					Minimum 1-Hour Mean				
Parameter	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain
Units	m/s	°C	%	mb	mm	m/s	°C	%	Mb	mm
January	3.6	8.4	100.0	1041.0	4.5	0.0	-3.4	29.2	1000.0	0.0
February	5.2	15.9	100.0	1033.0	8.6	0.0	-8.7	26.4	996.0	0.0
March	4.4	18.4	100.0	1027.0	8.3	0.0	-0.4	24.6	994.0	0.0
April	4.0	23.3	100.0	1030.0	9.4	0.1	1.0	11.6	1006.0	0.0
May	3.9	28.2	100.0	1027.1	7.0	0.0	3.5	21.0	1007.0	0.0
June	3.3	31.0	100.0	1027.0	4.0	0.0	7.0	27.9	1010.0	0.0
July	3.7	32.3	100.0	1024.2	3.7	0.1	8.9	21.9	1009.0	0.0
August	3.2	35.8	100.0	1025.6	4.8	0.0	10.4	17.4	1008.0	0.0
September	3.1	29.4	100.0	1023.0	7.0	0.0	8.4	34.5	1004.4	0.0
October	4.3	19.7	100.0	1032.0	9.5	0.0	3.0	14.6	994.9	0.0
November	5.2	14.4	100.0	1029.0	15.5	0.0	0.3	34.9	998.8	0.0
December	5.4	14.6	100.0	1037.0	7.0	0.0	-2.3	40.8	988.0	0.0
Annual	5.4	35.8	100.0	1041.0	15.5	0.0	-8.7	11.6	988.0	0.0

**Table A8. Trans Mountain Sumas Monthly Mean and Valid Data Meteorological Summary Statistics**

2025 Meteorological Statistics	Monthly Mean					Total	Valid Data					
Parameter	WS	Temp	RH	Pres	Rain	Rain	WS	WD	Temp	RH	Pres	Rain
Units	m/s	°C	%	Mb	mm	mm	%					
January	1.0	2.3	88.6	1026.5	0.1	88.2	100.0	100.0	100.0	100.0	100.0	100.0
February	1.6	2.0	79.4	1016.5	0.2	151.8	100.0	100.0	100.0	100.0	100.0	100.0
March	1.3	7.0	89.1	1011.5	0.3	234.2	99.7	99.7	100.0	100.0	100.0	100.0
April	1.4	10.1	74.3	1019.3	0.1	81.0	99.6	99.6	100.0	100.0	100.0	100.0
May	1.3	12.4	79.7	1017.7	0.1	101.9	100.0	100.0	100.0	100.0	100.0	100.0
June	1.1	15.5	82.5	1017.8	0.1	37.0	100.0	100.0	100.0	100.0	100.0	100.0
July	1.2	18.5	78.5	1017.0	0.0	21.0	100.0	100.0	100.0	100.0	100.0	100.0
August	1.0	19.1	83.0	1017.4	0.1	71.1	100.0	100.0	100.0	100.0	100.0	100.0
September	0.8	16.2	91.9	1015.2	0.1	61.6	100.0	100.0	99.9	99.9	99.9	99.9
October	1.3	10.1	87.5	1016.1	0.2	150.0	100.0	100.0	100.0	100.0	100.0	100.0
November	1.3	7.5	90.3	1016.4	0.3	205.6	100.0	100.0	100.0	100.0	100.0	99.9
December	1.5	5.5	82.6	1014.2	0.4	322.0	99.3	99.3	100.0	100.0	100.0	100.0
Annual	1.2	10.5	83.9	1017.1	0.2	1525.4	99.9	99.9	100.0	100.0	100.0	100.0

**Table A9. Trans Mountain Sumas 24-Hour PM<sub>2.5</sub> Exceedance Summary**

Date	24-hour Average (µg/m <sup>3</sup> )	Wind Speed (m/s)	Wind Direction (deg)	Discussion
September 3, 2025, 1:00-24:00	36.3	0.8	225.1	<p>The PM<sub>2.5</sub> levels rose above the BC AAQO limit of 25 µg/m<sup>3</sup> at 9:00 on September 3, 2025, and stayed above the limit throughout the day, reaching a maximum of 75.7 µg/m<sup>3</sup> at 23:00. Winds were predominantly out of the west southwest.</p> <p>At 10:00 September 3, 2025, Metro Vancouver issued an air quality update stating that Metro Vancouver and the Fraser Valley were experiencing hazy conditions due to wildfire smoke and humid conditions. Wildfires contributing to the region include those just east of Hope, near Whistler, and a large complex of fires in Cariboo area, in addition to fires in the US.</p> <p>It is likely these exceedances are a result of regional wildfire smoke and not the result of activities at the Sumas Terminal.</p>
September 4, 2025, 1:00-24:00	32.7	0.8	193.0	<p>The PM<sub>2.5</sub> levels rose above the AAQO limit of 25 µg/m<sup>3</sup> at 9:00 on September 3, 2025, and stayed above the limit into September 4, 2025. The maximum value on September 4, was 52.2 µg/m<sup>3</sup> at 01:00 and the minimum was 18.1 µg/m<sup>3</sup> at 21:00. Winds were predominantly out of the west.</p> <p>At 14:00 September 4, 2025, Metro Vancouver issued an air quality update to the one issued on September 3, 2025. This warning began on September 3 and is expected to last until there is a change in weather. Cause: Wildfire smoke is impacting air quality in Metro Vancouver and the Fraser Valley. Wildfires contributing to smoke in the region include fires north of Whistler, east of Hope, and a large complex of fires in the Cariboo region, in addition to fires in the US.</p> <p>It is likely these exceedances are a result of regional wildfire smoke and not the result of activities at the Sumas Terminal</p>

Date	24-hour Average ( $\mu\text{g}/\text{m}^3$ )	Wind Speed (m/s)	Wind Direction (deg)	Discussion
September 5, 2025, 1:00-24:00	27.6	0.6	198.3	<p>The <math>\text{PM}_{2.5}</math> levels rose above the AAQO limit of <math>25 \mu\text{g}/\text{m}^3</math> at 9:00 on September 3, 2025, and stayed above the limit into September 4, and through to September 5<sup>th</sup>, 2025. The maximum value on September 5, was <math>37.5 \mu\text{g}/\text{m}^3</math> at 13:00 and the minimum was <math>14.7 \mu\text{g}/\text{m}^3</math> at 18:00. Winds were predominantly out of the west.</p> <p>At 14:00 September 4, 2025, Metro Vancouver issued an air quality update to the one issued on September 3, 2025. This warning began on September 3 and is expected to last until there is a change in weather. Cause: Wildfire smoke is impacting air quality in Metro Vancouver and the Fraser Valley. Wildfires contributing to smoke in the region include fires north of Whistler, east of Hope, and a large complex of fires in the Cariboo region, in addition to fires in the US.</p> <p>It is likely these exceedances are a result of regional wildfire smoke and not the result of activities at the Sumas Terminal</p>