newgold Rainy River Project

**NEW GOLD INC.
RAINY RIVER PROJECT**

**AIR QUALITY MONITORING PROGRAM
FOURTH QUARTER 2017 REPORT**

Submitted by:

**Amec Foster Wheeler Environment & Infrastructure
160 Traders Blvd. E., Suite 110
Mississauga, Ontario
L4Z 3K7**

**February 2018
TC111504**

February 15, 2018
TC111504

Mr. Nigel Fisher
Ms. Twila Griffith
New Gold Inc.
Rainy River Project
5967 Hwy 11 / 71, P.O. Box 5
Emo, Ontario
P0W 1E0

Dear Mr. Fisher, Ms. Griffith:

**Re: Rainy River Project Air Quality Monitoring Program
        Fourth Quarter 2017 Report**

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to submit to New Gold Inc. (New Gold) the attached summary report of the fourth quarter (Q4) 2017 results for the ambient air quality monitoring program at the Rainy River Project.

The monitoring program consists of two air quality sampling stations that were established in May 2015: one to the south of the Site near the beginning of the Highway 600 reroute on Tait Road, and one to the east of the Site on Gallinger Road. The sampling stations are operated and maintained by New Gold staff; Amec Foster Wheeler staff performed quarterly calibrations, provided technical guidance to New Gold field staff, communicated with the laboratory staff as required, and prepared the data summary report.

Amec Foster Wheeler will supply the MOECC with raw and edited data per the Operations Manual for Air Quality Monitoring in Ontario (MOECC 2016b).

The key finding(s) of the Q4 2017 monitoring are as follow:

- There were no exceedances of the total suspended particulate (TSP), metals, or dustfall Ambient Air Quality Criteria, or the $PM_{2.5}$ Canadian Ambient Air Quality Standard measured in Q4 2017.

The measured TSP and $PM_{2.5}$ concentrations for the Q4 2017 are depicted in Figures CL-1 and CL-2.

Should you have any questions or wish to discuss the air monitoring program, please do not hesitate to contact the undersigned.

<Original signed by>   <Original signed by>

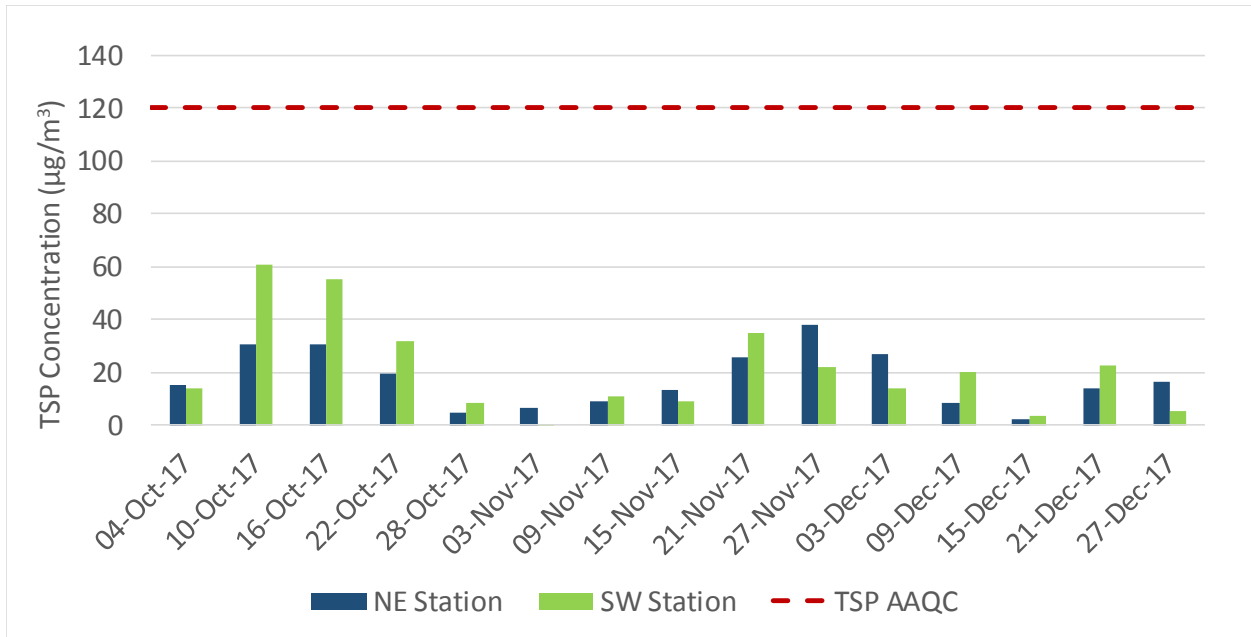Caleb Vandenberg, P.Eng.   Dan Russell, P.Geo.
Air Quality Engineer   Senior Environmental Geoscientist

Figure CL-1: TSP Concentrations (Q4 2017)
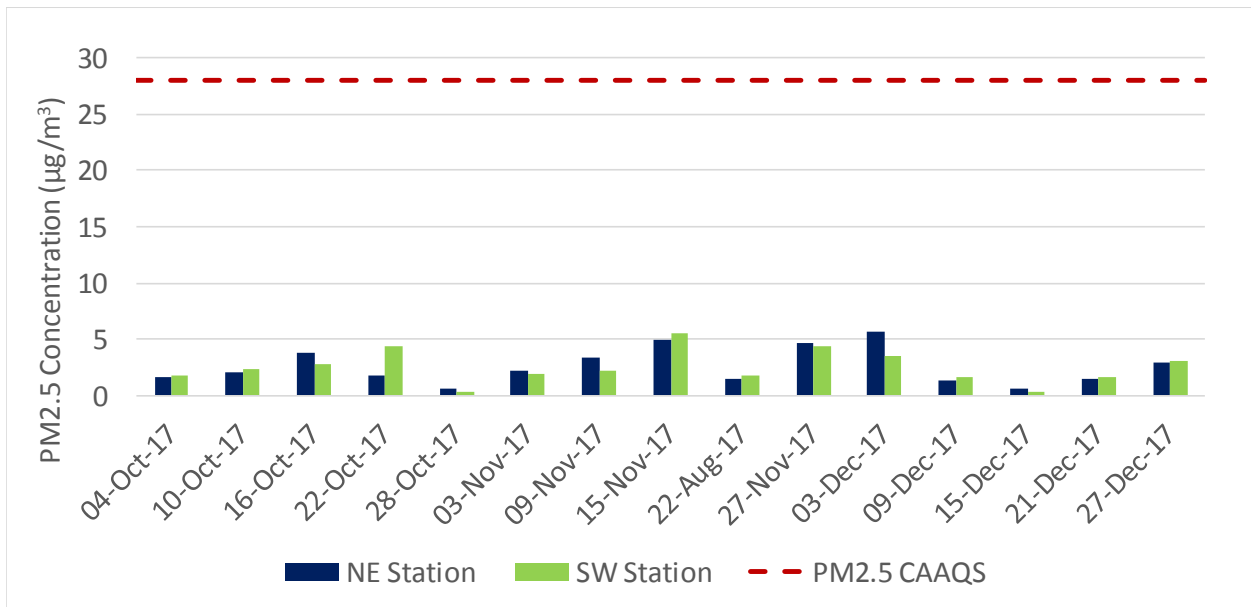
Figure CL-2: PM₂.₅ Concentrations (Q4 2017)

