



**NEW GOLD INC.  
RAINY RIVER PROJECT**

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

**Submitted by:**

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

**August 2017  
TC111504**



August 14, 2017  
TC111504

Mr. Darrell Martindale  
New Gold Inc.  
Rainy River Project  
5967 Hwy 11 / 71, P.O. Box 5  
Emo, Ontario  
P0W 1E0

Dear Mr. Martindale:

**Re: New Gold Rainy River Project  
Air Monitoring Report, Second Quarter 2017 Report**

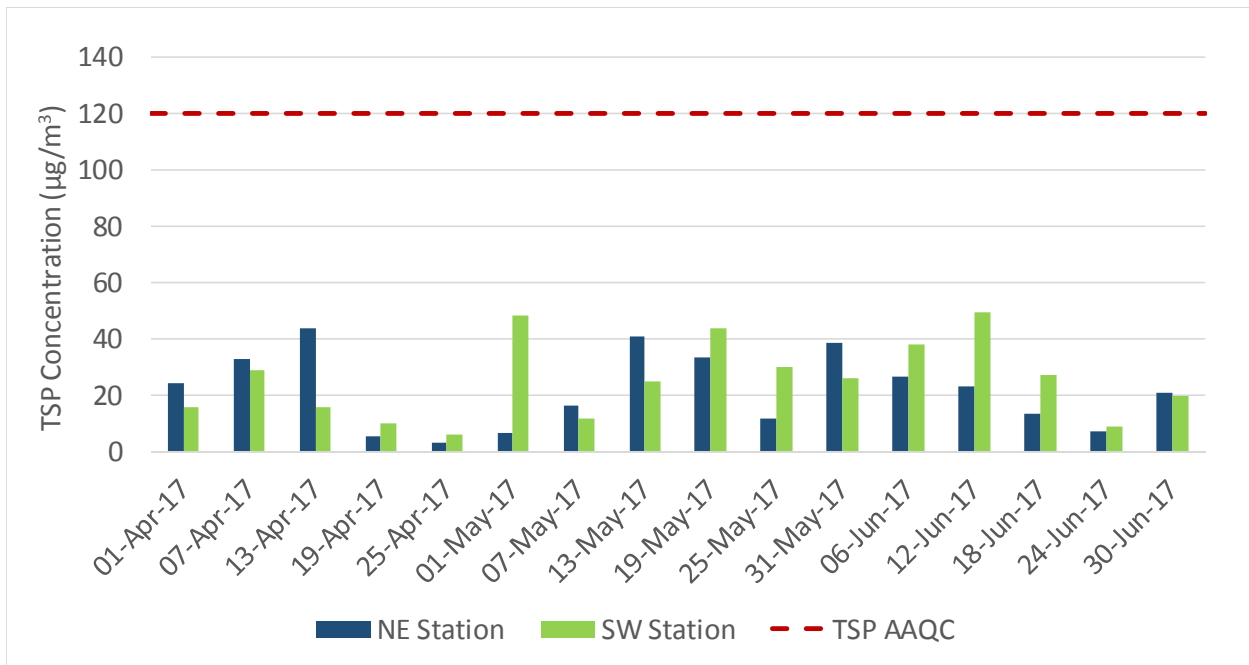
Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to submit to New Gold Inc. (New Gold) the attached summary report of the Second Quarter (Q2) 2017 results for the ambient air quality monitoring program at the Rainy 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.

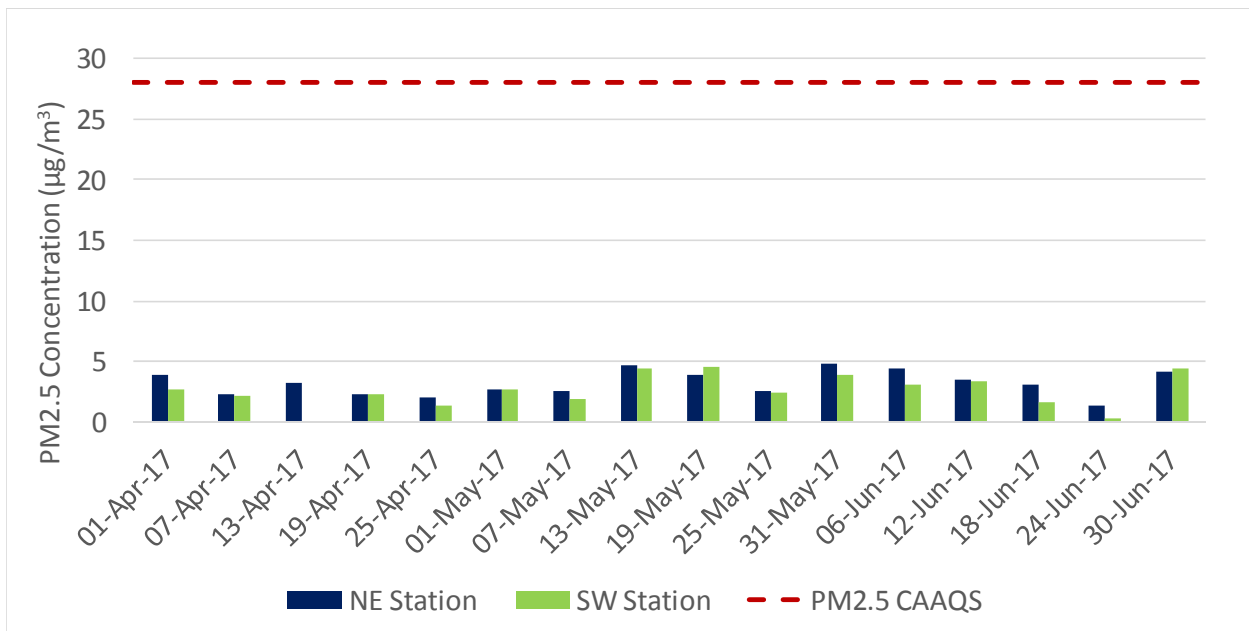
The key findings of the Q2 2017 monitoring are as follow:

- There were no exceedances of the PM<sub>2.5</sub>, TSP, or Metals AAQC measured in Q2 2017; and
- There was one (1) exceedance of the dustfall AAQC in Q2 2017.

The measured TSP and PM<sub>2.5</sub> concentrations for the Q2 2017 are depicted in Figures CL-1 and CL-2.



**Figure CL-1: TSP Concentrations (Q2 2017)**



**Figure CL-2: PM<sub>2.5</sub> Concentrations (Q2 2017)**

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.  
Air Quality Engineer

Sheila Daniel, M.Sc., P.Geo.  
Principal Mining Environmental

## 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
BCMOE	British Columbia Ministry of the Environment
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 <sub>10</sub>	Particulate Matter less than 10 microns in diameter
USEPA	United States Environmental Protection Agency
µg/m <sup>3</sup>	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 Second Quarter (Q2) 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 reroute on 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.

