

**Quarterly Ambient Air Quality
Monitoring Report for the Durham
York Energy Centre (Crago Road
Station) – July to September 2016**

Durham York Energy Centre



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Sign-off Sheet

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**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
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Executive Summary

The Regional Municipalities of Durham and York operate the Durham York Energy Centre (DYEC) which is an Energy from Waste (EFW) facility intended to provide a long-term, sustainable solution to manage municipal solid waste remaining after diversion from the Regions. The facility commenced commercial operation on February 1, 2016.

An Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study (Ambient Monitoring Plan) was developed and included two monitoring stations referred to as the Courtice Water Pollution Control Plant (WPCP) Station and the Rundle Road Station (as well as a temporary fence line monitor). The plan developed for these stations was based on the Regional Council's mandate to provide ambient air quality monitoring in the area of the DYEC for a three year period.

Subsequently, the Region decided to add a third ambient air monitoring station located near the corner of Crago and Osborne Roads (referred to as the Crago Road Station), which was installed in October/November 2014. The Crago Road Station is not part of the Ambient Monitoring Plan; however, it is operated following the same protocols as the other two stations. Results from the Crago Road Station are reported separately from the Courtice WPCP and Rundle Road Stations.

The Crago Road Station is equipped to measure concentrations of several air contaminants either continuously or at scheduled intervals (non-continuously) as outlined below:

- Contaminants monitored continuously:
 - Sulphur Dioxide (SO_2)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns ($\text{PM}_{2.5}$).
- Contaminants monitored non-continuously:
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

Meteorological data is also measured at the station. The predominantly downwind Crago Road Station measures horizontal wind speed, wind direction, atmospheric temperature, relative humidity and rainfall.

During this quarter, the Regional Municipality of Durham requested that the dioxin/ furan sampling frequency at the Crago Road monitoring Station (as well as at the Coutice WPCP and Rundle Road Stations) be increased from once every 24 days to once every 12 days for a 3-month period starting in September 2016. The additional sampling followed the same methodologies and protocols specified in the Ambient Monitoring Plan (Stantec, 2012) for the

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existing monitoring program. The results of this additional sampling have been included in this report.

Site personnel noted ongoing Highway 418 construction on the north and south sides of Highway 401 between Courtice and Crago Roads causing significant dust suspension from haul trucks, bulldozers, graders and excavators. These construction activities may have contributed to elevated PM_{2.5} measurements during this quarter.

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road Station for the period July to September 2016 (Calendar Quarter 3 (Q3)). All measured air quality parameters had above acceptable data recovery rates during this quarter. Instrumentation recovery rates are presented in Section 3.2 of this report.

The following observations and conclusions were made from a review of the measured ambient air quality monitoring data:

1. Measured levels of NO₂, SO₂ and PM_{2.5} were below the applicable O. Reg. 419/05 Standards or human health risk assessment (HHRA) health-based criteria presented in **Table 2-1** of this report.
2. Since the Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} is based on a 98th percentile level over 3 years, whereas the PM_{2.5} measurement period at the Crago Road Station for this quarterly report was three months, there was insufficient data collected to determine with any certainty if exceedances of the CAAQS would occur. Therefore no comparison of the measured PM_{2.5} data during this quarter to the CAAQS was conducted for this report, as it would not be scientifically accurate or representative.
3. The maximum measured concentrations of TSP and all metals with Ministry of Environment and Climate Change (MOECC) air quality Standards were well below their applicable Standards (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of all PAHs with MOECC air quality Standards were well below their applicable criteria shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene concentration for one sample, which exceeded the applicable Ontario AAQC by 23%. The measurement was however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based standard. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario.
5. The maximum measured toxic equivalent dioxin and furan concentration was below the applicable Standard presented in **Table 2-3**.

In summary, the measured concentrations of the air contaminants monitored were below their applicable MOECC Standards during the monitoring period between July and September 2016 with the exception of one (1) benzo(a)pyrene sample. All measured levels of the monitored contaminants were below their applicable HHRA health-based criteria.

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Abbreviations

AAQC	Ambient Air Quality Criteria
CAAQS	Canadian Ambient Air Quality Standard
CAC	Criteria Air Contaminants
CDD	Chlorinated Dibenzo-p-dioxins
CDF	Chlorinated Dibenzo-p-furans
D/Fs	Dioxins and Furans
DYEC	Durham York Energy Centre
EFW	Energy from Waste
HHRA	Human Health Risk Assessment
MOECC	Ontario Ministry of the Environment and Climate Change
SO ₂	Sulphur Dioxide
NO _x	Nitrogen Oxides
O ₃	Ozone
PAH	Polycyclic Aromatic Hydrocarbons
Particulate	A particle of a solid or liquid that is suspended in air.
PCB	Polychlorinated Biphenyl
PCDD/PCDF	Polychlorinated Dibenzo-p-dioxins and Dibenzofurans
PM	Particulate Matter
PM _{2.5}	Particulate Matter smaller than 2.5 microns
Q1, Q2, Q3, Q4	Quarter 1 (January, February and March); Quarter 2 (April, May and June); Quarter 3 (July, August, and September); and Quarter 4 (October, November and December)
TEQ	Toxic Equivalent Quotient
TEQs	Toxic Equivalents
TSP	Total Suspended Particulate
WPCP	Water Pollution Control Plant

Elements

Cd	Cadmium
Hg	Mercury
Pb	Lead
Al	Aluminum
As	Arsenic
Be	Beryllium
Cr	Chromium
Cu	Copper
Mn	Manganese

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Ni	Nickel
Ag	Silver
Tl	Thallium
Sn	Tin
V	Vanadium
Zn	Zinc

Miscellaneous

°C	Temperature in degrees Celsius
N/A	Not Available
%	Percent
ppm	Parts per million
ppb	Parts per billion
ppbv	Parts per billion by volume
ppt	Parts per trillion
min	Minimum
max	Maximum
mm	Millimetre
m	Metre
km/hr	Kilometre per hour
mg/m ³	Milligrams per cubic metre
µg/m ³	Micrograms per cubic metre
ng/m ³	Nanograms per cubic metre
pg/m ³	Picograms per cubic metre
pg TEQ/m ³	Picograms toxic exposure equivalents per cubic metre

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Introduction
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1.0 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

The Regional Municipalities of Durham and York operate the Durham York Energy Centre (DYEC) which is an Energy from Waste (EFW) facility intended to provide a long-term, sustainable solution to manage municipal solid waste remaining after diversion from the Regions. The location of the DYEC is shown in **Figure 1-1**. The facility commenced commercial operation on February 1, 2016.

An Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study (Ambient Monitoring Plan) was developed and included two monitoring stations referred to as the Courtice Water Pollution Control Plant (WPCP) Station and the Rundle Road Station (as well as a temporary fence line monitor). The plan developed for these stations was based on the Regional Council's mandate to provide ambient air quality monitoring in the area of the DYEC for a three year period.

The purposes of the ambient air quality monitoring program are to:

1. Quantify any measureable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (Jacques Whitford, 2009);
2. Monitor concentration levels of EFW-related air contaminants in nearby residential areas; and,
3. Quantify background ambient levels of air contaminants in the area.

At the request of the Regional Municipality of Durham (the Region), a third ambient air monitoring station located near the corner of Crago and Osborne Roads was installed. This station, which is not part of the Ambient Monitoring Plan, is operated following the same protocols as the other two stations (Courtice WPCP and Rundle Road Stations) already in operation.

The Crago Road Station is equipped to measure concentrations of several air contaminants either continuously or at scheduled intervals (non-continuously) as outlined below:

- Contaminants monitored continuously:
 - Sulphur Dioxide (SO_2)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns ($\text{PM}_{2.5}$).

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- Contaminants monitored non-continuously:
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

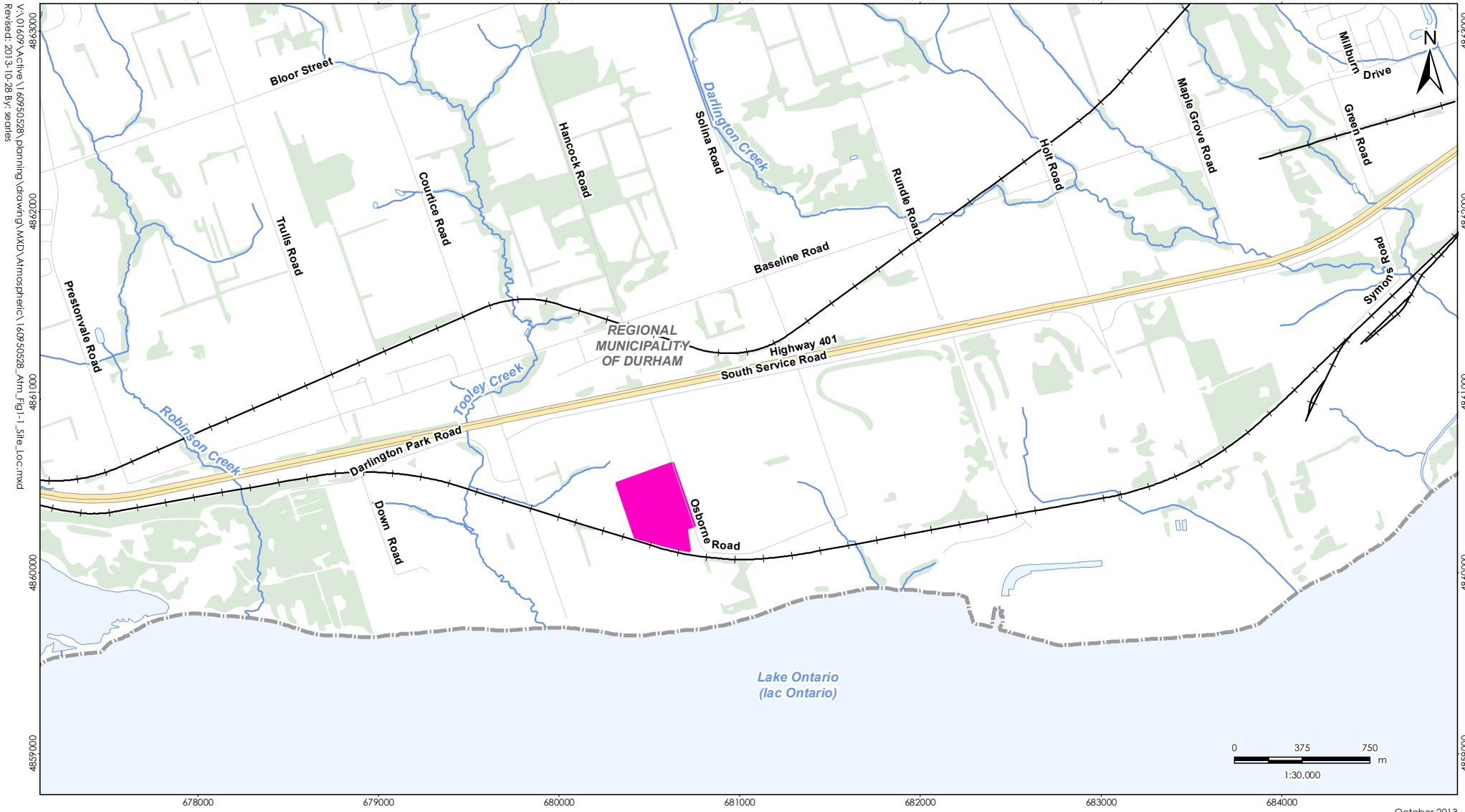
During this quarter, the Regional Municipality of Durham requested that the dioxin/ furan sampling frequency at the Crago Road, Courtice WPCP and Rundle Road monitoring stations be increased from once every 24 days to once every 12 days for a 3-month period starting in September 2016. The additional sampling followed the same methodologies and protocols specified in the Ambient Monitoring Plan (Stantec, 2012) for the existing monitoring program. The results of this additional sampling have been included in this report.

This quarterly report provides a summary of the ambient air quality data collected at this station for the period July to September 2016 (Q3).

1.2 LOCATION OF AMBIENT AIR QUALITY MONITORING STATION

The selection of the site for the monitoring station was accomplished in consultation with Regional Municipality of Durham representatives, with consideration of the location of the existing monitoring stations and general MOECC siting criteria. The final location of the monitoring station was influenced by the availability of electrical power, accessibility of each location, and security.

The Crago Road Station is sited east of the DYEC in the vicinity of the Darlington Hydro Upper and Lower Soccer Fields on the east side of Crago Road, north of Osborne Road. Its location is shown in **Figure 1-2 and Figure 1-3**. The monitoring station measures all the air contaminants listed in Section 1.1 and meteorological data.



October 2013
160950528



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N

2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

Legend

- Durham York Energy Centre Site
- Railway
- Road
- Highway
- Watercourse
- Waterbody
- Wooded Area



Client/Project

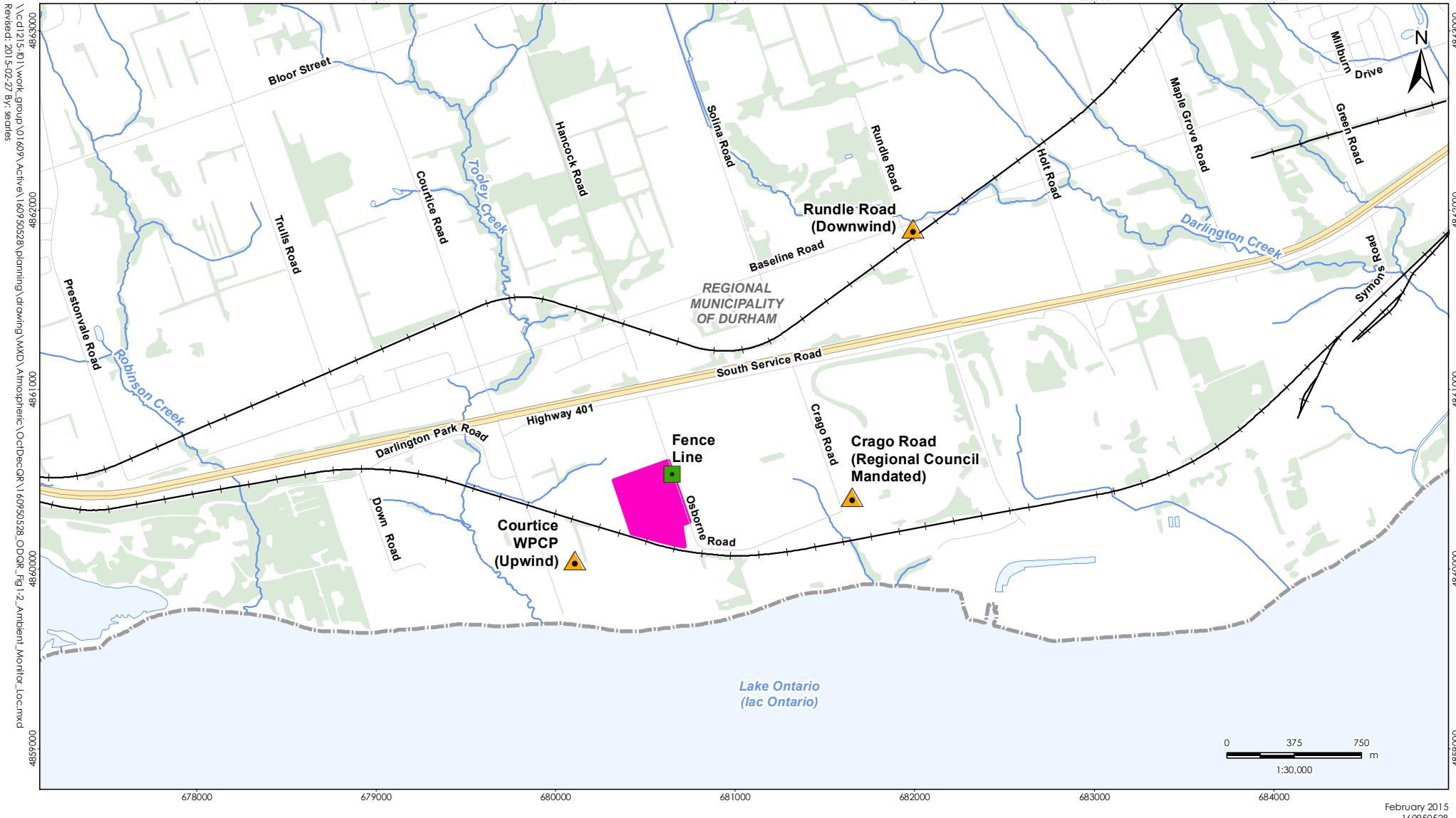
The Region of Durham
Durham York Energy Centre

Figure No.