ACRONYMS AND ABBREVIATIONS

AAQC	Ambient Air Quality Criteria
AAQO	Alberta Ambient Air Quality Objectives
ACFM	Cubic Feet Per Minute at Actual Conditions
AEP	Alberta Environment and Parks
ASTM	American Society for Testing and Materials
CAAQS	Canadian Ambient Air Quality Standards
Hi-Vol	High Volume Sampler
ICP/AES	Inductively Coupled Plasma Atomic Emission Spectroscopy
LPM	Litres Per Minute
MOECC	Ministry of the Environment and Climate Change
NIST	National Institute of Standards and Technology
TSP	Total Suspended Particulate
PM_{10}	Particulate Matter less than 10 microns in diameter
US EPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per Cubic Metre

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1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide a summary of the Fourth Quarter (Q4) 2017 results for the air quality monitoring program undertaken at the Rainy River Project located in northwestern Ontario. Two sampling stations were established in May 2015: one to the south of the Site near the beginning of the Highway 600 realignment at Tait Road, and one to the east of the Site on Gallinger Road (Figures 1-1, 1-2 and 1-3).

New Gold Inc. (New Gold) staff operate and maintain the sampling stations. Amec Foster Wheeler staff performed quarterly calibrations, provided technical guidance to New Gold field staff, communicated with the laboratory staff as required, and prepared the data summary report.

This Quarterly Air Quality Report addresses the required elements of a Quarterly Report defined in the Operations Manual for Air Quality Monitoring in Ontario (MOECC 2016b), hereafter referred to as the Operations Manual. Specifically, the following information is provided:

- Summary statistics;
- Sampling dates (start and end where applicable); and
- A summary of exceedances of an Ontario Standard, Ambient Air Quality Criterion (AAQC), or Canadian Ambient Air Quality Standard (CAAQS).

The purpose of the air monitoring program is to quantify potential air quality effects associated with activities related to the Project. The monitoring program consists of:

- Two High Volume (Hi-Vol) samplers for discrete sampling of Total Suspended Particulate (TSP) and metals;
- Two PQ200 samplers for discrete sampling of respirable particulate matter ($PM_{2.5}$);
- Two standard passive dustfall collection units;
- Two passive sampling enclosures each measuring NO_2 and SO_2; and
- One meteorological station to obtain real-time site wind speed, wind direction, temperature, relative humidity, and precipitation.

LEGEND

- 🟡 Ambient Air Quality Monitoring Stations
- ⬛ New Gold - Rainy River Property Boundary
- ⬜ New Gold Lands with No Current Access Control

Proposed Site Features

- Ⓟ Underground Portal
- ⬭ Open Pit
- ▢ Plant Site / Ancillary Facilities
- ▢ Explosives Facilities
- ▢ Overburden / West Mine Rock Stockpile
- ▢ Ore / East Mine Rock Stockpile
- ▢ Proposed Pump House
- ▢ Tailings Management Area
- Aggregate Pit / Quarry
- Site Roads
- Roads
- Existing Transmission Line
- First Nation Land

NOTES:
- Road and Utility data and topographic data extracted from Land Information Ontario, Ontario Road Network, MNR Queen's Printer for Ontario, 2011-2012
- Land tenure information and parcels provided by NewGold, December 16, 2016

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RAINY RIVER PROJECT

Ambient Air Monitoring Stations

Datum: NAD83
Projection: UTM Zone 15N

PROJECT N°: TC111504   FIGURE: 1-1

SCALE: 1:100,000   DATE: August 2017

P:\EMP\Projects\2011\TC111504 Rainy River\GIS\Air Baseline\MXD MapsIRR NG Property Ambient_quality monitoring6.mxd

LEGEND

Southwest Monitoring Station (Tait Road)

- - - - Highway Re-alignment

425950 426000 426050 426100 426150 426200

5407000

5406950

5406900

69 m

TAIT ROAD

Notes:
- Aerial imagery provided by RRR Pleiades imagery (June 2017).

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RAINY RIVER PROJECT

**Ambient Air Monitoring
Southwest Monitoring Station**

Datum & Projection:
NAD 1983 UTM Zone 15N

PROJECT Nº: TC111504 **FIGURE: 1-2**

SCALE: 1:700 DATE: August 2017

0 10 20 40 60 80 100
Meters
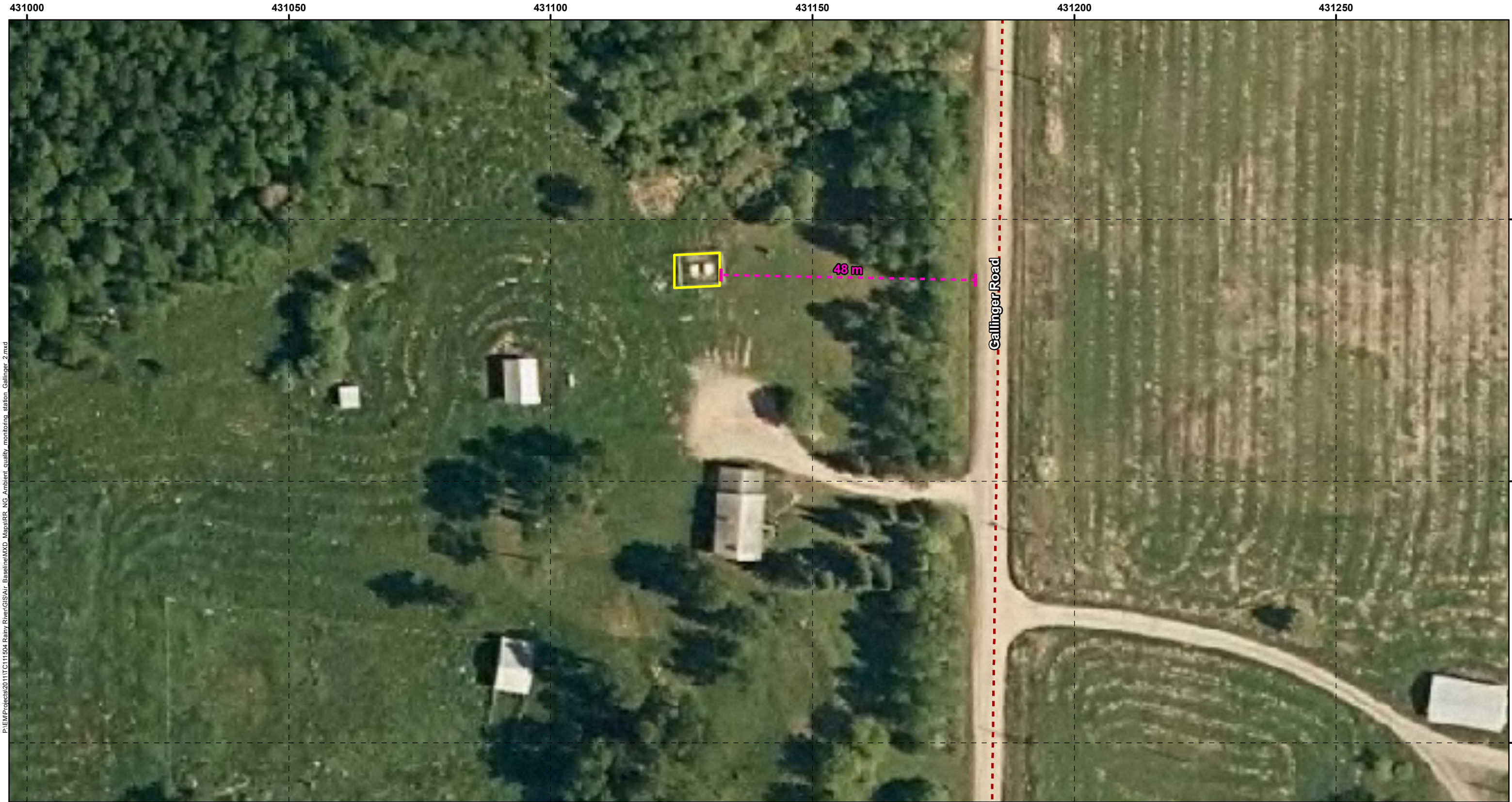
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Figure 1-3 — Ambient Air Monitoring, Northeast Monitoring Station