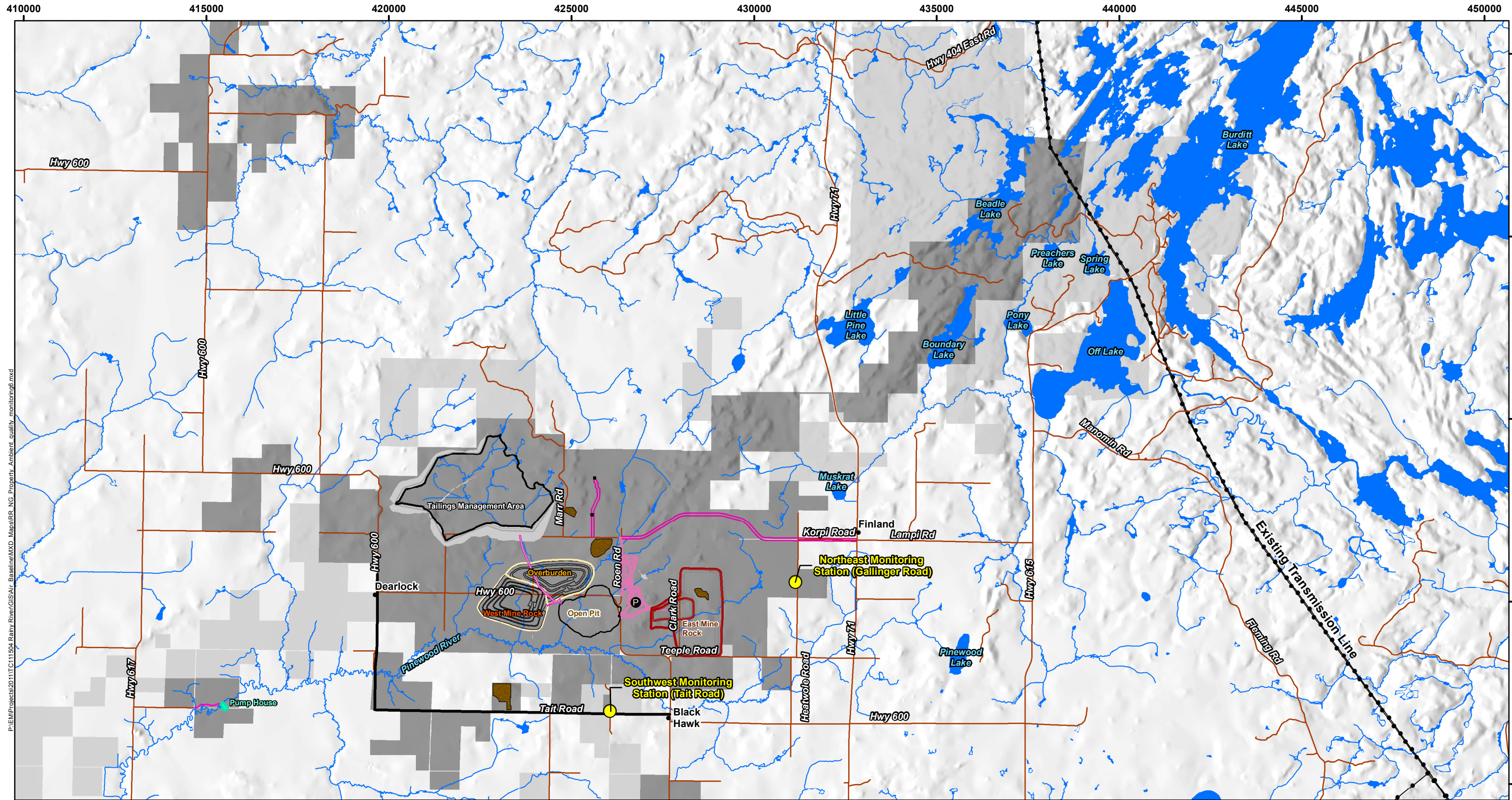
This Quarterly Air Quality Report addresses the required elements of a Quarterly Report defined in the Operations Manual for Air Quality Monitoring in Ontario (MOECC 2016), hereafter referred to as the Operations Manual. Specifically, the following information is provided:

- Summary statistics;
- Sampling dates (start and end where applicable); and
- A summary of exceedances of an Ontario Ambient Air Quality Criteria (AAQC).

The purpose of the air monitoring program is to quantify any 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<sub>2.5</sub>);
- Two standard dustfall collection units sampling over a 30-day period;
- Two passive sampling enclosures each measuring NO<sub>2</sub> and SO<sub>2</sub>; and
- One meteorological station to obtain real-time site wind speed, wind direction, temperature, relative humidity, and precipitation.





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- LEGEND**
- Ambient Air Quality Monitoring Stations
  - New Gold - Rainy River Property Boundary
  - New Gold Lands with No Current Access Control