1-1

Title

Site Location Plan



Legend

- ▲ Station Location
- Fence Line Station Location
(Monitoring to begin after DYEC commissioning period)
- Durham York Energy Centre Site
- Railway
- Road
- Highway

- Watercourse
- Waterbody
- Wooded Area

Client/Project

The Region of Durham
Durham York Energy Centre

Figure No.

1-2

Title

Locations of Ambient Monitoring Stations

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N

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Figure 1-3 View of Crago Road Ambient Air Quality Monitoring Station



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Key Components Assessed
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2.0 KEY COMPONENTS ASSESSED

2.1 METEOROLOGY

The following meteorological parameters are measured at the Crago Road monitoring station:

- Wind Speed and direction at a height of 10 m
- Ambient temperature at a height of 2 m
- Relative humidity, and
- Rainfall.

2.2 AIR QUALITY CONTAMINANTS OF CONCERN

The ambient air quality monitoring program for the Crago Road Station includes the following contaminants specified in the Ambient Monitoring Plan (Stantec, 2012):

- Continuously monitored criteria air contaminants (CACs)
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).
- Non-continuously monitored
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

The following are lists of the specific metals, PAHs, and dioxins and furans being measured. Rationales for the choice of contaminants being monitored are provided in the Ambient Monitoring Plan (Stantec, 2012).

Metals:

- Aluminum (Al)
- Antimony (Sb)
- Arsenic (As)
- Barium (Ba)
- Beryllium (Be)
- Bismuth (Bi)
- Boron (B)
- Cadmium (Cd)
- Cobalt (Co)
- Copper (Cu)
- Chromium (Cr) (Total)
- Iron (Fe)
- Lead (Pb)
- Magnesium (Mg)
- Manganese (Mn)
- Mercury (Hg)
- Molybdenum (Mo)
- Nickel (Ni)
- Phosphorus (Ph)
- Selenium (Se)
- Silver (Ag)
- Strontium (Sr)
- Thallium (Tl)
- Tin (Sn)
- Titanium (Ti)
- Uranium (U)
- Vanadium (V)
- Zinc (Zn)
- Zirconium (Zr)

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Polycyclic Aromatic Hydrocarbons:

- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo(a)anthracene
- Benzo(a)fluorene
- Benzo(a)pyrene
- Benzo(b)fluorene
- Benzo(b)fluoranthene
- Benzo(e)pyrene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Biphenol
- Chrysene
- Dibenz(a,h)anthracene
- Dibenz(a,c)anthracene
- Fluoranthene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Perylene
- Phenanthrene
- Pyrene
- Tetratin
- o-Terphenyl
- Total PAHs

Dioxins and Furans:

- 2,3,7,8-Tetra CDD
- 1,2,3,7,8-Penta CDD
- 1,2,3,4,7,8-Hexa CDD
- 1,2,3,6,7,8-Hexa CDD
- 1,2,3,7,8,9-Hexa CDD
- 1,2,3,4,6,7,8-Hepta CDD
- Octa CDD
- Total Tetra CDD
- Total Penta CDD
- Total Hexa CDD
- Total Hepta CDD
- 2,3,7,8-Tetra CDF
- 1,2,3,7,8-Penta CDF
- 2,3,4,7,8-Penta CDF
- 1,2,3,4,7,8-Hexa CDF
- 1,2,3,6,7,8-Hexa CDF
- 2,3,4,6,7,8-Hexa CDF
- 1,2,3,7,8,9-Hexa CDF
- 1,2,3,4,6,7,8-Hepta CDF
- 1,2,3,4,7,8,9-Hepta CDF
- Octa CDF
- Total Tetra CDF
- Total Penta CDF
- Total Hexa CDF
- Total Hepta CDF
- Total toxic equivalency (I-TEQ)

2.3 AIR QUALITY CRITERIA

Two sets of criteria were used for comparison to the air quality data as specified in the Ambient Monitoring Plan (Stantec, 2012). The first set of criteria is the Standards reported in O. Reg. 419/05 (Schedules 3 and 6). These are compliance based Standards used throughout the province of Ontario. However, not all chemicals have O. Reg. 419/05 Standards, or in some instances updated health-based criteria were used in the human health risk assessment (HHRA) conducted in support of the Environmental Assessment (July 31, 2009) - December 10, 2009). These health-based values, which were reported in Table 7-2 (Summary of Inhalation TRVs and Inhalation Benchmarks Selected for CACs) and Table 7-3 (Inhalation TRVs and Inhalation Benchmarks for Selected COPCs) of the HHRA (Stantec, 2009) were used as the second set of criteria.

The previously applicable 24-hour average Canada-Wide Standard (CWS) for PM_{2.5} of 30 µg/m³ (98th percentile averaged over 3 consecutive years), has been superseded by a new Canadian Ambient Air Quality Standard (CAAQS) of 28 µg/m³ (98th percentile averaged over 3 consecutive years) and an annual objective of 10 µg/m³ as noted in **Table 2-1**. The proposed CAAQS 24-hour objective for 2020 is 27 µg/m³.

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Summaries of the relevant air quality criteria for the contaminants monitored in Q3 2016 are presented in **Table 2-1** to **Table 2-3**.

Table 2-1 Summary of Air Quality Criteria for CACs

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria		
		1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Other time Period ($\mu\text{g}/\text{m}^3$)	1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Annual ($\mu\text{g}/\text{m}^3$)
Sulphur dioxide	7446095	690	275	-	690	275	29
Nitrogen oxides ^A	10102-44-0	400	200	-	400	200	60
Contaminant	CAS	Canadian Ambient Air Quality Standards (CAAQS)			HHRA Health-Based Criteria		
		1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Other time Period ($\mu\text{g}/\text{m}^3$)	1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Other time Period ($\mu\text{g}/\text{m}^3$)
PM _{2.5}	N/A	-	28 ^B	10 ^C	-	30 ^D	-

Notes:

- A. The Schedule 3 Standards for NO_x are based on health effects of NO₂, as NO₂ has adverse health effects at much lower concentrations than NO. Therefore the standard was compared to NO₂ in this report. However, as per the current April 2012 version of O. Reg. 419/05 Summary of Standards and Guidelines, the standard was also compared to the monitored NO_x.
- B. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter and Ozone, effective by 2015 (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile daily average concentration averaged over 3 consecutive years.
- C. Annual Canadian Ambient Air Quality Standard for Respirable Particulate Matter, effective by 2015. The Respirable Particulate Matter Objective is referenced to the 3-year average of the annual average concentrations.
- D. HHRA Health-Based criterion for PM_{2.5} was selected referencing CCME (2006).

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Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria		
		1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Other time Period ($\mu\text{g}/\text{m}^3$)	1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Annual ($\mu\text{g}/\text{m}^3$)
Total Particulate	NA	-	120	-	-	120	60
Aluminum	7429-90-5	-	4.8	-	-	-	-
Antimony	7440-36-0	-	25	-	5	25	0.2
Arsenic	7440-38-2	-	0.3	-	0.2	0.3	0.015 ^A 0.0043 ^B
Barium	7440-39-3	-	10	-	5	10	1
Beryllium	7440-41-7	-	0.01	-	0.02	0.01	0.007 ^A 0.0024 ^B
Bismuth	7440-69-9						
Boron	7440-42-8	-	120	-	50	-	5
Cadmium	7440-43-9	-	0.025	0.005; annual	0.1	0.025	0.005 ^A 0.0098 ^B
Chromium (Total)	7440-47-3	-	0.5	-	1	-	60
Cobalt	7440-48-4	-	0.1	-	0.2	0.1	0.1
Copper	8440-50-8	-	50	-	-	-	-
Iron	15438-31-0	-	4	-	-	-	-
Lead	7439-92-1	-	0.5	0.2; 30-day	1.5	0.5	0.5
Magnesium	7439-95-4						
Manganese	7439-96-5	-	0.4	-	-	-	-
Mercury	7439-97-6	-	2	-	0.6	2	0.3
Molybdenum	7439-87-7	-	120	-	-	-	-
Nickel	7440-02-0	-	0.2	0.04; annual	6	-	0.05
Phosphorus	7723-14-0	-	-	-	-	-	6.4×10^7
Selenium	7782-49-2	-	10	-	2	10	0.2
Silver	7440-22-4	-	1	-	0.1	1	0.01
Strontium	7440-24-6	-	120	-	-	-	-
Thallium	7440-28-0	-	-	-	1		0.1
Tin	7440-31-5	-	10	-	20	10	2
Titanium	7440-32-6	-	120	-	-	-	-
Vanadium	7440-62-2	-	2	-	0.5	1	1

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Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria		
		1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Other time Period ($\mu\text{g}/\text{m}^3$)	1-Hour ($\mu\text{g}/\text{m}^3$)	24-Hour ($\mu\text{g}/\text{m}^3$)	Annual ($\mu\text{g}/\text{m}^3$)
Uranium	7440-61-1	-	1.5	0.03; annual	-	-	-
Zinc	7440-66-6	-	120	-	50		5
Zirconium	7440-67-7	-	20	-	-	-	-

Notes:

- A. Annual Average
- B. Carcinogenic Annual Average

Table 2-3 Summary of Air Quality Criteria for PAHs and D/Fs

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria			
		1-Hour (ng/m^3)	24-Hour (ng/m^3)	Other time Period (ng/m^3)	1-Hour (ng/m^3)	24-Hour (ng/m^3)	Annual (ng/m^3)	Toxic Equivalency Factor Annual ^{A, F} (ng/m^3) ⁻¹
1-Methylnaphthalene	90-12-0	-	12,000	-	-	-	3,000	-
2-Methylnaphthalene	91-57-6	-	10,000	-	-	-	3,000	-
Acenaphthene	83-32-9	-	-	-	1,000	-	-	1
Acenaphthylene	208-96-8	-	3,500	-	1,000	-	-	10
Anthracene	120-12-7	-	200	-	500	-	50	-
Benzo(a)anthracene	56-55-3	-	-	-	500	-	-	100
Benzo(b)fluoranthene	205-99-2	-	-	-	500	-	-	100
Benzo(k)fluoranthene	207-08-9	-	-	-	500	-	-	100
Benzo(a)fluorene	238-84-6	-	-	-	500	-	50	-
Benzo(b)fluorene	243-17-4	-	-	-	500	-	50	-
Benzo (g,h,i) perylene	191-24-2	-	-	-	500	-	-	100
Benzo(a)pyrene	50-32-8	-	0.05 ^B 5 ^C 1.1 ^D	0.01; annual	-	1	87 ^A	-
Benzo(e)pyrene	192-97-2	-	-	-	500	-	-	10
Biphenyl	92-52-4	-	-	-	-	-	224,000	-
Chrysene	218-01-9			-			-	-

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Table 2-3 Summary of Air Quality Criteria for PAHs and D/Fs

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria				Toxic Equivalency Factor Annual ^{A, F} (ng/m ³) ⁻¹
		1-Hour (ng/m ³)	24-Hour (ng/m ³)	Other time Period (ng/m ³)	1-Hour (ng/m ³)	24-Hour (ng/m ³)	Annual (ng/m ³)		
Dibenzo(a,c)anthracene	215-58-7	-	-	-	-	-	-	-	100
Dibenzo(a,h)anthracene	53-70-3	-	-	-	500	-	-	-	1,000
Fluoranthene	206-44-0	-	-	-	500	-	-	-	1
Indeno(1,2,3-cd)pyrene	193-39-5	-	-	-	500	-	-	-	100
Naphthalene	91-20-3	-	22,500	-	-	22,500	3,000	-	-
o-Terphenyl	84-15-1	-	-	-	50,000	-	5,000	-	-
Perylene	198-55-0	-	-	-	500	-	-	-	1
Phenanthrene	85-01-8	-	-	-	500	-	-	-	1
Pyrene	129-00-0	-	-	-	500	-	-	-	1
Tetralin	119-64-2	-							-
Dioxins and Furans Total Toxic Equivalency ^E	NA	-	0.1 (pg TEQ/m ³) ^E 1 (pg TEQ/m ³) ^C	-	-	-	-	-	-

Notes:

- A. Carcinogenic Annual Average. Units in (ng/m³)⁻¹.
- B. Ontario Ambient Air Quality Criteria - The standard for benzo(a)pyrene (B(a)P) is for B(a)P as a surrogate for PAHs.
- C. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds
- D. O. Reg. 419/05 24 Hour Guideline
- E. Application of the air standard for dioxins, furans, and dioxin-like PCBs requires the calculation of the total toxicity equivalent (TEQ) concentration contributed by all dioxin-like compounds in the mixture. TEQ is calculated using the methodology as per the O. Reg. 419/05 Summary of Standards and Guidelines, and the corresponding WHO₂₀₀₅ toxic equivalency factors (TEFs).
- F. Toxic Equivalency Factors (TEFs) are shown as benzo(a)pyrene equivalents.

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3.0 INSTRUMENTATION SUMMARY AND FIELD CONDITIONS

3.1 INSTRUMENTATION

The measurement program at the monitoring site includes both continuous and non-continuous monitors to sample air contaminant concentrations.

Monitoring for respirable particulate matter (PM_{2.5}), nitrogen oxides (NO_x) and sulphur dioxide (SO₂) are conducted on a continuous basis. A summary of the continuous monitors and a brief description of their principle of operation are provided in **Table 3-1** below.

Table 3-1 Summary of Continuous Ambient Air Quality Monitors

Contaminant	Monitor	Principle of Operation	Range	Time Interval
PM _{2.5}	Thermo Sharp 5030 Synchronized Hybrid Ambient Real-time Particulate Monitor	Light Scattering Photometry / Beta Attenuation - Consists of a carbon14 source, detector and light scattering Nephelometer in a rack-mountable enclosure. The Thermo Sharp utilizes a continuous (non-step wise) hybrid mass measurement and a combination of beta attenuation and light scattering technology. The unit's filter tape is automatically advanced based upon a user defined frequency or particulate loading.	0 - 10 mg/m ³	1 minute
NO, NO ₂ , NO _x	API Model 200E Chemiluminescence Analyzer	Chemiluminescence - Uses a chemiluminescence detection principle and microprocessor technology for ambient continuous emissions monitoring (CEM). Measurements are automatically compensated for temperature and pressure changes.	0 – 1000 ppb	1 second
SO ₂	Teledyne Monitor Labs Sulphur Dioxide Analyzer Model T100	Pulsed Fluorescence - SO ₂ levels are measured based on the principle that SO ₂ has a strong ultraviolet (UV) absorption at a wavelength between 200 and 240 nanometres (nm). The absorption of photons at these wavelengths results in the emission of fluorescence photons at a higher wavelength. The amount of fluorescence measured is directly proportional to the concentration of SO ₂ .	0 – 1000 ppb	1 second

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Two manually operated, hi-volume air samplers are installed at the Crago Road Station to collect metals in total suspended particulate (TSP), polycyclic aromatic hydrocarbons (PAHs), and dioxins and furans. The samples were submitted to Maxxam Analytics Inc., a Canadian Association for Laboratory Accreditation Inc. (CALA) / Standards Council of Canada (SCC) accredited laboratory, for analysis.