LEGEND

▢ Northeast Monitoring Station (Gallinger Road)

– – – Gallinger Road

48 m

Gallinger Road

Notes:
- Aerial imagery provided by RRR Plieades imagery (June 2017).

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RAINY RIVER PROJECT

Ambient Air Monitoring
Northeast Monitoring Station

Datum & Projection:
NAD 1983 UTM Zone 15N
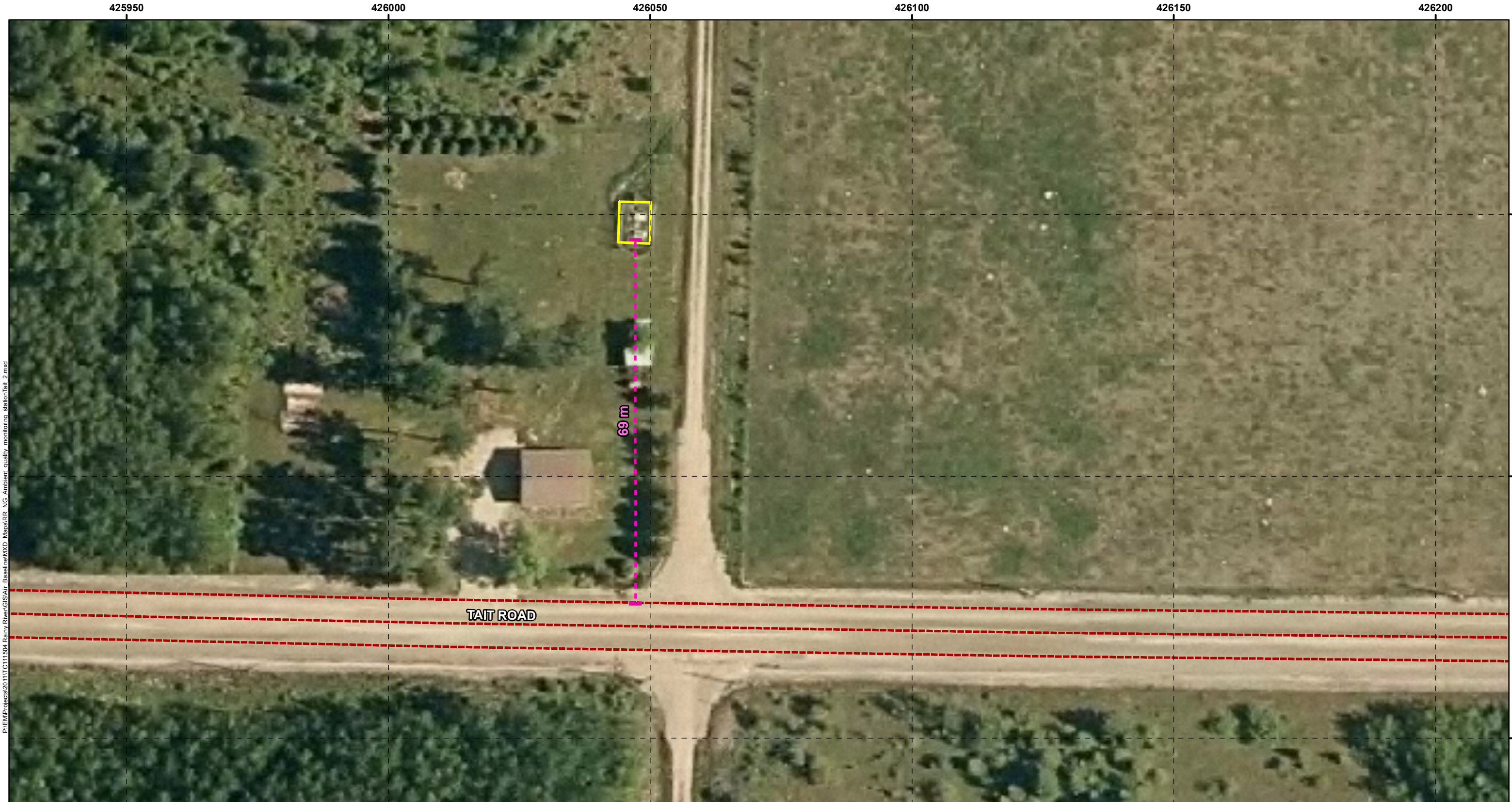
PROJECT N°: TC111504   **FIGURE: 1-3**

SCALE: 1:700   DATE: August 2017

P:\EMP\Projects\2011\TC111504 Rainy River\GIS\Air Baseline\MXD MapsIRR_NG_Ambient_quality_monitoring_station_Gallinger_2.mxd

431000 431050 431100 431150 431200 431250

5410550 5410500 5410450

0 10 20 40 60 80 100 Meters
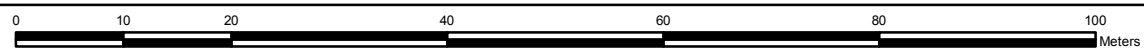
2.0 ANALYTICAL AND MONITORING METHODS

2.1 TSP and Metals

The TSP concentrations were determined using the standard gravimetric method following the reference methods approved by the Ontario Ministry of the Environment and Climate Change (MOECC) as described in the Operations Manual (MOECC 2016b). Measurements of 24-hour average TSP and metal concentrations were undertaken as this is the averaging time of the relevant AAQC (MOECC 2016a); particulate samples are collected every sixth day on the North American schedule (US EPA 2017). Sampling was performed with Hi-Vol samplers (brush motor and mass flow controlled). The metals and metalloids analyzed included the following: arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), nickel (Ni), selenium (Se), vanadium (V) and zinc (Zn). A metalloid is an element such as As that has both metallic and non-metallic properties.

The lowest detectable limit is 2.3 milligrams (mg) of total particulate on the filter, resulting in a method detection limit of 1.4 micrograms per cubic metre ($\mu g/m^3$) based on the target 24-hour sample volume of 1,630 m^3.

The metal concentrations were determined with the standard Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP/AES) method. The method detection limits are as shown in the data sheets in Appendix A-1.