**Proposed Site Features**

- P 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

Datum: NAD83  
 Projection: UTM Zone 15N

Rainy River Project

**RAINY RIVER PROJECT**

**Ambient Air Monitoring Stations**

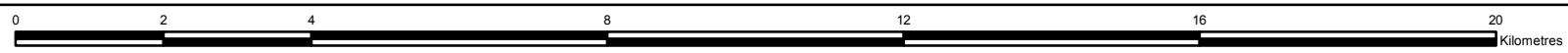
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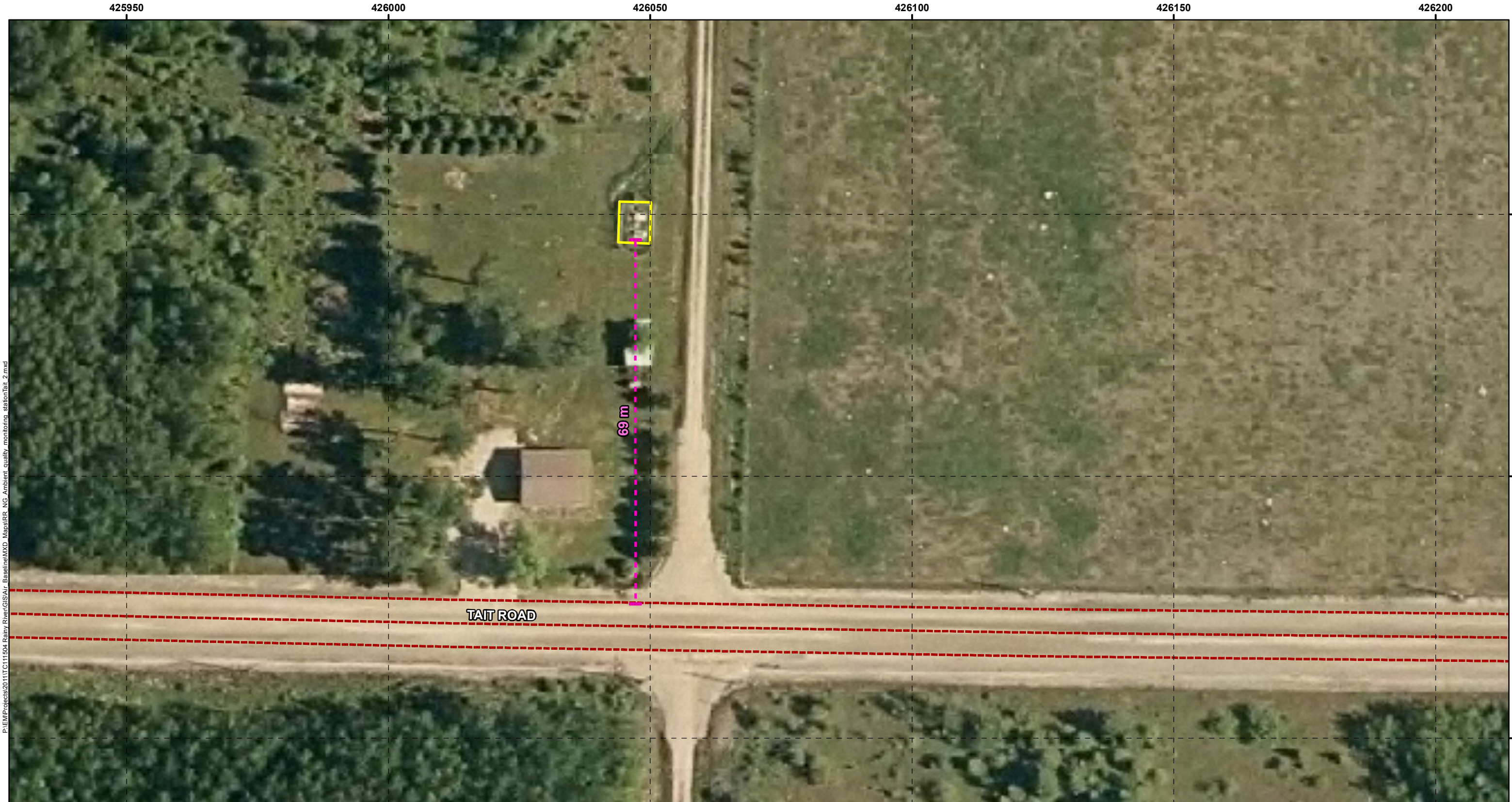
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SCALE: 1:100,000

FIGURE: 1-1

DATE: August 2017

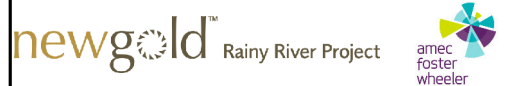




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- LEGEND**
- Southwest Monitoring Station (Tait Road)
  - Highway Re-alignment