Table 3-2 Summary of Non-Continuous Ambient Air Quality Monitors

Contaminant	Sampler	Filter Media	Lab Analysis	Sampling Schedule
TSP and metals	Tisch Environmental TE-5170 mass-flow high volume sampler	Pre-weighed, conditioned Teflon coated glass fibre filters	Weighed for particulate loading and analysed using the Atomic Emission Spectroscopy / Inductively Coupled Plasma (AES/ICP) technique to determine metals content	24 hour sample taken every 6 days
PAHs	Tisch Environmental TE-1000 mass-flow high volume air sampler	Dual chambered sampling module with a Teflon-coated glass fibre filter and a Poly-Urethane Foam (PUF) cartridge	Gas Chromatography / Mass Spectrometry (GC/MS)	24 hour sample taken every 12 days
Dioxins and Furans				24 hour sample taken every 24 days. At the request of the Region this was increased to every 12 days starting in September 2016 for a 3-month period.

Horizontal wind speed, wind direction, atmospheric temperature, relative humidity, and rainfall are measured at the predominantly downwind Crago Road Station. The meteorological sensors at the Crago Road Station are mounted on an external 10 m aluminum tower and are logged using a digital data acquisition system (DAS). The meteorological equipment at the Crago Road Station is summarized in **Table 3-3**.

Table 3-3 Summary of Meteorological Equipment

Parameter	Equipment
Wind Speed/Wind Direction	Met One Instruments Inc. Model 034B
Temperature/Relative Humidity	Campbell Scientific Model HMP60
Rainfall	Texas Electronic TE525M

A Campbell Scientific CRX1000 station data acquisition system is used to collect continuous instrument monitoring data and status codes from the ambient air quality monitors. Continuous

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station data is maintained in the data loggers, and data is viewed locally using a laptop and the relevant DAS software applications. Remote data transmission is accomplished by the periodic transmission of collected station air quality data via cellular phone.

3.2 INSTRUMENTATION ISSUES

A few minor instrumentation issues were encountered during this quarter. A summary of the operational issues for each measurement parameter during the monitoring period is presented in **Table 3-4**.

Table 3-4 Summary of Instrument Issues at the Crago Road Station

Parameter	Issues	Time Frame	Remedial Action
SO ₂	Data logger was reset during maintenance - data was not recorded for 3 hours.	Sept 16, 9:30 AM – 12:30 PM	Maintenance activity - no action required. Three hours of data invalidated.
NOx	Data logger was reset during maintenance - data was not recorded for 3 hours.	Sept 16, 9:30 AM – 12:30 PM	Maintenance activity - no action required. Three hours of data invalidated.
PM _{2.5}	Analogue output to data logger issue.	Aug 5, 12-15, 21-22	Data was downloaded directly from the analyzer. Valley Environmental Services calibrated and adjusted the instrument HVPS. All data intact.
TSP/Metals Hi-Vol.	None	-	-
PAH/ D/F Hi-Vol	None	-	-
Other	Data logger was reset during maintenance – data was not recorded from met station.	Sept 16, 9:30 AM – 12:30 PM	Maintenance activity - no action required. Three hours of data invalidated.

3.3 INSTRUMENTATION RECOVERY RATES

Data recovery rates for each monitor at the station during Q3 are presented in **Table 3-5**.

Table 3-5 Summary of Data Recovery Rates for the Crago Road Station – July to September 2016

Parameter	Valid Measurement Hours	Data Recovery Rate (%)
SO ₂	2192 ^B	99.3%
NOx	2192 ^B	99.3%
PM _{2.5}	2192 ^B	99.3%
Temperature	2205	99.9%
Rainfall	2205	99.9%
Relative Humidity	2205	99.9%

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Table 3-5 Summary of Data Recovery Rates for the Crago Road Station – July to September 2016

Parameter	Valid Measurement Hours	Data Recovery Rate (%)
Wind Speed/Direction	2195	99.4%
TSP/Metals	15 ^A	100%
PAHs	7 ^A	100%
Dioxins and Furans	4 ^A	100%

Notes:

- A. Number of filters/24-hour average samples.
- B. Includes instrumentation issues summarized in Table 3-4 and monthly calibrations.

3.4 FIELD CONDITION OBSERVATIONS

During Q3 2016 activities in the vicinity of the ambient air monitoring stations were observed that had the potential to affect air quality levels during the period. These observations were noted by Stantec and Valley Environmental Services personnel during field visits and by Regional Municipality of Durham personnel located at the DYEC.

Construction of Highway 418, which will connect with Highway 401 between Courtice Road and Crago Road was occurring during this quarter. Highway 418 will provide a north-south link between Highway 401 and the Phase 2 expansion of Highway 407. The Highway 401/418 interchange will be located almost directly north of the DYEC. During the week of August 29th the highway construction contractor excavated a large area immediately north of the DYEC between Energy Drive and Hwy 401. Through September the contractor continued to work in this area on the relocation/re-alignment of South Service Road. The new South Service Road will be located immediately south of the existing South Service Road and run between Courtice Road and Crago Road. Photographs of the South Service Road realignment are shown in **Figures 3-1** and **3-2**. Significant dust/particulate emissions are visible in **Figure 3-2** from these construction activities.

Other activities in the vicinity of the Crago Road Station that had the potential to affect local air quality included the construction of a new access road to the station on August 9, 2016. This activity included building a culvert and new gravel access roadway to the monitoring station.

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Figure 3-1 View from Crago Road Looking West at the New South Service Road Construction Area



Figure 3-2 View of South Service Road Realignment Construction (Looking North from the DYEC)



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4.0 SUMMARY OF AMBIENT MEASUREMENTS

The following sections provide summaries of the validated data and the validation done on each parameter.

4.1 METEOROLOGICAL DATA

A summary of the maximum, minimum, arithmetic mean, and standard deviation of the hourly average meteorological parameters measured at the monitoring station for the July to September 2016 period are presented in **Table 4-1**.

Table 4-1 Summary of Hourly Meteorological Measurements – July to September 2016

Parameter	Crago Road Station (Predominately Downwind)	Units
Temperature	Maximum	31.4
	Minimum	5.1
	Mean (July)	20.7
	Mean (August)	21.7
	Mean (September)	17.7
	Mean (Period)	20.0
	Standard Deviation	4.2
Rainfall	Maximum	13.6
	Minimum	0.0
	Mean (July)	0.04
	Mean (August)	0.07
	Mean (September)	0.06
	Mean (Period)	0.06
	Standard Deviation	0.54
Relative Humidity	Maximum	%
	Minimum	28.7
	Mean (July)	70.8
	Mean (August)	76.7
	Mean (September)	73.8
	Mean (Period)	73.7
	Standard Deviation	14.3

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Table 4-1 Summary of Hourly Meteorological Measurements – July to September 2016

Parameter	Crago Road Station (Predominately Downwind)	Units
Wind Speed ^A	Maximum	31.0
	Minimum	0.0
	Mean (July)	9.8
	Mean (August)	8.6
	Mean (September)	9.3
	Mean (Period)	9.3
	Standard Deviation	5.1

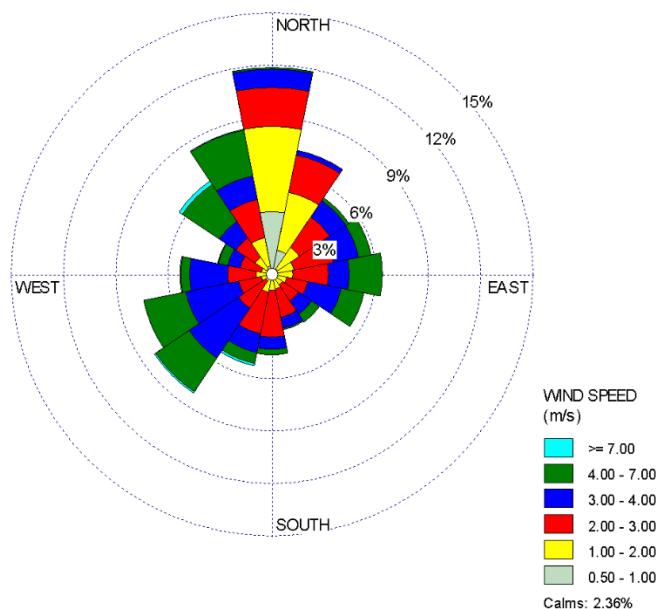
Note:

A. Wind speed is measured at 10 m.

A wind rose showing directionality and speed is presented in **Figure 4-1**. The length of the radial barbs gives the total percent frequency of winds from the indicated direction, while portions of the barbs of different widths indicate the frequency associated with each wind speed category.

Winds over the three-month period occurred predominantly from northerly and southwesterly directions. Wind contributions from the south and east were low. Higher wind speeds occurred from northwesterly and southwesterly directions.

Figure 4-1 Wind Rose for July to September 2016



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4.2 CAC AMBIENT AIR QUALITY MEASUREMENTS

A summary of the maximum, minimum, arithmetic mean and standard deviation of the measured CAC pollutant concentrations are presented in **Table 4-2**. Also presented in this table are the number of exceedances (if any occurred) of the relevant O. Reg. 419/05 Schedule 3 Standards, Ontario Ambient Air Quality Criteria (AAQC) or health-based criteria for each contaminant. All monitored contaminants were below their applicable criteria during the period between July to September, 2016.

Nitric oxide (NO) has no regulatory criteria as discussed in Section 4.2.2 below. There are both hourly and daily AAQCs as well as O. Reg. 419/05 Schedule 3 Standards for NO_x which are based on health effects of NO₂. As specified in the MOECC's listing of AAQCs (MOECC, 2012a) the AAQC were compared to measured NO₂ concentrations in this report. However, as per the current April 2012 version of O. Reg. 419/05 Summary of Standards and Guidelines, the Schedule 3 Standards for NO_x (MOECC, 2012b) was compared to the monitored NO_x levels.

The maximum concentration levels measured at the Crago Road Station in this quarter are compared in **Figure 4-2** to their respective AAQC along with the levels measured at the Courtice WPCP and Rundle Road Stations (Stantec, 2016).

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Table 4-2 Summary of Ambient CAC Monitoring Data – April to June 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
SO_2	1	250	690	Maximum	31.8	84.7
				Minimum	0.0	0.0
				Mean (April)	0.2	0.5
				Mean (May)	0.3	0.8
				Mean (June)	1.1	3.0
				Mean (Period)	0.5	1.4
				Standard Deviation	1.4	3.8
				# of Exceedances	0	0
	24	100	275	Maximum	6.2	16.7
				Minimum	0.0	0.0
				Mean (April)	0.2	0.6
				Mean (May)	0.3	0.8
				Mean (June)	1.1	2.8
				Mean (Period)	0.5	1.4
				Standard Deviation	0.7	1.8
				# of Exceedances	0	0

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Table 4-2 Summary of Ambient CAC Monitoring Data – April to June 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
PM _{2.5}	24	N/A	28 ^	Maximum	-	20.0
				Minimum	-	0.7
				Mean (April)	-	5.9
				Mean (May)	-	5.4
				Mean (June)	-	4.8
				Mean (Period)	-	5.4
				Standard Deviation	-	2.8
				# of Exceedances	-	N/A
NO ₂	1	200	400	Maximum	34.5	66.8
				Minimum	0.0	0.0
				Mean (April)	4.0	7.6
				Mean (May)	4.5	8.6
				Mean (June)	4.8	9.4
				Mean (Period)	4.4	8.5
				Standard Deviation	5.3	10.2
				# of Exceedances	0	0
	24	100	200	Maximum	11.6	22.5
				Minimum	0.1	0.1
				Mean (April)	4.0	7.5
				Mean (May)	4.5	8.5
				Mean (June)	4.9	9.4

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Table 4-2 Summary of Ambient CAC Monitoring Data – April to June 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
				Mean (Period)	4.4	8.5
				Standard Deviation	2.6	5.0
				# of Exceedances	0	0
NO _C	1	NA	NA	Maximum	48.1	61.7
				Minimum	0.0	0.0
				Mean (April)	0.9	1.1
				Mean (May)	1.6	2.1
				Mean (June)	1.5	1.9
				Mean (Period)	1.3	1.7
				Standard Deviation	3.6	4.5
				# of Exceedances	N/A	N/A
	24	NA	NA	Maximum	10.3	13.3
				Minimum	0.0	0.0
				Mean (April)	0.9	1.1
				Mean (May)	1.6	2.0
				Mean (June)	1.5	1.9
				Mean (Period)	1.3	1.7
				Standard Deviation	1.6	2.0
				# of Exceedances	N/A	N/A

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Table 4-2 Summary of Ambient CAC Monitoring Data – April to June 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
NOx	1	200 ^B	400 ^B	Maximum	61.9	122.2
				Minimum	0.0	0.0
				Mean (April)	4.5	8.6
				Mean (May)	6.0	11.5
				Mean (June)	6.3	12.1
				Mean (Period)	5.6	10.8
				Standard Deviation	7.8	15.1
				# of Exceedances	0	0
	24	100 ^C	200 ^C	Maximum	18.1	35.5
				Minimum	0.2	0.3
				Mean (April)	4.5	8.6
				Mean (May)	6.0	11.4
				Mean (June)	6.3	12.2
				Mean (Period)	5.6	10.7
				Standard Deviation	3.8	7.4
				# of Exceedances	0	0

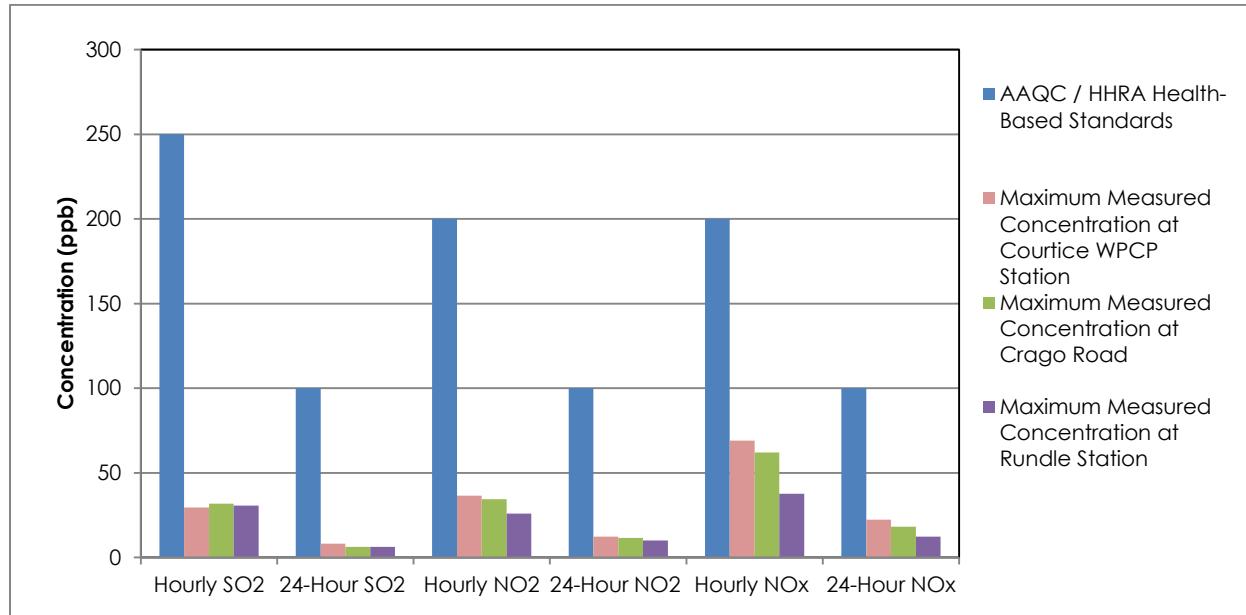
Notes:

- A. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile over 3 consecutive years.
- B. As per current version (April 2012) of O. Reg. 419/05 Summary of Standards and Guidelines, the air standard for NOx is compared to a monitored NOx concentration, although the O. Reg. 419/05 Schedule 3 Standard for NOx is based on health effects of NO₂.
- C. NO has no regulatory criteria.