2.2 PM$_{2.5}$

The PM$_{2.5}$ concentrations were determined using the standard gravimetric method following the reference methods approved by the US EPA and the MOECC as described in the Operations Manual (MOECC 2016b). Measurement of 24-hour average PM$_{2.5}$ was undertaken to match the averaging time for the Canadian Ambient Air Quality Standard (CAAQS); particulate samples are collected every sixth day on the North American schedule (US EPA 2017). Sampling was performed with PQ200 samplers.

The lowest detectable limit on the Teflon filters is 1 μg of PM$_{2.5}$, resulting in a method detection limit of 0.04 $\mu g/m^3$ (based on the target 24-hour sample volume of 24 m^3).

2.2.1 Total Dustfall

The water soluble and insoluble portions of dustfall were determined using ASTM method D-1739-98 and the British Columbia Ministry of Environment method outlined in Section G of Air Constituents – Inorganic (MOECC 2016c). Standard dustfall samplers were used to measure total dustfall deposition. The method detection limit for total dustfall is 0.3 g/m^2/30 days. Bird deterrents were added in Q3 2017 with the goal of reducing contamination.

2.3 Passive Sampling for SO₂ and NO₂

The SO_2 and NO_2 concentrations were monitored with passive sampling devices. The exposed permeation filters were analyzed using the methodology employed by the Maxxam Analytics Inc. laboratory located in Edmonton, Alberta. The methodology was developed, approved and validated by Alberta Environment with the support of the Alberta Research Council, the Clean Air Strategic Alliance of Alberta, and the National Research Council of Canada.

The sample uptake is dependent on temperature, relative humidity and wind speed. The analytical results are adjusted for these meteorological parameters measured during the exposure period (monthly averages). The required meteorological data were obtained from the Environment and Climate Change Canada Fort Frances meteorological station (Climate ID 6022474) by Maxxam Analytics to use with each sample submission. The method detection limit is in the order of 0.1 parts per billion (ppb) for both SO_2 and NO_2. Validation tests conducted in Alberta show that results from passive sampling are typically within 10% of those obtained from sampling with continuous analyzers for 30-day exposure periods.

Since there are no MOECC guidelines for monthly concentrations of SO_2 and NO_2 obtained from passive sampling, the data is only used for screening purposes. For NO_2, the monthly results were compared to the MOECC 24-hour AAQC converted to an equivalent 30-day average (78 µg/m³) using the methodology outlined in the *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* (MOECC 2017). For SO_2, the results were compared against the 30-day Alberta Ambient Air Quality Objective of 30 µg/m³ (AEP 2016).

2.4 Field Operations

2.4.1 Hi-Vol Samplers

The two stations were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample to meet the requirements of the 1 in 6-day sampling schedule. Additional visits were made to resolve instrumentation issues and perform flow calibration checks and preventative maintenance.

Amec Foster Wheeler staff performed calibrations on the Hi-Vol samplers using a BGI direct reading Hi-Vol electronic flow calibrator. The flows were calibrated to 40 actual cubic feet per minute (ACFM) for each station using mass flow controllers. The two calibrations used to calculate sample volumes in Q4 were performed on July 25, 2017 and November 2, 2017.

There were no MOECC audits during this quarter.

2.4.2 PQ200 Samplers

The stations were visited once every six days to recover the exposed filter and install a pre-weighed filter for the subsequent sample to meet the requirements of the 1 in 6-day sampling

schedule. Additional visits were made to resolve instrumentation issues and perform flow calibration checks and preventative maintenance.

Amec Foster Wheeler staff performed flow, temperature, and barometric pressure calibrations using an electronic BGI flow calibrator. The flows were calibrated to 16.7 litres per minute (LPM) for each station. The two calibrations used to calculate sample volumes in Q4 were performed on July 25, 2017 and November 2, 2017.

There were no MOECC audits during this quarter.

2.4.3   Dustfall Samplers

The dustfall samplers containing algaecide were changed every month, as required. Dustfall jars were provided by the laboratory with screw-on lids to prevent sample loss during transport.

2.4.4   Passive Samplers

The permeation filters in the passive samplers were changed every month, as required. Permeation filters were kept in filter cassettes inside Ziploc bags until deployed to prevent premature exposure. After the sample is collected, the filter is placed back in its cassette and into a Ziploc bag for shipment to the lab.

3.0 RESULTS

The results for the Q4 2017 sampling program are presented in Appendix A-1 for the particulate and metals data, Appendix A-2 for the dustfall data and Appendix A-3 for the passive SO_2 and NO_2 data. For the purpose of performing statistical analyses, and in keeping with MOECC protocol, a value of half the detection limit was substituted for concentrations less than the detection limit.

For comparative purposes, the MOECC AAQC and CAAQS values are presented, where available, noting that the AAQCs are numerically equivalent to the 419 standards.

Summaries of the statistical analyses for Q4 2017 for the TSP, metals, and $PM_{2.5}$ concentrations are presented in Tables 3-1, 3-2, and 3-3 respectively. During the quarter, the 1 in 6-day sampling schedule results in a possible 15 sampling days between October 1 and December 31, 2017.

A summary of the statistical analyses for Q4 2017 for the total dustfall data is presented below in Table 3-4.

A summary of the statistical analysis for the Q4 2017 passive SO_2 and NO_2 results is presented in Table 3-5.

3.1 TSP and Metals

The Gallinger Road and Tait Road stations collected 14 and 15 valid samples respectively, resulting in 93% and 100% valid data respectively for Q4 2017. The December 27, 2017 sample at the Gallinger Road station was invalidated due to extreme cold conditions resulting in a total volume collected that was more than 10% below the target collection volume.

For the quarter, the geometric mean TSP concentrations were 13.3 µg/m³ for the Tait Road station and 13.6 µg/m³ for the Gallinger Road station. Values reported by the laboratory as below the detection limit were, by convention, substituted with one-half of the detection limit. The maximum 24-hour concentration for TSP was 60.5 µg/m³ at the Tait Road station (October 10, 2017), and 38.0 µg/m³ at the Gallinger Road station (November 27, 2017).

In the quarter, the 24-hour metal concentrations were all below the AAQCs. The rolling 30-day average lead concentrations at both stations were at maximum 1% of the 30-day lead AAQC (0.2 µg/m³) in Q4 2017.

There were no exceedances of the MOECC AAQC measured for any of TSP metals, or metalloids in Q4 2017.

Appendix A-1 and Figure 3-1 present individual sample data. The Q4 2017 TSP and metals summary statistics are summarized in Tables 3-1 and 3-2 respectively.

3.2   PM$_{2.5}$

Both stations collected 15 valid samples in Q4 2017, resulting in 100% valid data.

Values reported by the laboratory as below the detection limit were, by convention, substituted with one-half of the detection limit. The maximum 24-hour concentration for PM$_{2.5}$ was 5.53 µg/m^3 at the Tait Road station (November 15, 2017), and 5.75 µg/m^3 at the Gallinger Road station (December 3, 2017). There were no PM$_{2.5}$ exceedances of the AAQC of 30 µg/m^3 or CAAQS (ECCC 2013) of 28 µg/m^3 measured in Q4 2017. Appendix A-1 and Figure 3-2 present individual sample data.

The Q4 2017 PM$_{2.5}$ summary statistics are summarized in Table 3-3.