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



**RAINY RIVER PROJECT**

**Ambient Air Monitoring  
 Southwest Monitoring Station**

Datum & Projection:  
 NAD 1983 UTM Zone 15N

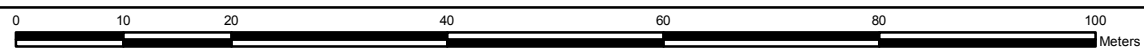


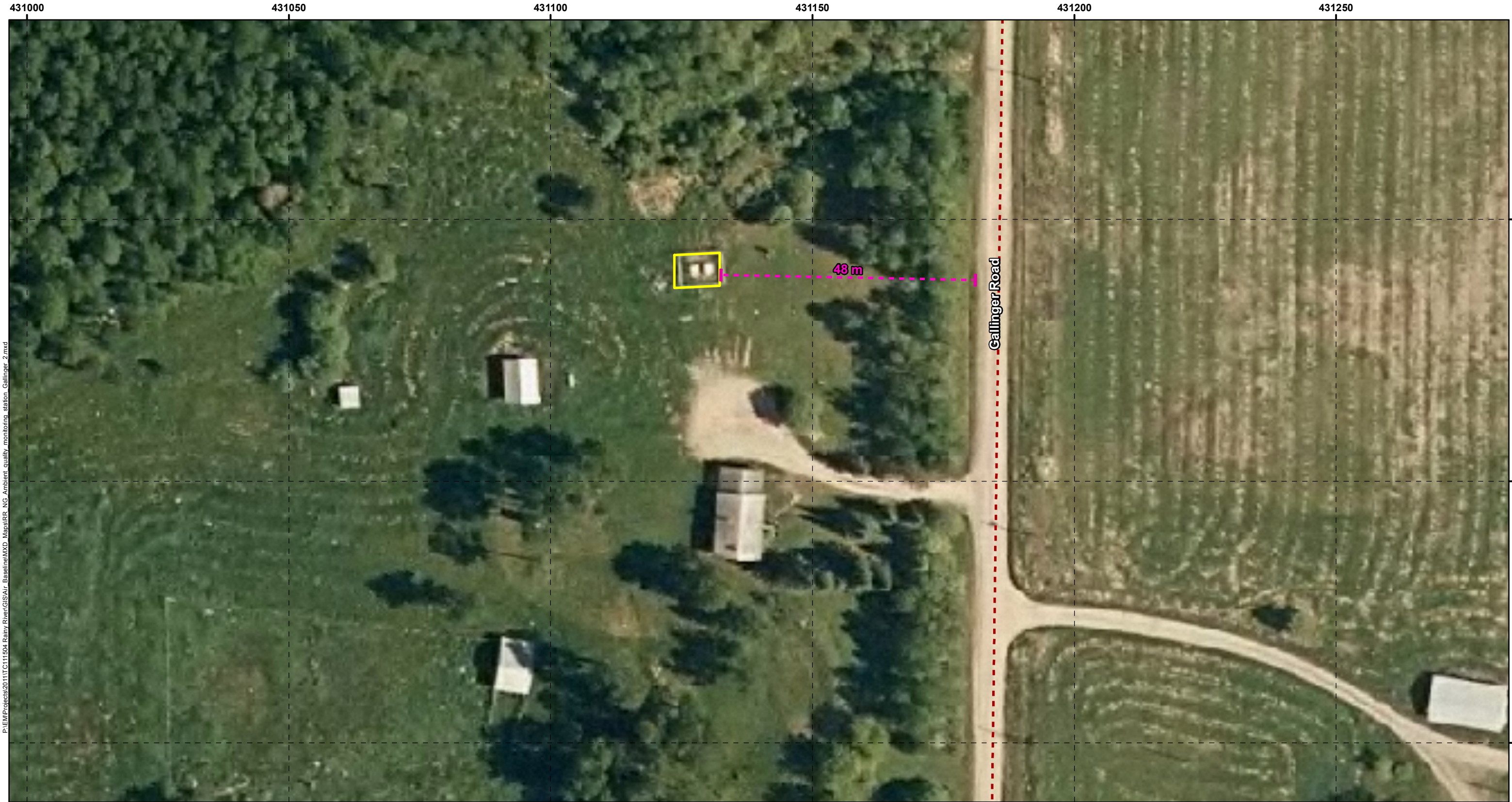
PROJECT N<sup>o</sup>: TC111504

FIGURE: 1-2

SCALE: 1:700

DATE: August 2017





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- LEGEND**
- Northeast Monitoring Station (Gallinger Road)
  - Gallinger Road

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



**RAINY RIVER PROJECT**

**Ambient Air Monitoring  
 Northeast Monitoring Station**

Datum & Projection:  
 NAD 1983 UTM Zone 15N

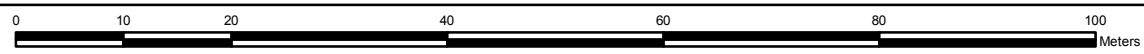


PROJECT N<sup>o</sup>: TC111504

FIGURE: 1-3

SCALE: 1:700

DATE: August 2017



## **2.0 ANALYTICAL AND MONITORING METHODS**

### **2.1 TSP and Metals**

The total suspended particulate (TSP) concentrations were determined using the standard gravimetric method following the reference methods approved by the United States Environmental Protection Agency (US EPA) and the Ontario Ministry of the Environment and Climate Change (MOECC) as described in the Operations Manual (MOECC 2016). Measurements of 24-hour average TSP and metal concentrations were undertaken as this is the averaging time of the relevant AAQC (MOECC 2012); 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 arsenic 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 ( $\mu\text{g}/\text{m}^3$ ) based on a typical 24-hour sample volume of 1,630  $\text{m}^3$ .

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<sub>2.5</sub>**

The PM<sub>2.5</sub> 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 2016). Measurement of 24-hour average PM<sub>2.5</sub> 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  $\mu\text{g}$  of PM<sub>2.5</sub>, resulting in a method detection limit of 0.04  $\mu\text{g}/\text{m}^3$  (based on a typical 24-hour sample volume of 24  $\text{m}^3$ ).

#### **2.2.1 Total Dustfall**

The water soluble and insoluble portions of dustfall were determined using ASTM method D-1739-98 and the BCMOE method outlined in Section G of Air Constituents – Inorganic. Standard dustfall samplers were used to measure total dustfall deposition. The method detection limit for total dustfall is 0.3  $\text{g}/\text{m}^2/30$  days. Bird deterrents were added in Q2 2017 with the goal of reducing contamination.

## 2.3 Passive Sampling for SO<sub>2</sub> and NO<sub>2</sub>

SO<sub>2</sub> and NO<sub>2</sub> 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.

Since 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 are taken from the Environment 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<sub>2</sub> and NO<sub>2</sub>. 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<sub>2</sub> and NO<sub>2</sub> obtained from passive sampling, the data is only used for screening purposes. For NO<sub>2</sub>, the monthly results were compared to the MOECC 24-hour AAQC converted to an equivalent 30-day average (78 µg/m<sup>3</sup>) using the methodology outlined in the *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* (MOECC 2009). For SO<sub>2</sub>, the results were compared against the 30-day Alberta Ambient Air Quality Objective of 30 µg/m<sup>3</sup> (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 in order 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. Calibrations used in the quarter were performed on:

- April 4, 2017: All hi-vols calibrated.

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 in order 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. Calibrations used in Q2 2017 were performed on:

- April 4, 2017: All PQ200s calibrated.

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 Q2 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<sub>2</sub> and NO<sub>2</sub> 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.

Summaries of the statistical analyses for Q2 2017 for the TSP, metals, and PM<sub>2.5</sub> 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 16 sampling days between April 1 and June 30, 2017.

A summary of the statistical analyses for Q2 2017 for the total dustfall data is presented below in Table 3-4.

A summary of the statistical analysis for the Q2 2017 passive SO<sub>2</sub> and NO<sub>2</sub> results is presented in Table 3-5.

#### **3.1 TSP and Metals**

Both stations collected 16 valid samples in Q2 2017, resulting in 100% valid data.

For the quarter, the geometric mean TSP concentrations were 21.3 µg/m<sup>3</sup> for the Tait Road station and 17.1 µg/m<sup>3</sup> 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 49.2 µg/m<sup>3</sup> at the Tait Road station (June 12, 2017), and 43.8 µg/m<sup>3</sup> at the Gallinger Road station (April 13, 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 less than 1% of the 30-day lead AAQC (0.2 µg/m<sup>3</sup>) in Q2 2017.

There were no exceedances of the MOECC AAQC measured for any of TSP metals, or metalloids in Q2 2017.

Appendix A-1 and Figure 3-1 present individual sample data. The Q2 2017 TSP and metals summary statistics are summarized in Tables 3-1 and 3-2 respectively.

### 3.2 PM<sub>2.5</sub>

Both stations collected 16 valid samples in Q2 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<sub>2.5</sub> was 4.54 µg/m<sup>3</sup> at the Tait Road station (May 19, 2017), and 4.83 µg/m<sup>3</sup> at the Gallinger Road station (May 31, 2017). There were no PM<sub>2.5</sub> exceedances of the AAQC of 30 µg/m<sup>3</sup> or CAAQS (ECCC, 2013) of 28 µg/m<sup>3</sup> measured in Q2 2017. Appendix A-1 and Figure 3-2 present individual sample data.

The Q2 2017 PM<sub>2.5</sub> summary statistics are summarized in Table 3-3.

### 3.3 Total Dustfall

In Q2 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. A shipment of replacement dustfall jars from the lab was lost in transit resulting in the June samples being exposed for 38 days, not satisfying the exposure guideline, and being invalidated.

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

There was one exceedance of the dustfall MOECC AAQC (7 g/m<sup>2</sup>/30 days) measured in Q2 2017 in April at the Gallinger station; the laboratory noted some particulate, flies and black particles in the jar upon reception.

### 3.4 Passive SO<sub>2</sub> and NO<sub>2</sub>

In Q2 2017, three valid samples were collected at each station for each of SO<sub>2</sub> and NO<sub>2</sub>.