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Figure 4-2 Comparison of NO₂, NOx and SO₂ Ambient Air Quality Monitoring Data to Applicable Criteria at the Stations



Detailed discussion for each measured contaminant is presented in the following sections.

4.2.1 Sulphur Dioxide (SO₂)

Data summaries are presented in **Appendix A** for sulphur dioxide for each month as well as time history plots of hourly and 24-hour average SO₂ concentrations. For hourly and 24-hour averages, the Ontario AAQCs of 250 ppb and 100 ppb (690 µg/m³ and 275 µg/m³) are shown with blue lines on the respective plot. As shown in these figures, measured ambient SO₂ concentrations at the station were well below the Ontario AAQCs.

The maximum hourly and 24-hour average SO₂ concentrations measured at the Cago Road Station during July to September 2016 were 31.8 and 6.2 ppb (84.7 and 16.7 µg/m³) respectively, which are 13% and 6% of the applicable 1-hour and 24-hour Ontario AAQCs.

A pollution rose of hourly average SO₂ concentrations measured at the Cago Road Station is presented in **Figure 4-3**. The pollution rose plot presents measured hourly average contaminant concentrations versus measured wind direction (over 10° wind sectors). Concentrations less than 5 µg/m³, which account for 95% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. In this period, the Cago Road Station generally measured higher hourly concentrations for winds blowing from easterly directions.

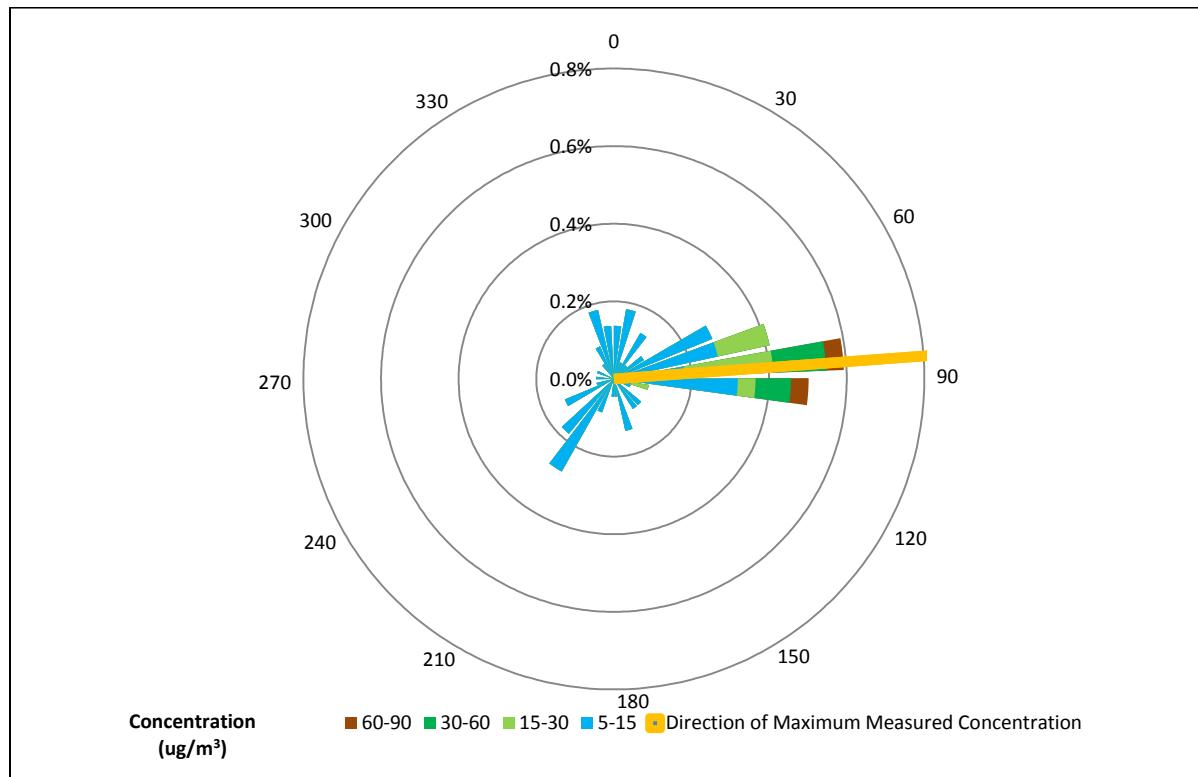
The maximum hourly average concentration of SO₂ occurred on 28-September at 14:00, with winds blowing from the east (the direction of the St. Mary's Cement facility). The maximum 24-

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hour average SO₂ concentration also occurred for winds blowing from the direction of St. Mary's Cement on September 29.

Figure 4-3 Pollution Rose of Measured Hourly Average SO₂ Concentrations – July to September 2016



4.2.2 Nitrogen Dioxide (NO₂)

Nitrogen oxides (NO_x) are almost entirely made up of nitric oxide (NO) and nitrogen dioxide (NO₂). Together, they are often referred to as NO_x. Most NO₂ in the atmosphere is formed by the oxidation of NO, which is emitted directly by combustion processes, particularly those at high temperature and pressure. Exposure to both NO and NO₂ can result in adverse health effects to an exposed population. NO₂ is the regulated form of NO_x. Similar to other jurisdictions (e.g., Alberta Environment, World Health Organization), the O. Reg. 419/05 Schedule 3 Standards for NO_x are based on health effects of NO₂, as health effects are seen at much lower concentrations of NO₂ than NO. In this report, because NO₂ is the regulated form of NO_x, the AAQC were compared to measured NO₂ concentrations (as per MOECC, 2012a). However, as per the current April 2012 version of O. Reg. 419/05 Summary of Standards and Guidelines, the Schedule 3 NO_x Standards were also compared to the monitored NO_x concentrations (see Section 4.2.3 below).

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Data summaries are presented in **Appendix B** for nitrogen dioxide for the station for each month as well as time history plots of the hourly and 24-hour average NO₂ concentrations. For the hourly and 24-hour averages, the Ontario AAQCs of 200 ppb and 100 ppb (400 µg/m³ and 200 µg/m³) are shown with blue lines on the respective plot. As shown in these figures, measured ambient NO₂ concentrations were well below the Ontario AAQCs.

The maximum measured hourly and 24-hour average concentrations were 34.5 and 11.6 ppb (66.8 and 22.5 µg/m³), which are 17% and 12% respectively, of the applicable 1-hour and 24-hour Ontario AAQCs.

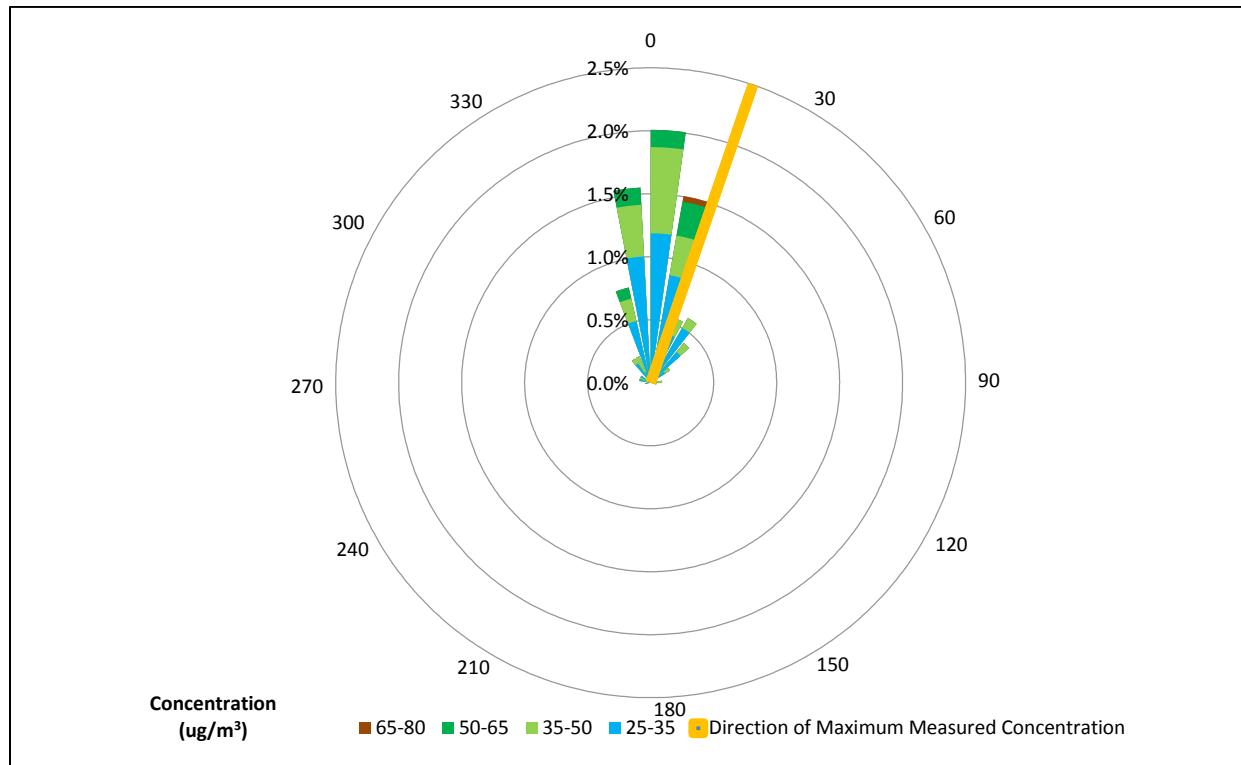
A pollution rose of measured hourly average NO₂ concentrations is presented in **Figure 4-4**. Concentrations less than 25 µg/m³, which account for 91% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. Higher measured hourly average concentrations generally occurred from northerly directions.

The highest measured hourly average NO₂ concentration occurred on July 20 at 22:00. During this hour winds were blowing from the north-northeast for which Highway 401 was upwind. The highest 24-hour average concentration occurred when winds were blowing from the north-northwest on September 22, for which Highway 401 and Highway 418 construction activities were upwind.

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Figure 4-4 Pollution Rose of Measured Hourly Average NO₂ – July to September 2016



4.2.3 Nitrogen Oxides (NO_x)

Data summaries are presented in **Appendix C** for nitrogen oxides for each month as well as time history plots of the hourly and 24-hour average NO_x concentrations. For the hourly and 24-hour averages, the O. Reg. 419/05 Schedule 3 Standards of 200 ppb and 100 ppb (400 µg/m³ and 200 µg/m³) are shown with blue lines on the respective plot.

The maximum hourly NO_x concentration measured at the Crago Road Station was 61.9 ppb (122.2 µg/m³), which is 31% of the 1-hour Ontario AAQCs. The maximum 24-hour average NO_x concentration measured at this station was 18.1 ppb (35.5 µg/m³), which is 18% of the applicable 24-hour Ontario AAQCs. See **Table 4-2** for detailed results.

A pollution rose of measured hourly average NO_x concentrations is presented in **Figure 4-5**. Concentrations less than 25 µg/m³, which account for 87% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown. In **Figure 4-5**, higher measured hourly average NO_x concentrations typically occurred for winds blowing from northerly directions.

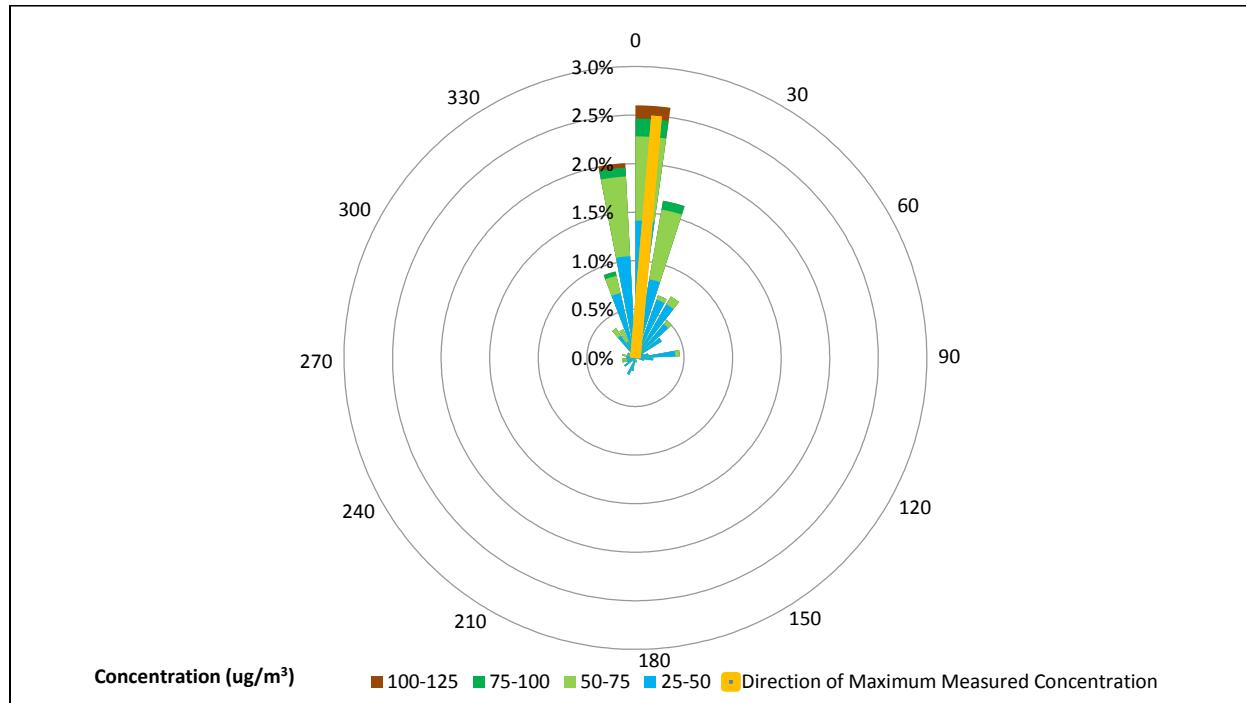
The highest measured hourly average NO_x concentration occurred for winds blowing from the north (from the direction of Highway 401) on September 21 at 3:00. The maximum 24-hour

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average NO_x concentration was measured on August 23 when winds were blowing from the north-northwest for which Highway 401 and Highway 418 construction activities were upwind.

Figure 4-5 Pollution Rose of Measured Hourly Average NO_x Concentrations – July to September 2016



4.2.4 Particulate Matter Smaller than 2.5 Microns (PM_{2.5})

Data summaries and time history plots of measured 24-hour average concentrations are presented in **Appendix D** for PM_{2.5}.

The maximum measured 24-hour average PM_{2.5} concentration was 20.0 µg/m³ during this quarter. It should be noted that since an exceedance of the 24-hour CAAQS for PM_{2.5} requires the average of the 98th percentile levels in each of three consecutive calendar years to be greater than 28 µg/m³ whereas the PM_{2.5} measurements in this report consisted of 3 months of data, there is insufficient data to determine with any certainty if exceedances of the CAAQS would occur. Discussion of PM_{2.5} measurements with respect to the CAAQS will be provided in the 2016 annual report, at which time sufficient data will have been collected to make preliminary comparisons.