3.3   Total Dustfall

In Q4 2017, two valid samples were collected at each station. Each dustfall jar was exposed for approximately 30-days to coincide with each calendar month in the quarter.

The October 2017 samples that were to be collected at both stations were lost due to contamination. The lab performed an ash analysis on the insoluble dustfall fraction only, as the soluble fraction of the sample was destroyed during the gravimetric analysis. Based on the results it appears that the majority of the insoluble dustfall fraction (96%-98%) is organic material and therefore not likely related to site activities. Organic materials can include materials such as bird dropping, insects, pollen etc.

There were no dustfall exceedances of the AAQC of 7 g/m^2 measured in Q4 2017

A summary of the results is presented in Table 3-4 and the monthly results are presented in Appendix A-2.

3.4 Passive SO$_2$ and NO$_2$

In Q4 2017, three valid samples were collected at each station for each of SO$_2$ and NO$_2$.

There are no MOECC standards, guidelines or AAQCs for SO$_2$ or NO$_2$ for a 30-day averaging period.

The 30-day average SO$_2$ and NO$_2$ concentrations measured allow for future analysis of trends in the ambient concentrations, to identify any notable increases, and for potential comparison with dispersion modelling results. For NO$_2$, the monthly results were compared to the MOECC 24-hour AAQC converted to an equivalent 30-day average (78 µg/m^3) using the methodology outlined in the *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* (MOECC 2017). For SO$_2$, the results were compared against the Alberta Ambient Air Quality Objective of 30 µg/m^3 (AEP 2016).

A summary of the passive results is presented in Table 3-5 and the monthly results are presented in Appendix A-3.

Table 3-1: Summary Statistics for Q4 2017 TSP Concentration Data

Statistic	Q4	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean (µg/m³)	13.3	13.6
Arithmetic mean (µg/m³)	20.8	17.5
October Maximum (µg/m³)	60.5	30.7
November Maximum (µg/m³)	34.7	38.0
December Maximum (µg/m³)	22.7	26.6
Maximum 24 hour (µg/m³)	60.5 (Oct.10)	38.0 (Nov.27)
90th percentile	47.0	30.5
95th percentile	56.7	33.2
24-hour AAQC	120	120
No. of valid samples	15	14
% valid data	100	93
No. samples > AAQC (particulate)	0	0
No. samples > AAQC (metals)	0	0
No. samples > AAQC (metalloids)	0	0

Table 3-2: Summary Statistics for Q4 2017 Metals Concentration Data

Metal	24-hr AAQC (µg/m³)	Tait Road Q4 2017		Gallinger Road Q4 2017	
		Maximum 24-hour Concentration (µg/m³)	% 24-hr AAQC	Maximum 24-hr Concentration (µg/m³)	% 24-hr AAQC
As	0.3	9.83E-04	0.33%	1.02E-03	0.34%
Cd	0.025	5.73E-04	2.29%	2.05E-04	0.82%
Cr	0.5	5.73E-03	1.15%	5.57E-03	1.11%
Co	0.1	7.94E-04	0.79%	3.54E-04	0.35%
Cu	50	1.13E-01	0.23%	8.16E-01	1.63%
Fe	4	1.33E+00	33.30%	7.29E-01	18.23%
Pb	0.5	4.35E-03	0.87%	3.55E-03	0.71%
Mn	0.4	3.78E-02	9.45%	2.77E-02	6.94%
Ni	0.2	1.99E-03	1.00%	1.18E-03	0.59%
Se	10	4.26E-04	0.00%	4.42E-04	0.00%
V	2	1.64E-03	0.08%	1.70E-03	0.09%
Zn	120	2.47E-02	0.02%	3.10E-02	0.03%

Table 3-3: Summary Statistics for Q4 2017 PM$_{2.5}$ Concentration Data

Statistic	Q4	
	Tait Road (SW)	Gallinger Road (NE)
Arithmetic mean (µg/m³)	2.53	2.58
October Maximum (µg/m³)	4.45	3.87
November Maximum (µg/m³)	5.53	4.95
December Maximum (µg/m³)	3.54	5.75
Maximum 24 hour (µg/m³)	5.53 (Nov.15)	5.75 (Dec.3)
90th percentile	4.42	4.86
95th percentile	4.78	5.19
24-hour CAAQS	28	28
No. of valid samples	15	15
% valid data	100	100
No. samples > CAAQS	0	0

Table 3-4: Summary Statistics for Q4 2017 Total Dustfall Data

Statistic	Tait Road (SW)	Gallinger Road (NE)
Arithmetic mean (g/m²/30d)	1.4	2.2
Maximum (g/m²/30d)	1.8	2.6
30-day AAQC	7	7
No. > AAQC	0	0
No. valid samples*	2	2
% Valid data	67	67

Table 3-5: Summary Statistics for Q4 2017 Passive SO$_2$ and NO$_2$ Concentration Data

Statistic	Tait Road (SW)		Gallinger Road (NE)	
	SO$_2$	NO$_2$	SO$_2$	NO$_2$
Mean (µg/m³)	0.4	2.8	0.6	3.0
Maximum (µg/m³)	0.5	3.6	1.0	4.0
AAQC 24-hr converted to 30-day (µg/m³)	N/A	78	N/A	78
Alberta AAQO (µg/m³)	30	N/A	30	N/A
No. valid samples	3	3	3	3
% Valid data	100	100	100	100