There are no MOECC standards, guidelines or AAQCs for SO<sub>2</sub> or NO<sub>2</sub> for a 30-day averaging period.

The 30-day average SO<sub>2</sub> and NO<sub>2</sub> 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<sub>2</sub>, the monthly results were compared to the MOECC 24-hour AAQC converted to an equivalent 30-day average (78 µg/m<sup>3</sup>) using the methodology outlined in the *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* (MOECC 2009). For SO<sub>2</sub>, the results were compared against the Alberta Ambient Air Quality Objective of 30 µg/m<sup>3</sup> (AEP 2016).

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



**Table 3-1: Summary Statistics for Q2 2017 for TSP Data**

Statistic	Q2	
	Tait Road (SW)	Gallinger Road (NE)
Geometric mean ( $\mu\text{g}/\text{m}^3$ )	21.3	17.1
Arithmetic mean ( $\mu\text{g}/\text{m}^3$ )	25.2	21.8
April Maximum ( $\mu\text{g}/\text{m}^3$ )	29.1	43.8
May Maximum ( $\mu\text{g}/\text{m}^3$ )	47.9	40.6
June Maximum ( $\mu\text{g}/\text{m}^3$ )	49.2	26.4
Maximum 24 hour ( $\mu\text{g}/\text{m}^3$ )	49.2 (Jun.12)	43.8 (Apr.13)
90 <sup>th</sup> percentile	45.9	39.6
95 <sup>th</sup> percentile	48.2	41.4
24-hour AAQC	120	120
No. of valid samples	16	16
% valid data	100	100
No. samples > AAQC (particulate)	0	0
No. samples > AAQC (metals)	0	0
No. samples > AAQC (metalloids)	0	0

**Table 3-2: Summary Statistics for Q2 2017 for Metals Data**

Metal	24-hr AAQC ( $\mu\text{g}/\text{m}^3$ )	Tait Road Q2 2017 Maximum 24-hour Concentration ( $\mu\text{g}/\text{m}^3$ )	% 24-hr AAQC	Gallinger Road Q2 2017 Maximum 24-hr Concentration ( $\mu\text{g}/\text{m}^3$ )	% 24-hr AAQC
As	0.3	9.94E-04	0.33%	9.69E-04	0.32%
Cd	0.025	2.11E-04	0.85%	1.48E-04	0.59%
Cr	0.5	8.68E-03	1.74%	8.97E-03	1.79%
Co	0.1	7.29E-04	0.73%	6.01E-04	0.60%
Cu	50	7.82E-02	0.16%	4.47E-01	0.89%
Fe	4	1.31E+00	32.86%	9.13E-01	22.81%
Pb	0.5	1.56E-03	0.31%	1.52E-03	0.30%
Mn	0.4	3.21E-02	8.03%	2.94E-02	7.34%
Ni	0.2	2.18E-03	1.09%	2.00E-03	1.00%
Se	10	4.31E-04	0.00%	4.20E-04	0.00%
V	2	1.66E-03	0.08%	1.61E-03	0.08%
Zn	120	2.80E-02	0.02%	3.35E-02	0.03%

**Table 3-3: Summary Statistics for Q2 2017 for PM<sub>2.5</sub> Data**

Statistic	Q2	
	Tait Road (SW)	Gallinger Road (NE)
Arithmetic mean ( $\mu\text{g}/\text{m}^3$ )	2.6	3.2
April Maximum ( $\mu\text{g}/\text{m}^3$ )	2.7	3.8
May Maximum ( $\mu\text{g}/\text{m}^3$ )	4.5	4.8
June Maximum ( $\mu\text{g}/\text{m}^3$ )	4.5	4.4
Maximum 24 hour ( $\mu\text{g}/\text{m}^3$ )	4.5 (May.19)	4.8 (May.31)
90 <sup>th</sup> percentile	4.4	4.5
95 <sup>th</sup> percentile	4.5	4.7
24-hour CAAQS	28	28
No. of valid samples	16	16
% valid data	100	100
No. samples > CAAQS	0	0

**Table 3-4: Summary Statistics for Q2 2017 for Total Dustfall Data**

Statistic	Tait Road (SW)	Gallinger Road (NE)
Arithmetic mean ( $\text{g}/\text{m}^2/30\text{d}$ )	3.0	4.1
Maximum ( $\text{g}/\text{m}^2/30\text{d}$ )	5.6	7.7
30-day AAQC	7	7
No. > AAQC	0	1
No. valid samples*	2	2
% Valid data	66	66

**Notes:**

N/A: No applicable criteria

N/R: Not Reportable

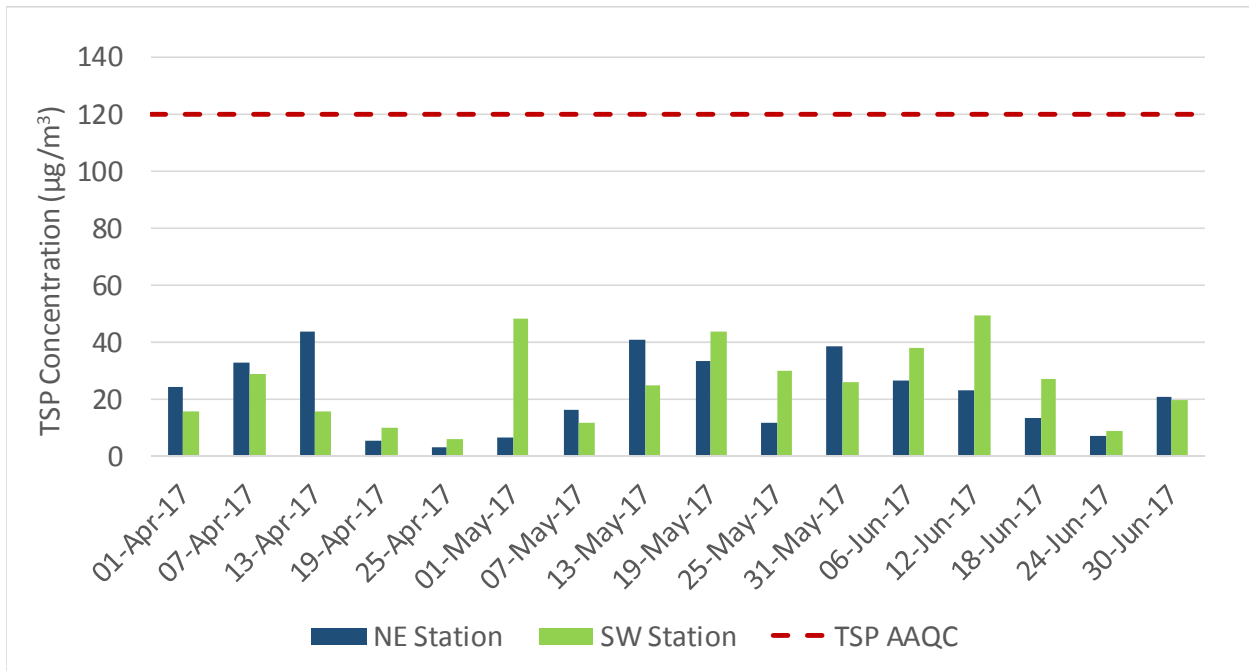
\*samples invalidated due to incorrect exposure period