A pollution rose showing the measured 24-hour average ambient PM_{2.5} concentrations versus direction is shown in **Figure 4-6**. Concentrations less than 10 µg/m³, which account for 95% of the measurements, have been removed from the plot to allow the distribution of maximum

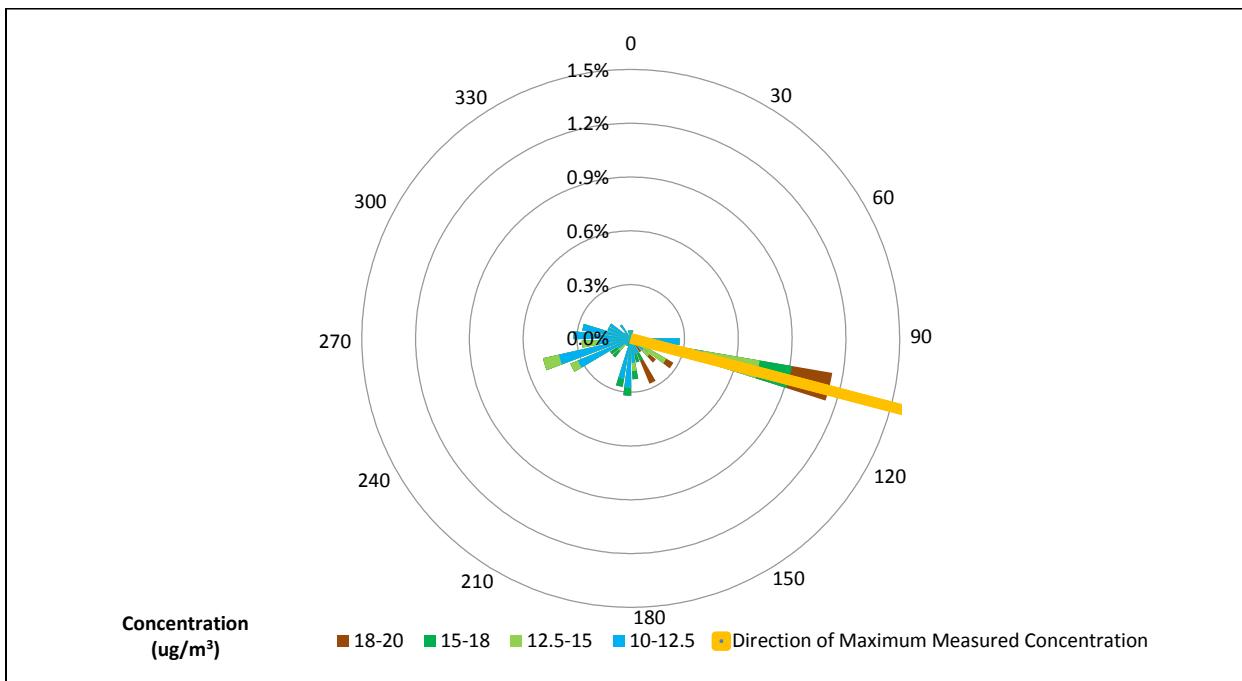
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levels to be more clearly shown in the figure. Higher measured concentrations typically occurred from easterly and southeasterly directions.

The highest measured 24-hour average concentration occurred on September 7 with winds originating from the east-southeast, from the direction of a CN Railway and the Darlington Nuclear Generating Station.

Figure 4-6 Pollution Rose of Measured 24-Hour Average PM_{2.5} Concentrations – July to September 2016



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4.3 AMBIENT TSP / METALS CONCENTRATIONS

A summary of the maximum and minimum ambient TSP and metals concentrations (for a daily averaging period) are presented in **Table 4-3**. A detailed summary of the concentrations measured for each sample is presented in **Appendix F**.

The maximum measured concentrations of TSP and all metals with MOECC AAQCs were below their applicable 24-hour criteria (shown in **Table 4-3** below).

Table 4-3 Summary of Measured Ambient TSP/Metals Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Particulate	µg/m ³	120	120	52.2	17.2	0
Total Mercury (Hg)	µg/m ³	2	2	2.5E-05	6.0E-06 ^	0
Aluminum (Al)	µg/m ³	4.8	-	2.6E-01	8.7E-02	0
Antimony (Sb)	µg/m ³	25	25	3.4E-03 ^	3.0E-03 ^	0
Arsenic (As)	µg/m ³	0.3	0.3	2.0E-03 ^	1.8E-03 ^	0
Barium (Ba)	µg/m ³	10	10	1.7E-02	4.8E-03	0
Beryllium (Be)	µg/m ³	0.01	0.01	3.4E-04 ^	3.0E-04 ^	0
Bismuth (Bi)	µg/m ³	-	-	2.0E-03 ^	1.8E-03 ^	-
Boron (B)	µg/m ³	120	-	5.2E-03 ^	1.8E-03 ^	0
Cadmium (Cd)	µg/m ³	0.025	0.025	6.8E-04 ^	6.0E-04 ^	0
Chromium (Cr)	µg/m ³	0.5	-	4.5E-03	1.5E-03 ^	0
Cobalt (Co)	µg/m ³	0.1	0.1	6.8E-04 ^	6.0E-04 ^	0
Copper (Cu)	µg/m ³	50	-	6.6E-02	2.0E-02	0
Iron (Fe)	µg/m ³	4	-	8.4E-01	2.0E-01	0
Lead (Pb)	µg/m ³	0.5	0.5	4.5E-03	9.0E-04 ^	0
Magnesium (Mg)	µg/m ³	-	-	4.8E-01	1.1E-01	-
Manganese (Mn)	µg/m ³	0.4	-	3.3E-02	6.4E-03	0
Molybdenum (Mo)	µg/m ³	120	-	1.0E-03 ^	9.0E-04 ^	0
Nickel (Ni)	µg/m ³	0.2	-	1.0E-03 ^	9.0E-04 ^	0
Phosphorus (P)	µg/m ³	-	-	7.4E-02	2.8E-02	-
Selenium (Se)	µg/m ³	10	10	3.4E-03 ^	3.0E-03 ^	0
Silver (Ag)	µg/m ³	1	1	1.7E-03 ^	1.5E-03 ^	0
Strontium (Sr)	µg/m ³	120	-	1.1E-02	2.8E-03	0
Thallium (Tl)	µg/m ³	-	-	3.4E-03 ^	3.0E-03 ^	-
Tin (Sn)	µg/m ³	10	10	3.4E-03 ^	3.0E-03 ^	0

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Table 4-3 Summary of Measured Ambient TSP/Metals Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Titanium (Ti)	µg/m ³	120	-	1.6E-02	3.3E-03 ^	0
Vanadium (V)	µg/m ³	2	1	1.7E-03 ^	1.5E-03 ^	0
Zinc (Zn)	µg/m ³	120	-	4.9E-02	1.1E-02	0
Zirconium (Zr)	µg/m ³	20	-	1.7E-03 ^	1.5E-03 ^	0
Total Uranium (U)	µg/m ³	1.5	-	1.5E-04 ^	1.4E-04 ^	0

Note:

A. Measured concentration was less than the laboratory method detection limit.

4.4 AMBIENT PAH CONCENTRATIONS

A summary of the maximum and minimum ambient PAH concentrations (for a daily averaging period) are presented in **Table 4-4**. In this summary, both individual PAHs as well as a total PAH concentration are reported. A detailed summary of the concentrations measured for each sample is presented in **Appendix G**.

The maximum measured concentrations of the PAHs with MOECC AAQCs were well below their applicable 24-hour criteria, with the exception of one (1) measurement of benzo(a)pyrene (B(a)P). The B(a)P the sample collected on September 21, 2016, exceeded the Ontario AAQC by 23%. The sample was however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based criteria.

Northerly winds were occurring at the time of sampling. Contributors to the measurement may have included agricultural activity and CN rail, both of which are located to the north of the Crago Road Station. The samples at the Rundle Road Station on the same day also exceeded the B(a)P AAQC by 42%.

B(a)P is a byproduct of a wide variety of natural and man-made combustion processes (including motor vehicles, natural gas, wood, refuse, oil, forest fires, etc.) and is widely present in the environment (including being present in soil and water).

The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. B(a)P measurement data available from the National Air Pollutant Surveillance (NAPS) network for Ontario in 2013 (for Simcoe, Toronto and Hamilton), all had maximum levels above the AAQC (varying between 136% -6,220% of the criteria). Available NAPS data for Ontario in 2012 (for Windsor, Toronto and Hamilton) showed maximum B(a)P levels at these stations that varied between 716% -2,920% of the criteria. In 2011, NAPS data available for seven Ontario stations (Windsor, Toronto, Etobicoke, Hamilton, Simcoe, Pt. Petrie and Burnt Island) showed exceedances at six of the seven stations, with only the remote Burnt Island Ontario station reporting a maximum level below the MOECC AAQC. In



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2010, all of these stations, including the Burnt Island station, measured B(a)P levels above the AAQC.

Based on the air quality assessments completed during the Environmental Assessment Study and the Environmental Compliance Approval application for the DYEC, the facility will not be a significant contributor of B(a)P. Therefore, ambient B(a)P levels are not expected to be substantially impacted by the operation of the DYEC

Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Benzo(a)pyrene	ng/m ³	0.05 ^A	1	6.14E-02	5.60E-03 ^A	1
		5 ^B				0
		1.1 ^C				0
1-Methylnaphthalene	ng/m ³	12,000	-	1.44E+01	3.26E+00	0
2-Methylnaphthalene	ng/m ³	10,000	-	2.77E+01	5.76E+00	0
Acenaphthene	ng/m ³	-	-	1.73E+01	4.40E+00	-
Acenaphthylene	ng/m ³	3500	-	3.07E-01	6.73E-02 ^A	0
Anthracene	ng/m ³	200	-	7.91E-01	9.73E-02 ^A	0
Benzo(a)anthracene	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Benzo(a)fluorene	ng/m ³	-	-	2.20E-01 ^A	1.35E-01 ^A	-
Benzo(b)fluoranthene	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Benzo(b)fluorene	ng/m ³	-	-	2.20E-01 ^A	1.35E-01 ^A	-
Benzo(e)pyrene	ng/m ³	-	-	2.20E-01 ^A	1.35E-01 ^A	-
Benzo(g,h,i)perylene	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Benzo(k)fluoranthene	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Biphenyl	ng/m ³	-	-	7.57E+00	1.67E+00	-
Chrysene	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Dibenz(a,h)anthracene ^D	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Dibenzo(a,c)anthracene + Picene	ng/m ³	-	-	1.95E-01 ^A	6.92E-02 ^A	-
Fluoranthene	ng/m ³	-	-	3.29E+00	1.16E+00	-
Indeno (1,2,3-cd)pyrene	ng/m ³	-	-	1.10E-01 ^A	6.73E-02 ^A	-
Naphthalene	ng/m ³	22,500	22,500	3.81E+01	1.30E+01	0
o-Terphenyl	ng/m ³	-	-	2.20E-01 ^A	1.35E-01 ^A	-
Perylene	ng/m ³	-	-	2.20E-01 ^A	1.35E-01 ^A	-
Phenanthrene	ng/m ³	-	-	1.96E+01	7.66E+00	-

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Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Pyrene	ng/m ³	-	-	1.36E+00	4.98E-01	-
Tetralin	ng/m ³	-	-	2.74E+00	8.34E-01	-
Total PAH E	ng/m ³	-	-	128	42.3	-

Notes:

- A. Ontario Ambient Air Quality Criteria. The standard for benzo(a)pyrene (B(a)P) is for B(a)P as a surrogate for PAHs.
- B. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds.
- C. O. Reg. 419/05 24 Hour Guideline
- D. Based on laboratory analyses, dibenzo(a,c)anthracene co-elutes with dibenz(a,h)anthracene. Picene elutes after dibenz(a,h)anthracene
- E. The reported total PAH is the sum of all analyzed PAH species.
- F. Measured concentration was less than the laboratory method detection limit.

4.5 AMBIENT DIOXINS AND FURANS CONCENTRATIONS

A summary of the maximum and minimum ambient dioxins and furans concentrations (for a daily averaging period) are presented in **Table 4-5**. In this summary, both individual dioxin and furan concentrations (pg/m³) as well as the total toxic equivalency concentration (TEQ) are reported. A detailed summary of the concentrations measured for each sample is presented in **Appendix H**.

The maximum measured toxic equivalent dioxin and furan concentration was below the applicable 24-hour Ontario AAQC of 0.1 pg TEQ/m³ (as shown in **Table 4-5**).

Table 4-5 Summary of Measured Ambient Dioxins and Furans Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
2,3,7,8-Tetra CDD *	pg/m ³	-	-	6.09E-03 A	3.71E-03 A	N/A
1,2,3,7,8-Penta CDD	pg/m ³			5.67E-03 A	4.11E-03 A	
1,2,3,4,7,8-Hexa CDD	pg/m ³			5.81E-03 A	4.15E-03 A	
1,2,3,6,7,8-Hexa CDD	pg/m ³			6.09E-03 A	4.28E-03 A	
1,2,3,7,8,9-Hexa CDD	pg/m ³			5.53E-03 A	3.89E-03 A	
1,2,3,4,6,7,8-Hepta CDD	pg/m ³			2.84E-02	1.26E-02	
Octa CDD	pg/m ³			1.32E-01	4.78E-02	
Total Tetra CDD	pg/m ³			2.49E-02 A	5.88E-03 A	
Total Penta CDD	pg/m ³			2.21E-02 A	4.73E-03 A	

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Table 4-5 Summary of Measured Ambient Dioxins and Furans Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Total Hexa CDD	pg/m ³			2.63E-02 A	1.23E-02 A	
Total Hepta CDD	pg/m ³			5.96E-02	1.26E-02	
2,3,7,8-Tetra CDF **	pg/m ³			9.72E-03 A	4.41E-03 A	
1,2,3,7,8-Penta CDF	pg/m ³			5.28E-03 A	4.02E-03 A	
2,3,4,7,8-Penta CDF	pg/m ³			5.28E-03 A	4.02E-03 A	
1,2,3,4,7,8-Hexa CDF	pg/m ³			7.33E-03 A	3.37E-03 A	
1,2,3,6,7,8-Hexa CDF	pg/m ³			7.05E-03 A	3.24E-03 A	
2,3,4,6,7,8-Hexa CDF	pg/m ³			7.75E-03 A	3.63E-03 A	
1,2,3,7,8,9-Hexa CDF	pg/m ³			8.30E-03 A	3.76E-03 A	
1,2,3,4,6,7,8-Hepta CDF	pg/m ³			1.23E-02	3.76E-03 A	
1,2,3,4,7,8,9-Hepta CDF	pg/m ³			5.39E-03 A	3.96E-03 A	
Octa CDF	pg/m ³			1.32E-02	4.93E-03 A	
Total Tetra CDF	pg/m ³			9.72E-03	4.41E-03 A	
Total Penta CDF	pg/m ³			1.15E-02	4.02E-03 A	
Total Hexa CDF	pg/m ³			9.72E-03 A	3.50E-03 A	
Total Hepta CDF	pg/m ³			2.02E-02	4.15E-03 A	
TOTAL TOXIC EQUIVALENCY ^B	pg TEQ/m ³	0.1	-	0.019	0.014	0
		1 C				0

Notes:

- A. Measured concentration was less than the laboratory method detection limit.
- B. Total Toxicity Equivalent (TEQ) concentration contributed by all dioxins, furans and dioxin-like PCBs calculated as per O. Reg. 419/05 methodology using corresponding WHO₂₀₀₅ toxic equivalency factors (TEFs) and a value of half the minimum detection limit (MDL) substituted for concentrations less than the MDL.
- C. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds

* CDD - Chloro Dibenzo-p-Dioxin, ** CDF - Chloro Dibenzo-p-Furan

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5.0 CONCLUSIONS

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road monitoring station for the period July to September 2016.