Note: N/A: No applicable criterion
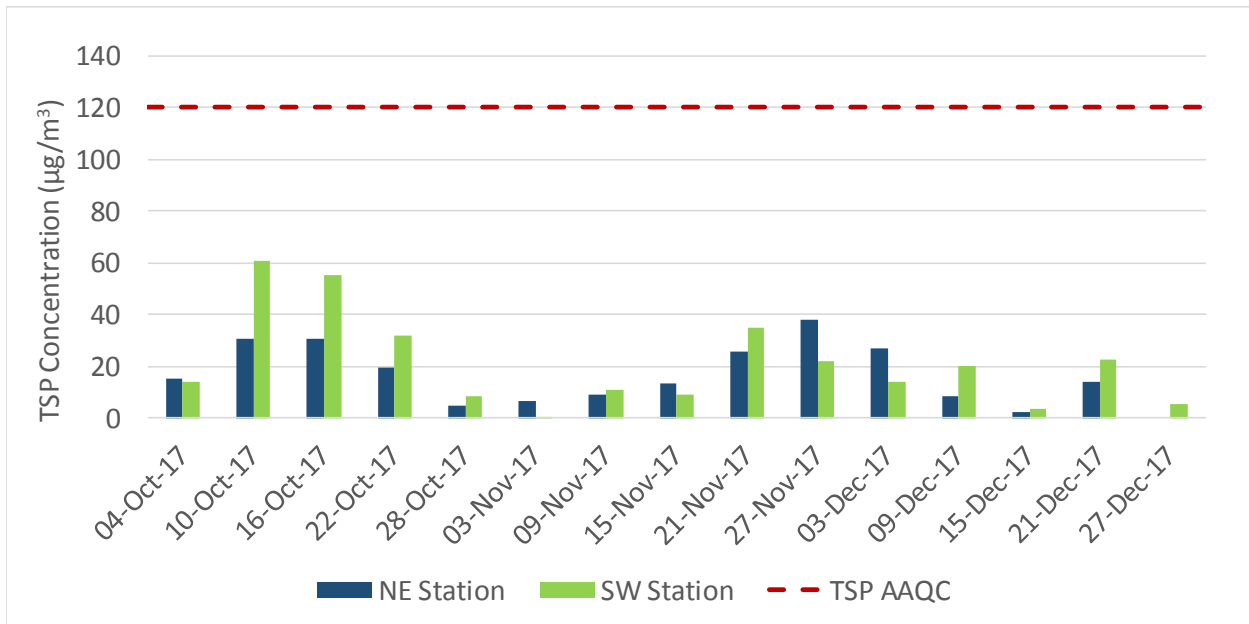
Figure 3-1: TSP Concentrations (Q4 2017)
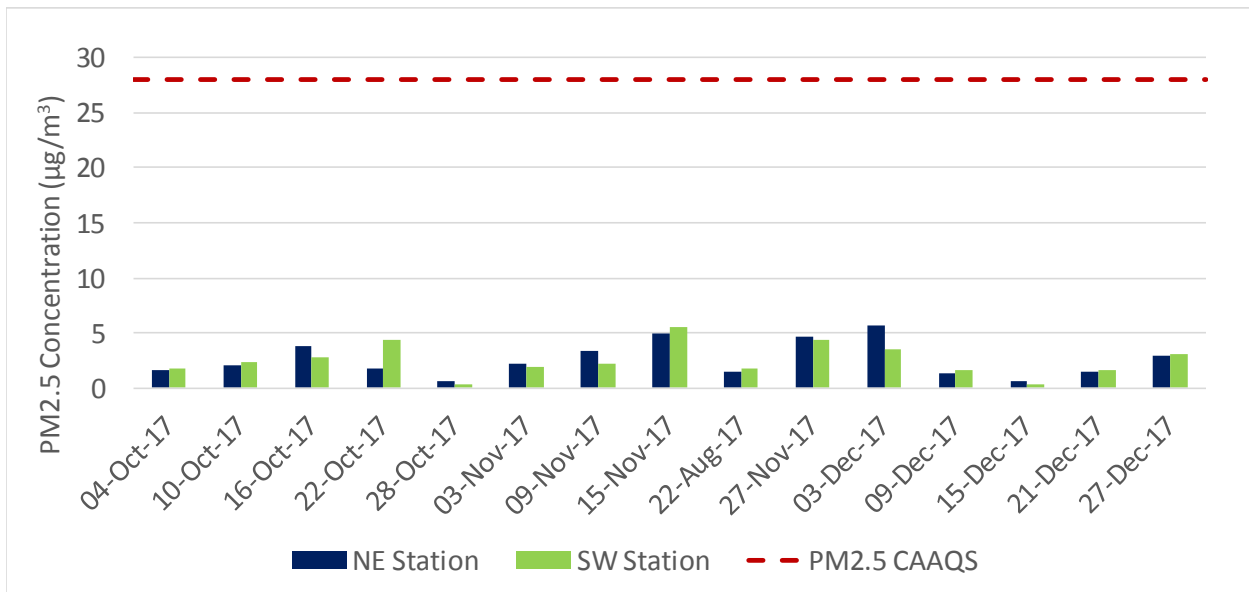
Figure 3-2: PM2.5 Concentrations (Q4 2017)

4.0 CONCLUSIONS

Two ambient air quality monitoring stations were installed and commissioned in May 2015 at the Rainy River Project.

A summary of the Q4 2017 air quality sampling program is provided below:

- There were 14 and 15 valid TSP samples were collected resulting in 93% and 100% sample validity at the Gallinger Road and Tait Road station respectively. No exceedances of the AAQC were measured for TSP, or for any of the metals and metalloids.

- There were 15 valid $PM_{2.5}$ samples collected at each station (100% sample validity), and no exceedances of the CAAQS were measured.

- There were 2 valid dustfall samples collected at each station (67% sample validity), and no exceedances of the AAQC were measured.

- There were 3 valid passive samples for each of SO_2 and NO_2, at each of the two stations, collected (100% sample validity). There were no exceedances of AEP Criterion for SO_2 or the 30-day equivalent AAQC for NO_2.

5.0   REFERENCES

Alberta Environment and Parks (AEP). 2016. Alberta Ambient Air Quality Objectives and Guidelines Summary.

American Society for Testing and Materials (ASTM). 2004. Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter).

British Columbia Ministry of the Environment. 2007. Section G of Air Constituents – Inorganic.

Environment and Climate Change Canada (ECCC). 2013. Canadian Environmental Protection Act, 1999 Sections 54 and 55.

Ministry of the Environment and Climate Change (MOECC). 2017. Procedure for Preparing and Emission Summary and Dispersion Modelling Report.

Ministry of the Environment and Climate Change (MOECC). 2016a. Ontario's Ambient Air Quality Criteria, PIBS # 6570e01.

Ministry of the Environment and Climate Change (MOECC). 2016b. Operations Manual for Air Quality Monitoring in Ontario.

Ministry of the Environment and Climate Change (MOECC). 2016c. Determination of Total Dustfall in Air Particulate Matter by Gravimetry, E3043.

United States Environmental Protection Agency (USEPA). 2017. Sampling Schedule Calendar, https://www3.epa.gov/ttnamti1/calendar.html (Accessed February 10, 2017).

6.0 CLOSING

This *Rainy River Project Air Quality Monitoring Program Fourth Quarter 2017 Report* was prepared by Amec Foster Wheeler for the sole benefit of New Gold Inc. for specific application to the Rainy River Project. The quality of information, conclusions and estimates contained herein are consistent with the level of effort involved in Amec Foster Wheeler's services and based on:

  i)   information available at the time of preparation;
  ii) data supplied by outside sources; and
  iii) the assumptions, conditions and qualifications set forth in this document.

This report is intended to be used by New Gold only, and its nominated representatives, subject to the terms and conditions of its contract with Amec Foster Wheeler. Any other use of, or reliance on, this report by any third party is at that party's sole risk. This report has been prepared in accordance with generally accepted industry-standard practices. No other warranty, expressed or implied, is made.

If you require further information regarding the above or the project in general, please contact the undersigned at (905) 568-2929. Thank you for the opportunity to be of service to New Gold Inc.