**Table 3-5: Summary Statistics for Q2 2017 for Passive SO<sub>2</sub> and NO<sub>2</sub> Data**

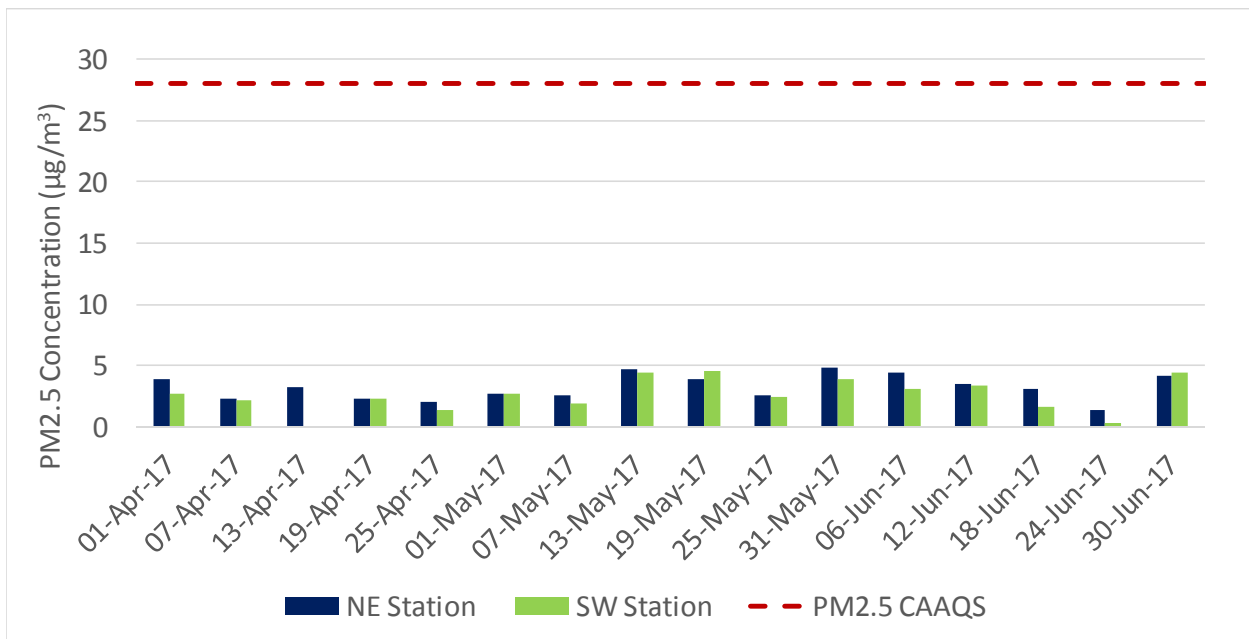
Statistic	Tait Road (SW)		Gallinger Road (NE)	
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>
Mean ( $\mu\text{g}/\text{m}^3$ )	0.4	1.6	0.3	0.7
Maximum ( $\mu\text{g}/\text{m}^3$ )	0.6	2.2	0.5	0.8
AAQC 24-hr converted to 30-day ( $\mu\text{g}/\text{m}^3$ )	N/A	78	N/A	78
Alberta AAQO ( $\mu\text{g}/\text{m}^3$ )	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 (Q2 2017)**



**Figure 3-2: PM2.5 Concentrations (Q2 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 Q2 2017 air quality sampling program is provided below:

- There were 16 valid TSP samples collected at both stations (100% sample validity), and no exceedances of the AAQC were measured for TSP, or for any of the metals and metalloids.
- There were 16 valid PM<sub>2.5</sub> samples collected at both stations (100% sample validity), and no exceedances of the CAAQS were measured.
- Four valid dustfall samples were collected (66% sample validity). One exceedance of the AAQC was measured in April at the Gallinger Station.
- Six valid passive samples for each of SO<sub>2</sub> and NO<sub>2</sub> were collected (100% sample validity). There were no exceedances of AEP Criterion for SO<sub>2</sub> or of the 30-day equivalent AAQC for NO<sub>2</sub>.

## 5.0 REFERENCES

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## 6.0 CLOSING

This air quality monitoring program, Second 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. 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.  
Air Quality Engineer

Sheila Daniel, M.Sc., P.Geo.  
Principal Mining Environmental

**APPENDIX A**

**SAMPLING RESULTS**

<b>Appendix A-1</b>	<b>TSP, Metals and PM2.5 Sampling Results</b>
<b>Appendix A-2</b>	<b>Total Dustfall Sampling Results</b>
<b>Appendix A-3</b>	<b>SO<sub>2</sub> and NO<sub>2</sub> Passive Sampling Results</b>