The following observations and conclusions were made from a review of the measured ambient air quality monitoring data:

1. Measured levels of NO₂, SO₂ and PM_{2.5} were below the applicable O. Reg. 419/05 Standards or human health risk assessment (HHRA) health-based criteria presented in **Table 2-1** of this report.
2. Since the Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} is based on a 98th percentile level over 3 years, whereas the PM_{2.5} measurement period at the Crago Road Station for this quarterly report was three months, there was insufficient data collected to determine with any certainty if exceedances of the CAAQS would occur. Therefore, no comparison of the measured PM_{2.5} data during this quarter to the CAAQS was conducted for this report, as it would not be scientifically accurate or representative.
3. The maximum measured concentrations of TSP and all metals with Ministry of Environment and Climate Change (MOECC) air quality Standards were well below their applicable Standards (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of all PAHs with MOECC air quality Standards were well below their applicable Standards shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene concentration for one sample, which exceeded the applicable Ontario AAQC by 23%. The measurement was however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based standard. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario.
5. The maximum measured toxic equivalent dioxin and furan concentration was below the applicable Standards presented in **Table 2-3**.

In summary, the measured concentrations of the air contaminants monitored were below their applicable MOECC Standards during the monitoring period between July and September 2016 with the exception of one (1) benzo(a)pyrene sample. All measured levels of the monitored contaminants were below their applicable HHRA health-based criteria.

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Appendix A SO₂ Data Summaries and Time History Plots
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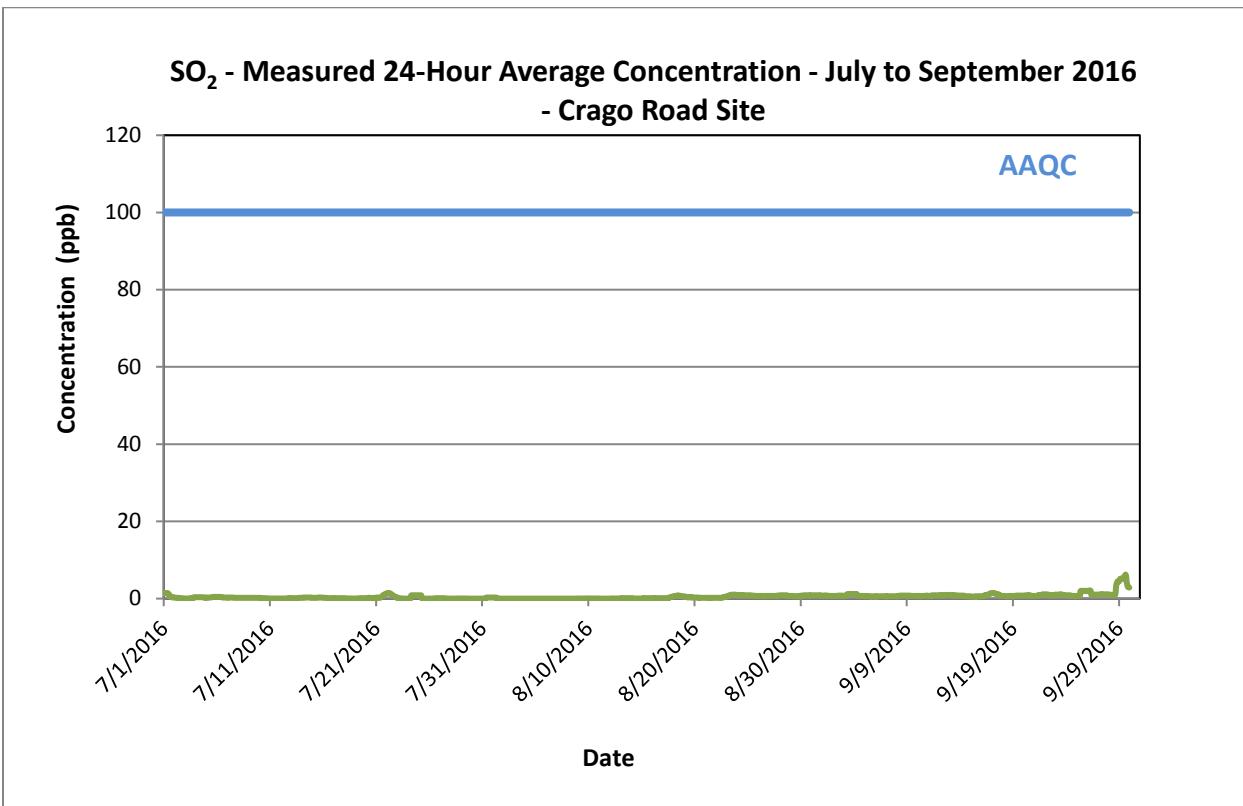
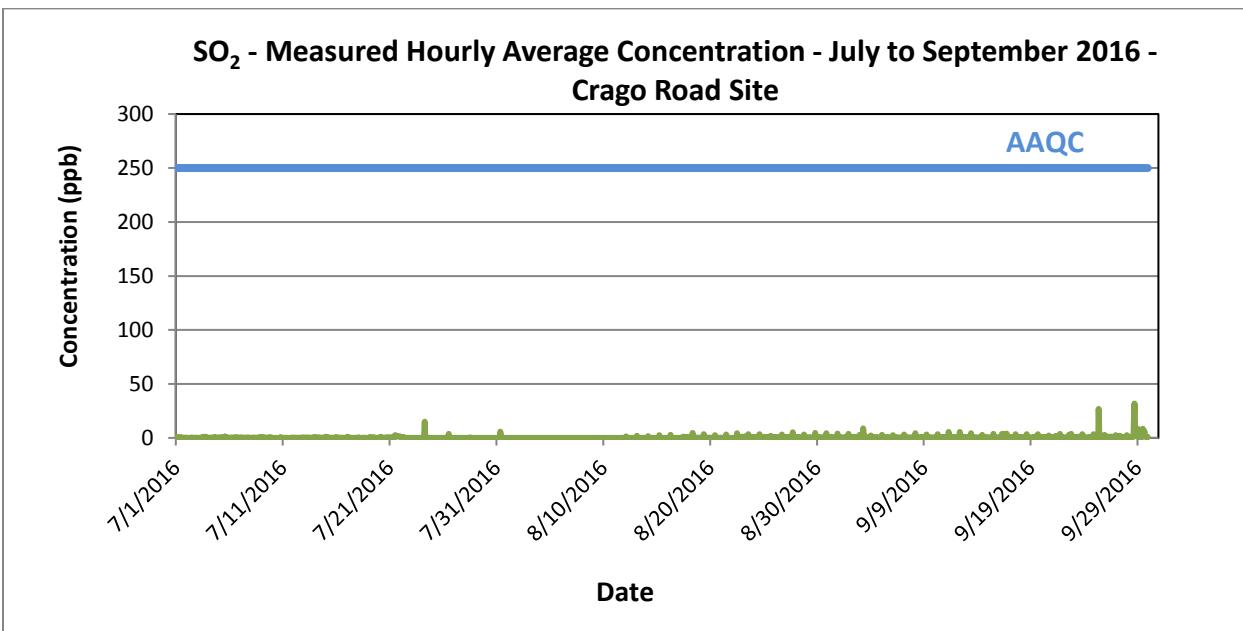
**Appendix A SO₂ DATA SUMMARIES AND TIME HISTORY
PLOTS**

SO ₂ - Crago Road July 2016 ppb																														
Day	Hour		Data (ppb)																						Summary					
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>250	Days>100
1	0.4	0.4	0.3	0.3	0.4	0.2	0.3	0.2	0.4	0.3	0.4	0.9	0.5	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.2	0.2	24	0.9	0.0	0.3	0	0
2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	24	0.6	0.0	0.1	0	0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.5	1.0	0.4	0.3	0.6	0.8	1.0	1.2	0.8	0.5	0.2	0.2	24	1.2	0.0	0.3	0	0
4	0.3	0.2	0.2	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.1	0.3	0.4	0.4	0.7	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.3	0.3	24	0.7	0.0	0.2	0	0
5	0.3	0.1	0.1	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.7	1.0	0.8	1.4	0.7	0.5	0.4	0.5	0.3	0.2	0.3	0.2	24	1.4	0.1	0.4	0	0
6	0.1	0.1	0.2	0.2	0.3	0.1	0.5	0.1	0.1	0.1	0.2	0.1	0.2	0.4	0.6	0.5	0.7	0.3	0.3	0.3	0.2	0.1	0.0	0.1	24	0.7	0.0	0.2	0	0
7	0.1	0.2	0.4	0.5	0.4	0.3	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.0	0.2	0.5	0.3	0.2	0.2	0.1	0.3	0.3	24	0.5	0.0	0.2	0	0
8	0.3	0.3	0.3	0.3	0.2	0.0	0.1	0.2	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.5	0.4	0.1	0.1	0.3	0.7	24	0.7	0.0	0.2	0	0
9	0.5	0.2	0.2	0.4	0.5	0.1	0.0	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.7	0.3	0.1	0.3	0.1	0.1	24	0.7	0.0	0.2	0	0
10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.8	0.0	0.0	0	0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.2	0.1	24	0.5	0.0	0.1	0	0
12	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.5	0.1	0.1	24	0.5	0.0	0.1	0	0
13	0.0	0.2	0.3	0.0	0.1	0.4	0.3	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.2	0.1	0.2	0.3	0.3	0.2	0.2	0.4	0.4	0.8	24	0.8	0.0	0.2	0	0
14	0.2	0.2	0.4	0.4	0.5	0.4	0.4	0.2	0.1	0.1	0.4	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	24	0.5	0.0	0.2	0	0
15	0.9	0.3	0.5	0.2	0.5	0.1	0.6	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.0	0.1	0.1	24	0.9	0.0	0.2	0	0
16	0.2	0.8	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	24	0.8	0.0	0.1	0	0
17	0.1	0.2	1.0	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	24	1.0	0.0	0.1	0	0
18	0.2	0.0	0.1	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	24	0.5	0.0	0.1	0	0
19	0.0	0.0	0.1	0.0	0.9	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.7	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	24	0.9	0.0	0.1	0	0
20	0.0	0.2	0.0	0.3	1.0	0.5	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.3	0.4	0.5	0.4	0.4	0.3	0.5	0.3	0.3	24	1.0	0.0	0.2	0	0
21	0.2	0.1	0.5	0.2	0.1	0.5	C	C	C	C	C	C	2.5	2.3	2.2	2.0	1.9	1.6	1.6	1.5	1.4	1.3	1.4	1.2	18	2.5	0.1	1.3	0	0
22	1.2	1.0	0.7	0.8	0.7	0.6	0.7	0.6	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.2	0.0	0.3	0	0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0
24	0.0	0.0	0.0	0.0	0.0	0.0	1.0	15.0	4.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	15.0	0.0	0.9	0	0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	3.8	0.0	0.2	0	0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.5	0.0	0.0	0	0
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0	0
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	5.7	0.0	0.3	0	0
Count	31	31	31	31	31	31	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	738				
Maximum	1.2	1.0	1.0	0.8	0.9	1.0	1.0	15.0	4.4	5.7	1.6	0.9	2.5	3.8	2.2	2.0	1.9	1.6	1.6	1.5	1.4	1.3	1.4	1.2	24					
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18					
Average	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.6	0.2	0.3	0.1	0.1	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	24					
Percentiles	10	20	30	40	50	60	70	80	90	95	99	100														Maximum Hourly	15.0			
Data	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.7	2.0																		

		SO ₂ - Crago Road August 2016 ppb																														
Hour		0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>250	Days>100	
Day																																
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.1	0.0	0.0	0.0	0	0
10	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0.0	0	0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.0	0.0	0.0	0.0	0	0
12	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.5	0.0	0.1	0	0	0
13	0.0	0.0	0.0	0.0	1.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.9	0.0	0.1	0	0	0
14	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.8	0.0	0.1	0	0	0
15	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	2.4	0.0	0.1	0	0	0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	2.7	0.0	0.1	0	0	0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	1.2	1.1	0.9	0.9	0.9	0.9	0.7	0.7	0.8	0.8	0.7	0.6	0.5	0.6	0.6	19	1.2	0.0	0.5	0	0	0
18	0.5	0.7	0.4	0.5	0.5	0.5	0.5	0.1	4.5	1.2	0.8	0.6	0.4	0.4	0.3	0.3	0.3	0.1	0.1	0.2	0.3	0.2	0.4	0.5	0.6	24	4.5	0.0	0.6	0	0	0
19	0.2	0.2	0.3	0.1	0.1	0.1	0.2	0.1	0.0	3.4	1.0	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	24	3.4	0.0	0.3	0	0	0
20	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.9	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	2.7	0.0	0.2	0	0	0
21	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	3.1	1.0	0.6	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	3.1	0.0	0.2	0	0	0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	1.5	0.5	0.7	0.7	0.8	0.7	0.6	0.8	0.8	0.8	1.1	1.1	24	4.2	0.0	0.5	0	0	0	
23	1.0	0.9	0.7	0.9	0.7	0.9	1.4	1.0	0.8	0.7	0.7	0.9	0.7	0.5	3.5	1.7	1.2	1.0	0.8	0.7	0.7	0.6	0.6	0.6	0.6	24	3.5	0.5	1.0	0	0	0
24	0.6	0.5	0.6	0.6	0.7	0.7	1.2	0.8	0.8	0.9	0.7	0.7	0.6	0.5	0.5	3.5	1.4	1.0	0.9	0.8	0.6	0.5	0.7	0.7	24	3.5	0.5	0.9	0	0	0	
25	0.8	0.7	0.6	0.4	0.6	0.7	0.8	0.5	0.5	0.4	0.4	0.4	0.6	0.7	0.6	0.6	1.9	1.3	1.1	0.9	0.6	0.6	0.4	0.4	24	1.9	0.4	0.7	0	0	0	
26	0.5	0.7	0.6	0.6	0.4	0.7	0.5	0.6	0.4	0.5	0.5	0.5	0.4	0.5	0.6	0.5	0.5	3.2	1.3	1.0	0.9	0.8	0.7	0.7	24	3.2	0.4	0.7	0	0	0	
27	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	5.2	1.9	1.1	1.0	0.9	0.8	0.8	24	5.2	0.3	0.8	0	0	0	
28	0.6	0.6	0.7	0.7	0.4	0.5	0.7	0.6	0.3	0.2	0.4	0.5	0.4	0.4	0.5	0.4	0.5	3.2	1.4	0.9	0.7	0.9	0.7	0.9	24	3.2	0.2	0.7	0	0	0	
29	0.7	0.5	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.4	4.5	2.0	1.3	1.0	24	4.5	0.3	0.7	0	0	0
30	0.8	0.7	0.8	0.6	0.7	0.7	0.8	0.7	0.5	0.5	0.4	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	4.4	1.9	1.4	1.4	24	4.4	0.4	0.8	0	0	0
31	0.9	1.1	0.9	0.7	0.7	0.7	0.9	0.9	0.6	0.3	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	24	3.9	0.0	0.8	0.8	0	0	
Count	31	31	31	31	31	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	739						
Maximum	1.0	1.1	0.9	1.5	1.9	1.8	2.4	2.7	0.8	4.5	3.4	2.7	3.1	4.2	3.5	3.5	1.9	3.2	5.2	3.2	4.5	4.4	3.9	1.6	24							
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19						
Average	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.																		