Yours truly,
Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Prepared by: Reviewed by:

<Original signed by>   <Original signed by>

Caleb Vandenberg, P.Eng.   Linda Lattner, M.Eng., P.Eng.
Air Quality Engineer   Senior Air Quality Engineer

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wheeler

newgold™ Rainy River Project

APPENDIX A

SAMPLING RESULTS

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APPENDIX A-1

TSP, METALS AND PM$_{2.5}$ SAMPLING RESULTS

NORTHEAST (GALLINGER ROAD) PARTICULATE/METALS CONCENTRATIONS														
Date	PM2.5	TSP	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Nickel (Ni)	Selenium (Se)	Vanadium (V)	Zinc (Zn)
4-Oct-17	1.62	15.4	*9.55E-04*	4.58E-05	3.06E-03	9.68E-05	9.17E-02	1.64E-01	5.73E-04	9.74E-03	5.67E-04	*4.14E-04*	*1.59E-03*	6.18E-03
10-Oct-17	2.08	30.7	*9.40E-04*	5.58E-05	3.70E-03	2.14E-04	2.09E-01	4.57E-01	7.52E-04	1.73E-02	8.46E-04	*4.07E-04*	*1.57E-03*	5.96E-03
16-Oct-17	3.87	30.3	*9.49E-04*	6.96E-05	3.92E-03	1.93E-04	1.39E-01	4.33E-01	1.11E-03	2.01E-02	7.72E-04	*4.11E-04*	*1.58E-03*	9.30E-03
22-Oct-17	1.75	19.6	*9.22E-04*	4.12E-05	3.38E-03	1.30E-04	8.36E-02	2.67E-01	5.72E-04	1.18E-02	6.09E-04	*4.00E-04*	*1.54E-03*	5.96E-03
28-Oct-17	0.62	4.45	*9.53E-04*	5.15E-05	3.43E-03	4.51E-05	2.80E-01	3.69E-02	4.38E-04	1.22E-03	4.77E-04	*4.13E-04*	*1.59E-03*	5.59E-03
3-Nov-17	2.16	6.56	*9.65E-04*	9.07E-05	3.47E-03	6.95E-05	5.19E-01	5.08E-02	6.30E-04	2.23E-03	1.18E-03	*4.18E-04*	*1.61E-03*	3.10E-02
9-Nov-17	3.41	8.96	*9.95E-04*	1.60E-04	3.91E-03	6.04E-05	3.31E-01	9.36E-02	1.02E-03	4.18E-03	6.17E-04	*4.31E-04*	*1.66E-03*	1.21E-02
15-Nov-17	4.95	13.6	*9.82E-04*	1.47E-04	4.13E-03	1.15E-04	2.24E-01	1.74E-01	1.11E-03	4.92E-03	6.22E-04	*4.26E-04*	*1.64E-03*	8.45E-03
21-Nov-17	1.50	25.5	*9.97E-04*	2.05E-04	4.32E-03	2.27E-04	2.23E-01	4.16E-01	2.03E-03	1.04E-02	1.10E-03	*4.32E-04*	*1.66E-03*	1.10E-02
27-Nov-17	4.7	38.0	*9.43E-04*	1.11E-04	5.53E-03	3.54E-04	2.12E-01	7.29E-01	2.88E-03	2.15E-02	1.18E-03	*4.09E-04*	*1.57E-03*	1.33E-02
3-Dec-17	5.75	26.6	*9.52E-04*	1.96E-04	5.14E-03	2.80E-04	6.33E-01	5.26E-01	2.67E-03	2.77E-02	9.84E-04	*4.13E-04*	*1.59E-03*	1.36E-02
9-Dec-17	1.33	8.1	*9.82E-04*	1.63E-04	5.57E-03	1.66E-04	5.27E-01	1.36E-01	1.99E-03	5.93E-03	7.53E-04	*4.26E-04*	*1.64E-03*	2.36E-02
15-Dec-17	0.62	2.5	*9.80E-04*	6.47E-05	3.85E-03	6.60E-05	4.45E-01	4.96E-02	9.47E-04	1.40E-02	3.33E-04	*4.25E-04*	*1.63E-03*	1.88E-02
21-Dec-17	1.46	14.1	*1.02E-03*	1.24E-04	4.49E-03	8.71E-05	8.16E-01	1.52E-01	3.55E-03	1.18E-02	5.85E-04	*4.42E-04*	*1.70E-03*	1.72E-02
27-Dec-17	2.91	—	—	—	—	—	—	—	—	—	—	—	—	—

Geometric mean	N/A	13.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arithmetic mean	2.58	17.5	9.67E-04	1.09E-04	4.14E-03	1.50E-04	3.38E-01	2.63E-01	1.45E-03	1.07E-02	7.58E-04	4.19E-04	1.61E-03	1.30E-02
Max. concentration	5.75	38.0	1.02E-03	2.05E-04	5.57E-03	3.54E-04	8.16E-01	7.29E-01	3.55E-03	2.77E-02	1.18E-03	4.42E-04	1.70E-03	3.10E-02
Min. concentration	0.62	2.5	9.22E-04	4.12E-05	3.06E-03	4.51E-05	8.36E-02	3.69E-02	4.38E-04	1.22E-03	3.33E-04	4.00E-04	1.54E-03	5.59E-03
90th percentile	4.86	30.5	9.97E-04	1.86E-04	5.41E-03	2.64E-04	6.01E-01	5.05E-01	2.82E-03	2.11E-02	1.15E-03	4.32E-04	1.66E-03	2.22E-02
95th percentile	5.19	33.2	1.01E-03	1.99E-04	5.54E-03	3.06E-04	6.97E-01	5.97E-01	3.12E-03	2.37E-02	1.18E-03	4.36E-04	1.68E-03	2.62E-02
CAAQS	28.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value*	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AAQC	N/A	120	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	15	14	14	14	14	14	14	14	14	14	14	14	14	14
No. samples < mdl	0	0	14	0	0	0	0	0	0	0	0	14	14	0
Detection limit (µg)	6	5	6	2	5	2	5	50	3	50	3	10	5	5
Half detection limit (µg)	3	2.5	3	1	2.5	1	2.5	25	1.5	25	1.5	5	2.5	2.5
% < detection limit	0	0	100	0	0	0	0	0	0	0	0	100	100	0
% valid data	100	93	93	93	93	93	93	93	93	93	93	93	93	93

Notes:

All non detectable results were reported as 1/2 detection limit and are denoted by italics and underlining