**APPENDIX A-1**

**TSP, METALS AND PM2.5 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)
1-Apr-17	3.83	24.4	<i>9.02E-04</i>	8.53E-05	3.85E-03	3.17E-04	4.47E-01	6.13E-01	8.90E-04	1.56E-02	1.26E-03	<i>3.91E-04</i>	<i>1.50E-03</i>	1.19E-02
7-Apr-17	2.29	32.7	<i>9.37E-04</i>	7.37E-05	5.19E-03	4.67E-04	3.52E-01	6.69E-01	1.07E-03	1.61E-02	1.67E-03	<i>4.06E-04</i>	<i>1.56E-03</i>	2.19E-02
13-Apr-17	3.29	43.8	<i>9.64E-04</i>	6.81E-05	7.26E-03	6.01E-04	2.58E-01	9.13E-01	1.52E-03	2.78E-02	2.00E-03	<i>4.18E-04</i>	<i>1.61E-03</i>	1.06E-02
19-Apr-17	2.33	5.4	<i>9.58E-04</i>	4.92E-05	4.02E-03	7.85E-05	3.05E-01	8.43E-02	4.02E-04	2.67E-03	6.38E-04	<i>4.15E-04</i>	<i>1.60E-03</i>	8.75E-03
25-Apr-17	2.08	3.4	<i>9.69E-04</i>	6.98E-05	4.59E-03	1.05E-04	1.14E-01	6.46E-02	1.05E-03	3.11E-03	1.39E-03	<i>4.20E-04</i>	<i>1.61E-03</i>	3.35E-02
1-May-17	2.75	6.7	<i>9.54E-04</i>	1.48E-04	5.15E-03	1.25E-04	2.63E-01	1.32E-01	6.87E-04	4.67E-03	6.87E-04	<i>4.13E-04</i>	<i>1.59E-03</i>	7.12E-03
7-May-17	2.50	16.3	<i>9.57E-04</i>	4.53E-05	7.21E-03	1.72E-04	1.20E-01	2.60E-01	6.70E-04	6.51E-03	8.49E-04	<i>4.15E-04</i>	<i>1.60E-03</i>	3.70E-03
13-May-17	4.70	40.6	<i>9.41E-04</i>	5.96E-05	8.97E-03	4.69E-04	1.64E-01	7.53E-01	9.91E-04	1.90E-02	1.88E-03	<i>4.08E-04</i>	<i>1.57E-03</i>	6.71E-03
19-May-17	3.83	33.6	<i>9.46E-04</i>	5.68E-05	7.95E-03	3.80E-04	1.99E-01	6.25E-01	9.53E-04	1.54E-02	1.30E-03	<i>4.10E-04</i>	<i>1.58E-03</i>	6.18E-03
25-May-17	2.62	11.7	<i>9.29E-04</i>	5.88E-05	7.62E-03	1.67E-04	1.67E-01	3.82E-01	8.24E-04	9.54E-03	7.62E-04	<i>4.03E-04</i>	<i>1.55E-03</i>	6.07E-03
31-May-17	4.83	38.7	<i>9.31E-04</i>	7.45E-05	8.32E-03	4.58E-04	1.90E-01	7.70E-01	9.25E-04	2.94E-02	1.49E-03	<i>4.04E-04</i>	<i>1.55E-03</i>	1.01E-02
6-Jun-17	4.37	26.4	<i>9.03E-04</i>	5.60E-05	5.66E-03	2.68E-04	2.65E-01	4.01E-01	7.16E-04	1.07E-02	1.28E-03	<i>3.91E-04</i>	<i>1.50E-03</i>	1.10E-02
12-Jun-17	3.54	23.1	<i>9.59E-04</i>	7.29E-05	6.52E-03	2.65E-04	3.43E-01	4.00E-01	6.71E-04	1.23E-02	1.13E-03	<i>4.16E-04</i>	<i>1.60E-03</i>	8.95E-03
18-Jun-17	3.12	13.6	<i>9.43E-04</i>	3.02E-05	5.47E-03	9.87E-05	2.46E-01	1.23E-01	4.21E-04	5.09E-03	5.66E-04	<i>4.09E-04</i>	<i>1.57E-03</i>	5.66E-03
24-Jun-17	1.37	7.0	<i>9.50E-04</i>	3.55E-05	5.20E-03	7.10E-05	1.55E-01	6.21E-02	6.02E-04	2.10E-03	6.02E-04	<i>4.12E-04</i>	<i>1.58E-03</i>	8.74E-03
30-Jun-17	4.12	20.9	<i>9.32E-04</i>	5.34E-05	4.78E-03	1.50E-04	3.63E-01	2.10E-01	6.27E-04	5.93E-03	7.39E-04	<i>4.04E-04</i>	<i>1.55E-03</i>	6.46E-03
Geometric mean	N/A	17.1	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	3.22	21.8	9.42E-04	6.48E-05	6.11E-03	2.62E-04	2.47E-01	4.04E-01	8.14E-04	1.16E-02	1.14E-03	4.08E-04	1.57E-03	1.05E-02
Max. concentration	4.83	43.8	9.69E-04	1.48E-04	8.97E-03	6.01E-04	4.47E-01	9.13E-01	1.52E-03	2.94E-02	2.00E-03	4.20E-04	1.61E-03	3.35E-02
Min. concentration	1.37	3.42	9.02E-04	3.02E-05	3.85E-03	7.10E-05	1.14E-01	6.21E-02	4.02E-04	2.10E-03	5.66E-04	3.91E-04	1.50E-03	3.70E-03
90th percentile	4.54	39.6	9.62E-04	7.99E-05	8.13E-03	4.68E-04	3.58E-01	7.61E-01	1.06E-03	2.34E-02	1.78E-03	4.17E-04	1.60E-03	1.69E-02
95th percentile	4.73	41.4	9.65E-04	1.01E-04	8.48E-03	5.02E-04	3.84E-01	8.06E-01	1.18E-03	2.82E-02	1.91E-03	4.18E-04	1.61E-03	2.48E-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	16	16	16	16	16	16	16	16	16	16	16	16	16	16
No. samples < mdl	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100
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														