SO ₂ - Crago Road																															
September 2016																															
ppb																															
Hour																															
Day	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>250	Days>100	
1	1.1	0.9	0.7	0.8	0.5	0.5	0.6	0.4	0.5	0.6	0.5	0.6	0.5	0.5	0.4	0.3	0.5	0.5	0.3	0.4	0.5	0.4	0.5	3.8	24	3.8	0.3	0.7	0	0	
2	1.6	0.9	0.6	0.7	0.5	0.5	0.5	0.3	0.2	0.4	0.9	1.1	1.0	0.8	0.7	0.6	0.5	0.4	0.3	0.5	0.4	0.4	0.4	0.2	24	1.6	0.2	0.6	0	0	
3	2.8	1.5	1.0	0.8	0.5	0.5	0.5	0.5	0.5	8.7	1.7	2.6	1.1	0.7	0.7	0.6	0.4	0.5	0.4	0.5	0.4	0.6	0.5	0.4	24	8.7	0.4	1.2	0	0	
4	0.4	2.3	1.6	1.1	0.8	0.7	0.6	1.0	0.8	0.7	0.7	0.5	0.5	0.4	0.3	0.6	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	24	2.3	0.3	0.7	0	0	
5	0.3	0.3	2.8	1.2	0.9	0.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	24	2.8	0.3	0.6	0	0	
6	0.5	0.5	0.2	2.4	1.4	1.0	0.8	0.7	0.4	0.2	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.6	0.5	0.5	24	2.4	0.2	0.6	0	0	
7	0.5	0.4	0.3	0.5	3.0	1.4	0.8	0.6	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	24	3.0	0.3	0.6	0	0	
8	0.4	0.2	0.5	0.7	0.7	4.2	1.9	1.0	0.9	0.9	0.7	0.5	0.6	0.5	0.6	0.5	0.4	0.6	0.5	0.5	0.6	0.6	0.6	0.6	24	4.2	0.2	0.8	0	0	
9	0.7	0.3	0.5	0.5	0.5	0.5	3.2	1.9	1.0	0.8	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	24	3.2	0.3	0.7	0	0	
10	0.5	0.4	0.5	0.6	0.5	0.4	0.3	3.4	2.0	1.2	0.8	0.6	0.8	0.7	0.5	0.5	0.6	0.6	0.5	0.6	0.7	0.5	0.3	0.4	24	3.4	0.3	0.7	0	0	
11	0.4	0.4	0.5	0.5	0.3	0.4	0.3	0.3	5.4	3.2	1.6	1.2	0.9	0.6	0.5	0.5	0.4	0.5	0.5	0.3	0.5	0.6	0.7	0.7	24	5.4	0.3	0.9	0	0	
12	0.4	0.4	0.4	0.3	0.7	0.7	0.7	0.6	5.5	2.4	1.9	1.2	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.6	0.5	0.5	0.5	24	5.5	0.3	1.0	0	0	
13	0.5	0.4	0.5	0.5	0.3	0.5	0.6	0.5	0.4	0.3	4.4	2.1	1.2	0.9	0.9	0.8	0.7	0.5	0.5	0.5	0.6	0.6	0.5	0.4	24	4.4	0.3	0.8	0	0	
14	0.4	0.6	0.6	0.5	0.3	0.5	0.3	0.4	0.1	0.2	0.0	3.0	1.6	0.9	0.7	0.4	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.4	24	3.0	0.0	0.6	0	0	
15	0.3	0.3	0.2	0.3	0.4	0.3	0.2	0.2	0.0	0.2	0.3	0.3	3.8	1.8	1.2	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	24	3.8	0.0	0.6	0	0	
16	0.4	0.2	0.4	0.3	0.4	0.5	0.5	0.6	3.8	2.4	M	M	M	3.4	1.8	1.2	1.0	1.7	4.1	1.8	1.4	1.3	1.0	0.8	21	4.1	0.2	1.4	0	0	
17	0.7	0.7	0.6	0.7	0.6	0.6	0.5	0.6	0.4	0.5	0.5	0.6	0.6	0.5	0.5	0.3	0.0	1.7	0.2	0.5	0.5	0.6	0.5	0.5	24	3.5	0.0	0.7	0	0	
18	0.5	0.6	0.4	0.7	0.4	0.6	0.5	0.5	0.3	0.2	0.4	0.6	0.5	0.5	0.5	0.4	1.8	1.1	0.8	0.8	0.7	0.8	0.6	0.4	24	3.4	0.2	0.7	0	0	
19	0.6	0.6	0.5	0.5	0.5	0.5	0.7	0.4	0.6	1.0	0.8	0.4	0.5	0.5	0.6	0.6	3.3	1.8	1.2	1.0	0.8	0.7	0.7	0.7	24	3.3	0.4	0.8	0	0	
20	0.6	0.7	0.6	0.6	0.7	0.6	0.5	0.6	0.7	0.6	0.7	0.6	0.6	0.6	0.5	0.6	2.1	1.0	0.8	0.8	0.7	0.7	0.5	0.5	24	2.1	0.5	0.7	0	0	
21	0.5	0.5	0.4	0.5	0.6	0.8	1.2	1.2	1.4	1.4	1.3	1.2	1.6	1.4	1.1	0.8	0.7	0.6	3.7	1.8	1.2	0.9	0.8	0.5	0.5	24	3.7	0.4	1.1	0	0
22	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.4	0.5	0.5	0.4	0.8	2.7	1.5	1.0	0.8	0.8	3.8	2.1	1.4	1.2	0.9	0.9	24	3.8	0.4	1.0	0	0
23	0.8	0.8	0.7	0.7	0.6	0.6	0.4	0.3	C	C	1.1	0.9	0.7	0.8	0.6	0.6	0.7	0.6	0.5	0.5	3.3	1.7	1.1	0.9	22	3.3	0.3	0.9	0	0	
24	0.8	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.5	0.7	0.7	0.5	0.4	0.4	0.3	0.3	3.5	2.2	1.4	24	3.5	0.3	0.7	0	0	
25	0.7	0.5	0.5	0.5	0.3	0.4	0.4	0.4	4.5	26.7	0.8	0.5	0.4	0.4	0.6	0.3	0.8	0.8	0.8	0.5	0.6	0.6	2.8	2.0	24	26.7	0.3	2.0	0	0	
26	1.3	1.3	1.0	1.0	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.0	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.7	2.5	2.5	0.6	1.0	0	0			
27	1.9	1.5	0.9	1.0	1.2	1.4	1.5	1.6	1.9	1.4	1.4	1.4	0.9	0.8	0.8	0.8	0.8	0.7	0.6	0.6	0.6	0.4	0.6	0.4	24	1.9	0.4	1.0	0	0	
28	2.6	1.4	1.0	0.9	0.7	0.6	0.7	0.8	0.7	0.9	1.0	0.8	1.0	1.1	0.7	1.2	15.8	31.8	20.7	9.2	8.3	2.1	2.7	3.0	24	31.8	0.6	4.6	0	0	
29	1.2	6.5	8.2	3.7	1.5	1.0	0.8	0.7	0.7	0.5	1.0	5.5	8.5	5.8	3.8	6.6	5.0	1.9	1.1	0.9	0.8	0.6	0.6	24	8.5	0.5	2.8	0	0		
30	0.5	0.5	5.0	1.5	1.7	0.9	0.7	0.7	0.5	0.6	0.6	2.2	12.6	3.9	1.2	0.7	1.8	3.5	16.7	6.5	1.1	0.8	0.8	0.8	24	16.7	0.5	2.7	0	0	
31	Count	30	30	30	30	30	30	30	30	29	28	29	29	30	30	30	30	30	30	30	30	30	30	30	715						
	Maximum	2.8	6.5	8.2	3.7	3.0	4.2	3.2	3.4	8.7	26.7	4.4	5.5	8.5	12.6	3.9	6.6	15.8	31.8	20.7	16.7	8.3	3.5	2.8	3.8	24					
	Minimum	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.0	0.2	0.0	0.3	0.4	0.3	0.4	0.3	0.0	0.4	0.2	0.3	0.3	0.3	0.2	0.1	21						
	Average	0.8	0.9	1.1	0.8	0.8	0.8	0.7	0.8	1.3	1.9	1.0	1.0	1.2	1.4	1.1	0.9	1.4	1.9	1.6	1.6	1.2	0.8	0.8	0.9	24					
Percentiles		10	20	30	40	50	60	70	80	90	95	99	100													Maximum		31.8			
Data		0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.8	1.0</																					

Figure A-1 Time History Plots of Measured Hourly Average and 24-Hour Average SO₂ Concentrations– Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

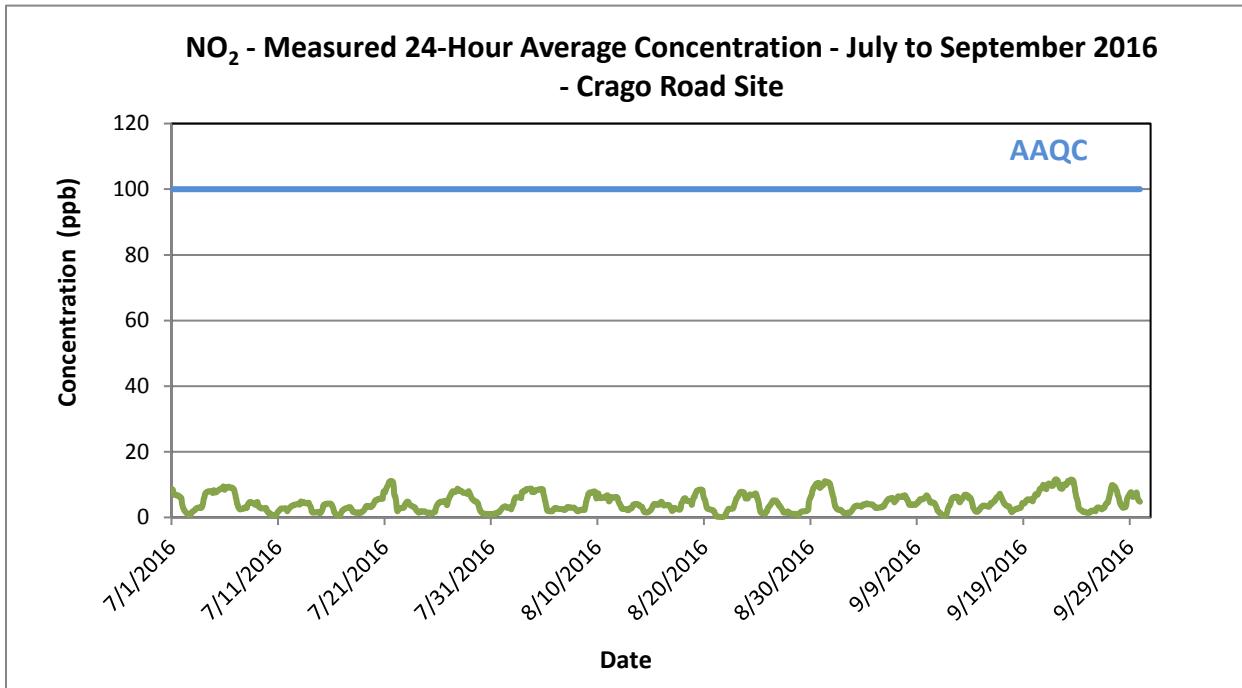
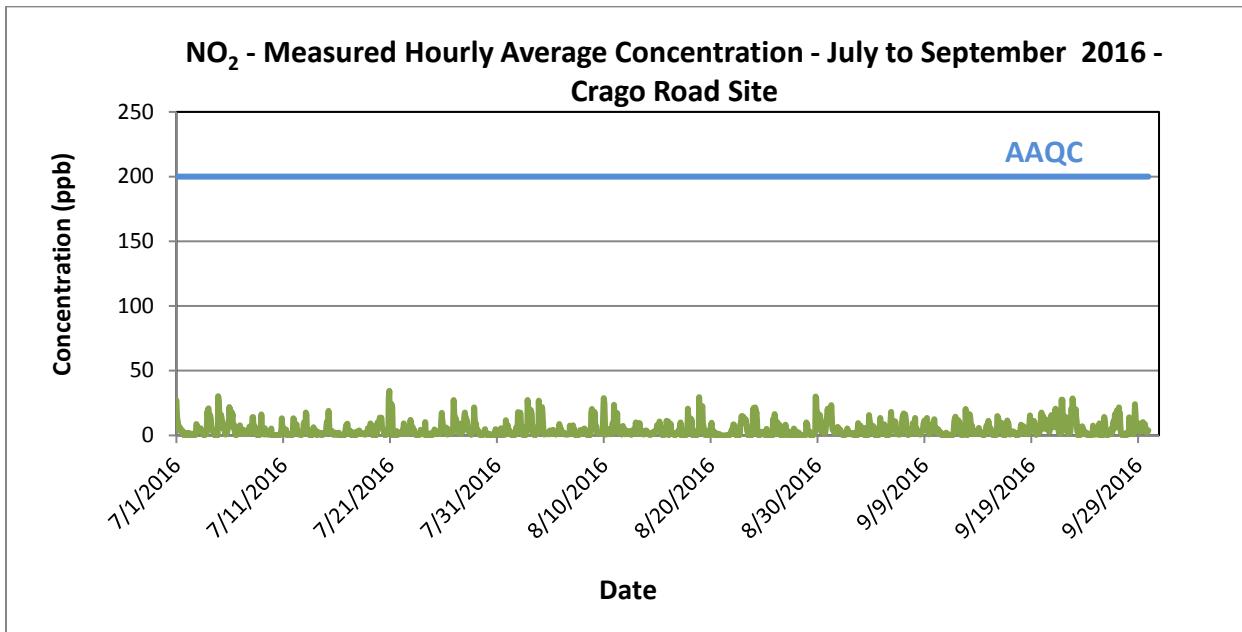
Appendix B NO₂ Data Summaries and Time History Plots
November 7, 2016