N/A: Not applicable

—: Invalid Sample

*Canadian Ambient Air Quality Standard, 24-hour standard

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SOUTHWEST (TAIT ROAD) PARTICULATE/METALS CONCENTRATIONS

Date	PM2.5	TSP	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Nickel (Ni)	Selenium (Se)	Vanadium (V)	Zinc (Zn)
4-Oct-17	1.75	13.9	9.20E-04	2.70E-05	3.50E-03	1.01E-04	4.03E-02	2.13E-01	7.12E-04	1.41E-02	5.64E-04	3.99E-04	1.53E-03	7.06E-03
10-Oct-17	2.41	60.5	9.61E-04	3.27E-05	5.70E-03	7.94E-04	6.79E-02	1.33E+00	7.04E-04	3.78E-02	1.99E-03	4.16E-04	1.60E-03	8.65E-03
16-Oct-17	2.83	55.1	9.43E-04	7.67E-05	5.15E-03	5.74E-04	4.41E-02	1.05E+00	9.30E-04	3.45E-02	1.56E-03	4.09E-04	1.57E-03	1.19E-02
22-Oct-17	4.45	31.5	9.33E-04	4.48E-05	3.73E-03	2.62E-04	3.69E-02	4.62E-01	7.65E-04	1.51E-02	8.33E-04	4.04E-04	1.55E-03	1.39E-02
28-Oct-17	0.31	8.6	9.82E-04	9.75E-05	3.66E-03	6.22E-05	7.72E-02	1.03E-01	8.70E-04	2.98E-03	6.68E-04	4.25E-04	1.64E-03	1.59E-02
3-Nov-17	2.00	0.7	9.04E-04	1.25E-04	3.50E-03	8.92E-05	8.92E-02	1.36E-01	6.81E-04	4.86E-03	7.60E-04	3.92E-04	1.51E-03	2.47E-02
9-Nov-17	2.25	10.8	9.14E-04	1.72E-04	3.23E-03	6.89E-05	1.13E-01	1.04E-01	5.36E-04	3.45E-03	4.87E-04	3.96E-04	1.52E-03	8.84E-03
15-Nov-17	5.53	9.0	9.13E-04	1.81E-04	3.59E-03	5.66E-05	3.53E-02	1.05E-01	9.61E-04	3.39E-03	4.68E-04	3.95E-04	1.52E-03	7.73E-03
21-Nov-17	1.83	34.7	9.18E-04	5.73E-04	4.28E-03	3.11E-04	6.43E-02	5.54E-01	2.23E-03	1.44E-02	1.15E-03	3.98E-04	1.53E-03	2.00E-02
27-Nov-17	4.37	21.9	9.11E-04	1.12E-04	4.62E-03	2.95E-04	2.64E-02	5.82E-01	1.52E-03	1.38E-02	8.75E-04	3.95E-04	1.52E-03	1.20E-02
3-Dec-17	3.54	14.1	9.09E-04	1.01E-04	3.82E-03	1.15E-04	3.60E-02	2.40E-01	1.79E-03	1.99E-02	5.57E-04	3.94E-04	1.51E-03	9.94E-03
9-Dec-17	1.62	19.8	9.63E-04	1.42E-04	3.47E-03	1.84E-04	6.16E-02	2.58E-01	3.01E-03	1.16E-02	6.49E-04	4.17E-04	1.61E-03	2.12E-02
15-Dec-17	0.31	3.57	9.39E-04	6.26E-05	3.38E-03	6.45E-05	5.58E-02	6.45E-02	8.01E-04	2.19E-03	4.82E-04	4.07E-04	1.56E-03	1.28E-02
21-Dec-17	1.71	22.7	9.66E-04	7.28E-05	5.73E-03	2.06E-04	4.00E-02	4.09E-01	4.35E-03	2.31E-02	8.76E-04	4.19E-04	1.61E-03	1.77E-02
27-Dec-17	3.04	5.1	9.83E-04	7.40E-05	4.13E-03	4.39E-05	2.95E-02	4.91E-02	9.50E-04	1.59E-03	3.73E-04	4.26E-04	1.64E-03	1.18E-02

	PM2.5	TSP	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Nickel (Ni)	Selenium (Se)	Vanadium (V)	Zinc (Zn)
Geometric mean	N/A	13.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arithmetic mean	2.53	20.8	9.37E-04	1.26E-04	4.10E-03	2.15E-04	5.45E-02	3.77E-01	1.39E-03	1.35E-02	8.20E-04	4.06E-04	1.56E-03	1.36E-02
Max. concentration	5.53	60.5	9.83E-04	5.73E-04	5.73E-03	7.94E-04	1.13E-01	1.33E+00	4.35E-03	3.78E-02	1.99E-03	4.26E-04	1.64E-03	2.47E-02
Min. concentration	0.31	0.7	9.04E-04	2.70E-05	3.23E-03	4.39E-05	2.64E-02	4.91E-02	5.36E-04	1.59E-03	3.73E-04	3.92E-04	1.51E-03	7.06E-03
90th percentile	4.42	47.0	9.76E-04	1.78E-04	5.48E-03	4.69E-04	8.44E-02	8.63E-01	2.70E-03	3.00E-02	1.40E-03	4.23E-04	1.63E-03	2.07E-02
95th percentile	4.78	56.7	9.82E-04	2.99E-04	5.71E-03	6.40E-04	9.63E-02	1.13E+00	3.41E-03	3.55E-02	1.69E-03	4.26E-04	1.64E-03	2.22E-02
CAAQS	28.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. > CAAQS value*	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AAQC	N/A	120	0.3	0.025	0.5	0.1	50	4	0.5	0.4	0.2	10	2	120
No. > AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of valid samples	15	15	15	15	15	15	15	15	15	15	15	15	15	15
No. samples < mdl	2	1	15	0	0	0	0	0	0	0	0	15	15	0
Detection limit (µg)	6	5	6	2	5	2	5	50	3	50	3	10	5	5
Half detection limit (µg)	3	2.5	3	1	2.5	1	2.5	25	1.5	25	1.5	5	2.5	2.5
% < detection limit	13	7	100	0	0	0	0	0	0	0	0	100	100	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100

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APPENDIX A-2

TOTAL DUSTFALL SAMPLING RESULTS

SW (Tait Road) Monitoring Results for Dustfall (Q4 2017)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
October	29	—	—	—
November	31	0.60	1.2	1.8
December	31	0.66	0.33	1.0

Arithmetic mean	1.4
Max. concentration	1.8
Min. concentration	1.0
AAQC	7
No. > AAQC value**	0
No. of valid samples	2
% Valid data	67
No. samples < mdl	0
Detection limit*	0.30
Half detection limit	0.15

NE (Gallinger Road) Monitoring Results for Dustfall (Q4 2017)
(results expresed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
October	29	—	—	—
November	31	0.69	1.1	1.7
December	31	2.0	0.63	2.6

Arithmetic mean	2.2
Max. concentration	2.6
Min. concentration	1.7
AAQC	7
No. > AAQC value**	0
No. of valid samples	2
% Valid data	67
No. samples < mdl	0
Detection limit*	0.30
Half detection limit	0.15

Notes:

All statistics w ere calculated using 1/2DL for values reported as <DL

All non detectable results w ere reported as 1/2 detection limit and are denoted by italics and underlining

N/A: Not applicable

N/R: No Results Available

—: Invalid Sample

*If samples had differing detection limits, the highest is displayed here

**Ontario Ambient Air Quality Criteria, 30-day standard

amec
foster
wheeler

APPENDIX A-3

SO₂ AND NO₂ PASSIVE SAMPLING RESULTS

Monitoring Results for Passive SO$_2$ and NO$_2$ (Q4 2017)

(results expresed in μg/m^3)

Month	SW (Tait Road)		NE (Gallinger Road)	
	SO$_2$	NO$_2$	SO$_2$	NO$_2$
October	0.5	2.2	1.0	2.1
November	0.3	3.6	0.3	4.0
December	0.5	2.5	0.5	2.8
Arithmetic mean	0.4	2.8	0.6	3.0
Max. concentration	0.5	3.6	1.0	4.0
Min. concentration	0.3	2.2	0.3	2.1
AAQC* 24-hr converted to 30-day	N/A	78 μg/m^3	N/A	78 μg/m^3
Alberta Ambient Air Quality Objectives 2013	30 μg/m^3	N/A	30 μg/m^3	N/A
No. of valid samples	3	3	3	3
% Valid Data	100%	100%	100%	100%
No. samples < mdl	2	0	0	0
Detection limit	0.3	0.2	0.3	0.2
Half detection limit	0.15	0.1	0.15	0.1

Notes:

All statistics w ere calculated using 1/2DL for values reported as <DL

All non detectable results w ere reported as 1/2 detection limit and are denoted by italics and underlining

All results reported by the lab in parts per billion (ppb) and are converted to µg/m3 assuming 101.23kPA and 25C

N/A: Not applicable

N/R: No Results Available

—: Invalid Sample

*Ontario Ambient Air Quality Criteria

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