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)
1-Apr-17	2.70	15.9	<u>9.87E-04</u>	4.47E-05	3.22E-03	2.84E-04	6.19E-02	3.61E-01	6.65E-04	9.21E-03	8.88E-04	<u>4.28E-04</u>	<u>1.65E-03</u>	9.21E-03
7-Apr-17	2.12	29.1	<u>9.94E-04</u>	2.11E-04	8.68E-03	5.07E-04	4.21E-02	8.08E-01	1.12E-03	1.90E-02	1.86E-03	<u>4.31E-04</u>	<u>1.66E-03</u>	2.80E-02
13-Apr-17	0.00	15.5	<u>9.76E-04</u>	5.01E-05	5.34E-03	2.60E-04	4.69E-02	4.25E-01	1.39E-03	1.58E-02	9.50E-04	<u>4.23E-04</u>	<u>1.63E-03</u>	1.09E-02
19-Apr-17	2.29	10.3	<u>9.87E-04</u>	1.05E-04	5.07E-03	1.61E-04	5.57E-02	2.57E-01	9.01E-04	6.25E-03	8.62E-04	<u>4.28E-04</u>	<u>1.64E-03</u>	1.19E-02
25-Apr-17	1.33	6.23	<u>9.73E-04</u>	1.02E-04	5.58E-03	1.32E-04	1.64E-02	1.69E-01	1.56E-03	4.18E-03	1.08E-03	<u>4.22E-04</u>	<u>1.62E-03</u>	2.23E-02
1-May-17	2.66	47.9	<u>9.81E-04</u>	8.50E-05	7.65E-03	6.33E-04	4.62E-02	1.31E+00	1.10E-03	3.21E-02	2.18E-03	<u>4.25E-04</u>	<u>1.63E-03</u>	1.39E-02
7-May-17	1.83	12.0	<u>9.57E-04</u>	2.81E-05	5.80E-03	1.77E-04	2.84E-02	2.62E-01	5.10E-04	5.63E-03	7.65E-04	<u>4.15E-04</u>	<u>1.59E-03</u>	3.44E-03
13-May-17	4.37	24.6	<u>9.55E-04</u>	2.99E-05	7.26E-03	2.70E-04	3.95E-02	4.41E-01	9.17E-04	1.01E-02	1.09E-03	<u>4.14E-04</u>	<u>1.59E-03</u>	8.53E-03
19-May-17	4.54	43.9	<u>9.62E-04</u>	5.96E-05	8.66E-03	6.73E-04	4.59E-02	1.17E+00	1.37E-03	2.58E-02	1.99E-03	<u>4.17E-04</u>	<u>1.60E-03</u>	1.53E-02
25-May-17	2.46	29.9	<u>9.29E-04</u>	4.34E-05	7.81E-03	4.60E-04	2.48E-02	7.81E-01	7.25E-04	1.60E-02	1.27E-03	<u>4.03E-04</u>	<u>1.55E-03</u>	7.25E-03
31-May-17	3.95	25.9	<u>9.56E-04</u>	5.80E-05	8.29E-03	2.55E-04	4.30E-02	3.84E-01	7.27E-04	1.56E-02	9.62E-04	<u>4.14E-04</u>	<u>1.59E-03</u>	5.80E-03
6-Jun-17	3.12	37.7	<u>9.13E-04</u>	4.14E-05	5.23E-03	5.07E-04	4.60E-02	7.37E-01	5.78E-04	1.59E-02	1.47E-03	<u>3.96E-04</u>	<u>1.52E-03</u>	8.28E-03
12-Jun-17	3.33	49.2	<u>9.43E-04</u>	4.27E-05	7.35E-03	7.29E-04	5.88E-02	1.15E+00	7.54E-04	2.56E-02	2.12E-03	<u>4.09E-04</u>	<u>1.57E-03</u>	9.62E-03
18-Jun-17	1.66	27.0	<u>9.43E-04</u>	3.58E-05	4.90E-03	2.72E-04	5.07E-02	4.13E-01	4.40E-04	1.11E-02	9.05E-04	<u>4.09E-04</u>	<u>1.57E-03</u>	6.22E-03
24-Jun-17	<u>0.31</u>	8.63	<u>9.52E-04</u>	1.97E-05	4.57E-03	1.06E-04	5.40E-02	1.31E-01	5.01E-04	3.26E-03	5.46E-04	<u>4.13E-04</u>	<u>1.59E-03</u>	6.92E-03
30-Jun-17	4.45	19.5	<u>9.30E-04</u>	4.40E-05	5.15E-03	1.95E-04	7.82E-02	2.82E-01	9.24E-04	6.89E-03	7.57E-04	<u>4.03E-04</u>	<u>1.55E-03</u>	1.18E-02
Geometric mean	N/A	21.3	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	2.57	25.2	9.59E-04	6.26E-05	6.28E-03	3.51E-04	4.62E-02	5.68E-01	8.86E-04	1.39E-02	1.23E-03	4.15E-04	1.60E-03	1.12E-02
Max. concentration	4.54	49.2	9.94E-04	2.11E-04	8.68E-03	7.29E-04	7.82E-02	1.31E+00	1.56E-03	3.21E-02	2.18E-03	4.31E-04	1.66E-03	2.80E-02
Min. concentration	0.00	6.23	9.13E-04	1.97E-05	3.22E-03	1.06E-04	1.64E-02	1.31E-01	4.40E-04	3.26E-03	5.46E-04	3.96E-04	1.52E-03	3.44E-03
90th percentile	4.41	45.9	9.87E-04	1.04E-04	8.47E-03	6.53E-04	6.04E-02	1.16E+00	1.38E-03	2.57E-02	2.06E-03	4.28E-04	1.64E-03	1.88E-02
95th percentile	4.47	48.2	9.89E-04	1.32E-04	8.66E-03	6.87E-04	6.60E-02	1.21E+00	1.43E-03	2.74E-02	2.13E-03	4.28E-04	1.65E-03	2.37E-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	16	16	16	16	16	16	16	16	16	16	16	16	16	16
No. samples < mdl	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0
% valid data	100	100	100	100	100	100	100	100	100	100	100	100	100	100
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													

**APPENDIX A-2**

**TOTAL DUSTFALL SAMPLING RESULTS**

**NE (Gallinger Road) Monitoring Results for Dustfall (Q2 2017)**  
(results expressed in g/m<sup>2</sup>/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
April	28	3.0	4.7	7.7
May	32	0.15	0.45	0.51
June	38	INV	INV	INV

Arithmetic mean	4.1
Max. concentration	7.7
Min. concentration	0.51
AAQC	7
No. > AAQC value**	0
No. of valid samples	2
% Valid data	100
No. samples < mdl	0
Detection limit	0.30
Half detection limit	0.15

**SW (Tait Road) Monitoring Results for Dustfall (Q2 2017)**  
(results expressed in g/m<sup>2</sup>/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
April	28	0.15	0.39	0.39
May	32	0.15	5.3	5.6
June	38	INV	INV	INV

Arithmetic mean	3.0
Max. concentration	5.6
Min. concentration	0.39
AAQC	7
No. > AAQC value**	0
No. of valid samples	2
% Valid data	100
No. samples < mdl	0
Detection limit	0.30
Half detection limit	0.15

Notes:

N/A: Not applicable

INV: Invalid Sample

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

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

**APPENDIX A-3**

**SO<sub>2</sub> AND NO<sub>2</sub> PASSIVE SAMPLING RESULTS**

**Monitoring Results for Passive SO<sub>2</sub> and NO<sub>2</sub> (Q2 2017)**  
(results expressed in µg/m<sup>3</sup>)

Month	SW (Tait Road)		NE (Gallinger Road)	
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>
April	0.5	2.2	0.5	0.7
May	0.1	1.5	0.1	0.6
June	0.6	1.0	0.1	0.8

Arithmetic mean	0.4	1.6	0.3	0.7
Max. concentration	0.6	2.2	0.5	0.8
Min. concentration	0.1	1.0	0.1	0.6
AAQC* 24-hr converted to 30-day	N/A	78 µg/m <sup>3</sup>	N/A	78 µg/m <sup>3</sup>
Alberta Ambient Air Quality Objectives 2013	30 µg/m <sup>3</sup>	N/A	30 µg/m <sup>3</sup>	N/A
No. of valid samples	3	3	3	3
No. samples < mdl	1	0	2	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 were calculated using 1/2DL for values reported as <DL

All results reported by the lab in parts per billion (ppb) and are converted to µg/m<sup>3</sup> assuming 101.23kPA and 25C

N/A: Not applicable

INV: Invalid Sample

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

\*Ontario Ambient Air Quality Criteria