**Appendix B NO₂ DATA SUMMARIES AND TIME HISTORY
PLOTS**

		NO ₂ - Crago Road																													
		August 2016																													
		ppb																													
Hour																															
Day	Hour	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100
1	7.8	6.4	3.6	4.2	2.7	2.6	2.8	1.0	1.3	0.3	0.0	0.3	0.1	0.4	0.0	0.0	0.5	0.6	3.3	5.9	5.6	2.8	2.2	18.0	24	18.0	0.0	3.0	0	0	
2	15.5	12.8	10.6	14.0	17.6	16.4	9.2	7.7	3.5	0.8	0.3	0.1	0.4	0.0	0.0	0.2	0.1	0.3	1.8	3.1	3.3	27.4	21.3	18.6	24	27.4	0.0	7.7	0	0	
3	16.9	16.9	13.7	10.4	19.7	18.8	16.3	8.4	7.3	1.4	0.7	0.6	1.4	0.2	0.1	0.8	0.9	1.5	1.1	2.8	2.1	3.9	26.9	15.0	24	26.9	0.1	7.8	0	0	
4	15.0	16.3	18.4	13.8	18.2	21.9	20.0	10.8	6.1	3.0	0.7	2.0	1.4	1.4	1.0	1.2	1.2	0.8	2.1	1.4	2.6	2.0	0.8	3.9	24	21.9	0.7	6.9	0	0	
5	2.4	3.2	1.7	3.0	1.3	2.4	4.3	1.7	2.0	1.3	1.4	0.9	0.7	1.1	1.0	1.2	1.3	1.2	1.1	4.5	8.9	7.0	6.0	4.8	24	8.9	0.7	2.7	0	0	
6	4.7	2.4	2.5	2.0	2.0	1.8	2.2	1.2	0.7	0.6	0.6	0.9	1.0	0.9	0.8	0.7	0.9	1.3	2.1	7.5	5.1	5.6	5.9	24	7.5	0.6	2.3	0	0		
7	5.2	6.8	7.4	7.8	4.6	5.0	1.1	0.6	0.2	0.1	0.3	0.2	0.5	0.5	0.5	0.8	0.5	0.9	1.5	4.1	4.1	3.0	1.7	1.8	24	7.8	0.1	2.5	0	0	
8	2.4	2.8	2.5	4.8	3.9	5.3	3.7	3.0	3.9	3.4	0.8	0.0	0.0	0.0	0.0	0.0	2.0	0.2	0.6	4.8	17.7	20.4	18.8	14.3	24	20.4	0.0	4.8	0	0	
9	17.7	12.9	12.0	18.1	14.5	6.7	5.8	6.8	2.9	1.7	1.5	1.7	2.2	2.1	1.8	2.1	1.3	1.1	1.1	2.0	2.8	4.7	23.2	24	23.2	1.1	6.2	0	0		
10	28.7	25.1	17.0	7.1	0.7	0.6	3.8	3.6	4.3	5.0	2.8	2.4	1.7	1.5	1.1	1.0	2.0	1.1	2.6	6.7	9.6	1.6	6.8	23.7	24	28.7	0.6	6.7	0	0	
11	13.2	5.8	8.2	7.3	6.9	10.6	17.3	4.6	2.5	3.0	3.4	2.0	2.0	2.4	2.0	1.0	0.7	4.1	3.1	7.3	3.2	1.7	5.0	4.4	24	17.3	0.7	5.1	0	0	
12	0.9	1.8	1.2	3.5	1.7	2.6	2.9	2.2	1.9	2.0	2.1	3.4	1.5	0.8	0.5	1.3	2.2	1.3	1.4	4.6	2.6	2.6	2.9	6.4	24	6.4	0.5	2.3	0	0	
13	10.0	5.6	2.5	2.2	1.2	1.7	8.2	9.6	9.5	9.2	3.6	1.6	1.6	2.3	2.0	3.0	2.5	0.7	0.9	1.1	3.2	1.0	2.3	3.8	24	10.0	0.7	3.7	0	0	
14	2.6	3.4	1.1	1.2	0.9	1.1	0.6	0.4	0.3	0.5	0.7	1.1	1.9	2.3	1.4	1.5	2.4	1.7	2.1	2.8	4.0	4.2	4.4	6.0	24	6.0	0.3	2.0	0	0	
15	7.9	6.4	5.4	6.6	8.0	10.7	8.3	4.5	2.1	2.3	0.6	0.6	0.3	0.0	0.3	2.3	1.1	0.8	2.0	6.3	4.2	11.3	9.8	10.1	24	11.3	0.0	4.7	0	0	
16	10.8	5.7	0.0	0.9	2.0	1.4	8.9	4.7	2.6	1.8	1.2	1.4	1.0	0.7	0.7	0.4	0.2	1.1	2.0	1.0	0.9	1.1	2.0	3.4	24	10.8	0.0	2.3	0	0	
17	2.2	4.2	2.7	7.6	10.1	8.2	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	4.5	9.8	20.8	8.3	19	20.8	0.0	4.6	0	0		
18	5.3	13.5	8.2	10.9	8.4	12.6	6.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	4.0	1.8	2.4	29.5	19.5	24	29.5	0.0	5.2	0	0	
19	21.2	15.7	16.8	9.5	17.9	22.7	15.9	8.4	7.0	1.5	0.8	0.3	2.0	2.5	1.2	2.2	0.0	0.1	1.4	3.6	0.0	0.1	3.7	4.0	24	22.7	0.0	6.6	0	0	
20	5.8	8.2	9.7	5.3	3.1	4.0	2.6	2.0	0.0	0.1	0.0	0.0	1.9	0.4	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.2	0.0	24	9.7	0.0	1.8	0	0	
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.5	1.5	1.7	2.8	4.3	24	4.3	0.0	0.5	0	0
22	3.3	3.3	6.9	8.6	8.5	7.5	5.5	4.5	1.8	0.2	0.1	0.0	0.0	0.0	0.7	0.2	0.4	0.4	0.4	2.8	9.0	8.5	14.7	14.9	13.0	24	14.9	0.0	4.8	0	0
23	14.4	14.5	10.2	13.2	12.1	12.4	10.9	12.2	9.2	7.3	3.5	2.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.2	16.4	24	16.4	0.0	5.9	0	0
24	21.1	6.0	8.6	12.8	21.6	19.6	16.2	18.2	11.2	4.3	1.8	0.2	0.9	0.8	0.6	0.4	0.4	2.0	1.7	2.0	2.9	1.2	0.8	0.9	2.2	24	21.6	0.2	6.6	0	0
25	2.8	2.4	1.1	0.2	0.7	0.7	5.2	1.3	0.4	0.3	0.7	1.3	0.5	0.0	0.0	0.2	0.6	0.6	0.6	0.0	4.0	12.6	6.5	0.7	5.9	24	12.6	0.0	2.0	0	0
26	16.5	12.6	5.6	1.9	3.2	6.6	10.1	6.6	4.9	5.6	6.1	8.0	4.4	0.0	0.0	0.3	1.1	0.0	1.7	1.8	1.3	0.4	3.7	3.6	24	16.5	0.0	4.4	0	0	
27	8.2	2.6	1.8	1.8	0.5	0.8	2.9	3.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	5.4	5.0	3.3	0.8	0.0	24	8.2	0.0	1.5	0	0	
28	1.3	2.9	1.9	0.6	0.0	0.7	2.1	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.4	0.0	0.0	0.6	0.5	0.0	0.2	2.7	10.0	24	10.0	0.0	1.1	0	0
29	6.2	8.5	3.7	2.2	2.2	3.2	3.1	1.0	0.0	0.0	0.0	0.6	0.0	0.6	0.8	1.6	0.9	2.0	4.8	30.1	28.1	18.8	18.1	24	30.1	0.0	5.7	0	0		
30	14.5	11.9	12.4	12.5	15.7	16.0	14.4	11.8	3.0	3.4	4.5	8.1	6.4	5.2	1.9	1.5	2.2	3.4	6.7	9.6	12.1	19.2	20.6	24	20.6	1.5	9.1	0	0		
31	17.1	18.2	18.6	16.1	13.5	17.1	18.5	23.4	12.5	6.7	4.6	4.7	4.0	2.4	1.5	1.6	2.9	1.9	2.1	2.7	3.5	6.5	5.1	3.9	24	23.4	1.5	8.7	0	0	
Count	31	31	31	31	31	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	739						
Maximum	28.7	25.1	18.6	18.1	21.6	22.7	20.0	23.4	12.5	9.2	6.1	8.1	6.4	5.2	2.0	3.0	2.9	4.1	3.4	9.0	30.1	28.1	29.5	23.7	24						
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	19						
Average	9.7	8.3</td																													

		NO ₂ - Crago Road																													
		September 2016																													
		ppb																													
Day	Hour	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100
1	5.4	4.9	3.0	4.4	2.6	2.8	1.9	1.2	0.4	0.1	0.1	0.0	0.1	0.3	0.3	0.6	1.1	1.1	2.0	5.3	3.6	1.9	2.6	0.8	24	5.4	0.0	1.9	0	0	
2	2.2	1.3	0.8	0.8	1.4	1.4	1.9	1.0	0.7	0.1	1.1	1.1	1.9	0.5	0.6	0.0	0.6	0.2	3.5	9.6	7.2	6.6	5.0	7.4	24	9.6	0.0	2.4	0	0	
3	7.5	7.3	4.3	3.7	5.1	2.5	3.4	1.6	5.9	0.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.4	15.6	11.1	8.2	8.7	24	15.6	0.0	3.9	0	0	
4	7.2	6.5	4.9	5.3	3.8	7.2	6.2	2.4	0.9	0.2	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.2	0.7	5.6	8.5	13.5	5.5	6.9	24	13.5	0.0	3.6	0	0	
5	2.4	2.4	1.4	2.1	1.7	6.2	8.6	2.8	1.3	0.6	1.3	0.2	0.4	0.0	0.0	0.6	0.3	1.0	6.3	2.9	10.5	18.1	7.3	8.9	24	18.1	0.0	3.6	0	0	
6	10.3	10.6	7.7	7.5	7.2	7.6	11.1	10.0	5.0	1.1	0.9	1.3	1.5	0.8	0.9	1.4	0.8	3.0	1.0	1.1	1.4	2.0	10.0	14.7	24	14.7	0.8	5.0	0	0	
7	14.0	17.0	7.7	13.0	15.9	16.1	12.2	10.5	2.9	1.6	1.1	0.5	0.8	0.7	1.1	1.1	4.7	1.5	4.2	4.6	3.3	1.7	9.5	4.7	24	17.0	0.5	6.3	0	0	
8	9.6	3.7	5.3	13.4	4.4	4.1	5.6	1.6	1.8	1.5	2.0	2.9	2.5	1.3	0.5	0.6	0.9	1.7	3.0	4.4	3.8	4.7	9.1	10.1	24	13.4	0.5	4.1	0	0	
9	11.4	9.4	10.8	9.0	9.9	12.1	13.4	6.9	2.5	1.6	1.0	1.0	1.2	2.5	3.2	2.9	2.3	3.6	8.6	8.1	6.6	10.4	12.6	8.5	24	13.4	1.0	6.6	0	0	
10	5.8	2.8	5.7	3.9	3.8	2.1	2.4	5.0	2.1	2.0	1.1	2.8	2.1	1.3	0.4	1.4	0.2	0.5	0.2	0.7	0.7	0.2	0.7	0.4	24	5.8	0.2	2.0	0	0	
11	1.8	2.0	1.4	0.4	0.5	0.0	0.1	0.1	0.6	0.0	0.2	0.0	0.1	0.0	0.1	0.1	0.2	1.0	4.9	9.3	13.0	10.0	14.4	12.3	24	14.4	0.0	3.0	0	0	
12	8.8	8.0	3.5	5.7	11.8	11.3	10.9	9.6	8.0	1.5	0.4	0.5	0.3	3.4	0.5	0.5	0.5	3.0	0.9	3.0	4.4	3.5	20.5	0.6	24	20.5	0.3	5.0	0	0	
13	0.0	5.8	9.0	11.8	16.6	16.4	16.1	14.7	9.3	5.3	7.0	7.7	5.2	1.9	1.1	1.1	1.4	1.3	1.1	2.0	1.1	3.0	1.8	2.3	24	16.6	0.0	6.0	0	0	
14	2.0	3.2	5.9	1.7	1.4	1.8	2.4	2.7	1.4	0.7	1.0	0.9	0.5	0.5	0.5	0.5	0.7	1.9	4.5	5.9	8.1	4.2	4.8	6.6	24	8.1	0.5	2.7	0	0	
15	11.3	5.7	4.2	5.9	5.2	5.7	3.7	1.9	0.8	0.4	0.4	0.0	0.0	0.0	0.3	0.0	0.7	1.1	5.6	15.0	14.0	12.7	11.6	24	15.0	0.0	4.4	0	0		
16	3.2	9.0	8.9	7.1	9.7	6.7	5.1	4.7	9.2	3.8	M	M	0.7	0.5	1.2	0.9	5.6	11.6	9.7	9.5	8.6	5.2	1.7	21	11.6	0.5	5.8	0	0		
17	0.7	1.1	1.5	3.0	2.5	2.4	2.9	2.7	3.1	2.5	1.2	1.7	0.9	1.0	1.8	0.0	0.0	1.8	1.0	0.5	0.7	1.8	1.9	3.0	24	3.1	0.0	1.7	0	0	
18	4.5	8.2	3.1	5.3	3.0	3.7	5.2	7.0	4.4	1.7	1.5	2.5	1.9	2.2	1.6	1.7	1.0	3.1	1.7	4.8	8.4	15.5	9.4	5.2	24	15.5	1.0	4.4	0	0	
19	3.6	3.7	3.8	6.4	8.0	9.7	11.2	9.8	8.0	6.6	2.5	0.4	0.8	0.9	1.1	2.3	2.2	2.6	7.1	2.6	3.9	5.3	15.4	17.7	24	17.7	0.4	5.7	0	0	
20	12.0	9.8	11.2	15.0	12.2	7.2	5.2	12.4	12.2	8.8	11.5	11.2	10.0	8.1	5.6	3.5	3.6	2.9	4.2	9.8	14.1	15.7	13.4	6.7	24	15.7	2.9	9.4	0	0	
21	9.7	10.2	6.7	6.9	6.4	17.2	20.2	20.6	17.2	12.8	12.3	7.8	5.5	4.4	2.6	2.8	1.1	4.6	1.4	11.9	27.5	22.7	27.6	11.1	24	27.6	1.1	11.3	0	0	
22	15.2	11.3	7.0	4.1	7.1	12.9	14.2	7.5	6.4	3.6	1.7	2.0	1.8	2.1	1.9	2.1	2.7	8.7	20.7	19.3	19.7	28.7	23.3	15.6	24	28.7	1.7	10.0	0	0	
23	11.6	12.1	12.5	14.0	20.2	14.9	10.5	4.8	2.1	C	C	3.6	2.9	1.5	0.7	0.5	0.9	2.2	7.1	6.7	3.9	4.2	4.2	2.4	22	20.2	0.5	6.5	0	0	
24	1.9	2.3	1.1	0.6	1.2	1.8	1.9	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.9	3.4	7.5	4.8	2.4	1.7	1.4	24	7.5	0.0	1.4	0	0	
25	0.7	1.1	0.9	0.9	2.7	2.7	2.8	3.1	2.2	9.3	0.0	0.0	0.0	0.0	0.1	0.8	0.0	1.1	3.4	2.1	14.1	12.1	8.8	3.1	24	14.1	0.0	3.0	0	0	
26	0.3	0.7	1.2	0.6	1.0	0.4	2.2	2.0	1.4	2.0	1.9	2.0	5.4	1.7	2.4	3.8	8.0	11.0	7.1	8.4	14.9	16.9	8.8	6.1	24	16.9	0.3	4.6	0	0	
27	13.0	19.4	13.7	12.1	11.5	21.8	16.7	17.1	9.4	2.2	1.9	0.6	0.6	0.1	0.2	1.0	0.9	0.6	0.9	0.9	0.2	1.8	1.4	1.5	24	21.8	0.1	6.2	0	0	
28	1.3	0.9	0.6	3.0	13.9	9.5	12.8	11.4	3.1	1.9	2.0	1.2	2.1	1.4	0.8	2.9	15.9	24.1	19.6	10.2	8.4	6.1	7.4	6.7	24	24.1	0.6	7.0	0	0	
29	3.4	5.9	9.4	3.9	2.9	3.5	3.8	3.1	3.1	3.9	3.4	10.3	9.1	5.5	4.1	8.9	7.0	4.3	2.6	3.2	4.2	3.9	2.2	3.0	24	10.3	2.2	4.8	0	0	
30	3.2	3.6	4.6	2.6	3.5	4.4	5.4	5.1	3.3	2.5	1.6	1.2	1.8	5.2	2.6	0.8	1.3	2.1	5.1	12.2	4.6	0.8	0.3	0.6	24	12.2	0.3	3.3	0	0	
31																										0	0				
Count	30	30	30	30	30	30	30	30	30	29	28	29	29	30	30	30	30	30	30	30	30	30	30	30	30	715					
Maximum	15.2	19.4	13.7	15.0	20.2	21.8	20.2	20.6	17.2	12.8	12.3	11.2	10.0	8.1	5.6	8.9	15.9	24.1	20.7	19.3	27.5	28.7	27.6	17.7	24						
Minimum	0.0	0.7	0.6	0.4	0.5	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.2	0.2	0.3	0.4	21						
Average	6.1	6.3	5.4	5.8	5.8	6.6	7.2	7.3	6.1	4.3	2.7	2.2	2.2	1.6	1.2	1.5	2.1	3.1	4.7	6.2	8.0	8.9	7.9	6.4	24						
Percentiles	10	20	30	40	50	60	70	80	90	95	99	100																	Maximum		
Data	0.4	0.9	1.4	2.0	2.9	4.2	6.1	8.8	12.1	15.1	20.7	28.7																Maximum Hourly			
Notes	C - Calibration / Span Cycle												NA - No Data Available												Maximum Daily						
													T - Test												11.3						
													A- MOE Audit												4.9						
													M - Equipment Malfunction / Down												Monthly Average						

Figure B-1 Time History Plots of Measured Hourly Average and 24-Hour Average NO₂ Concentrations – Crago Road Station



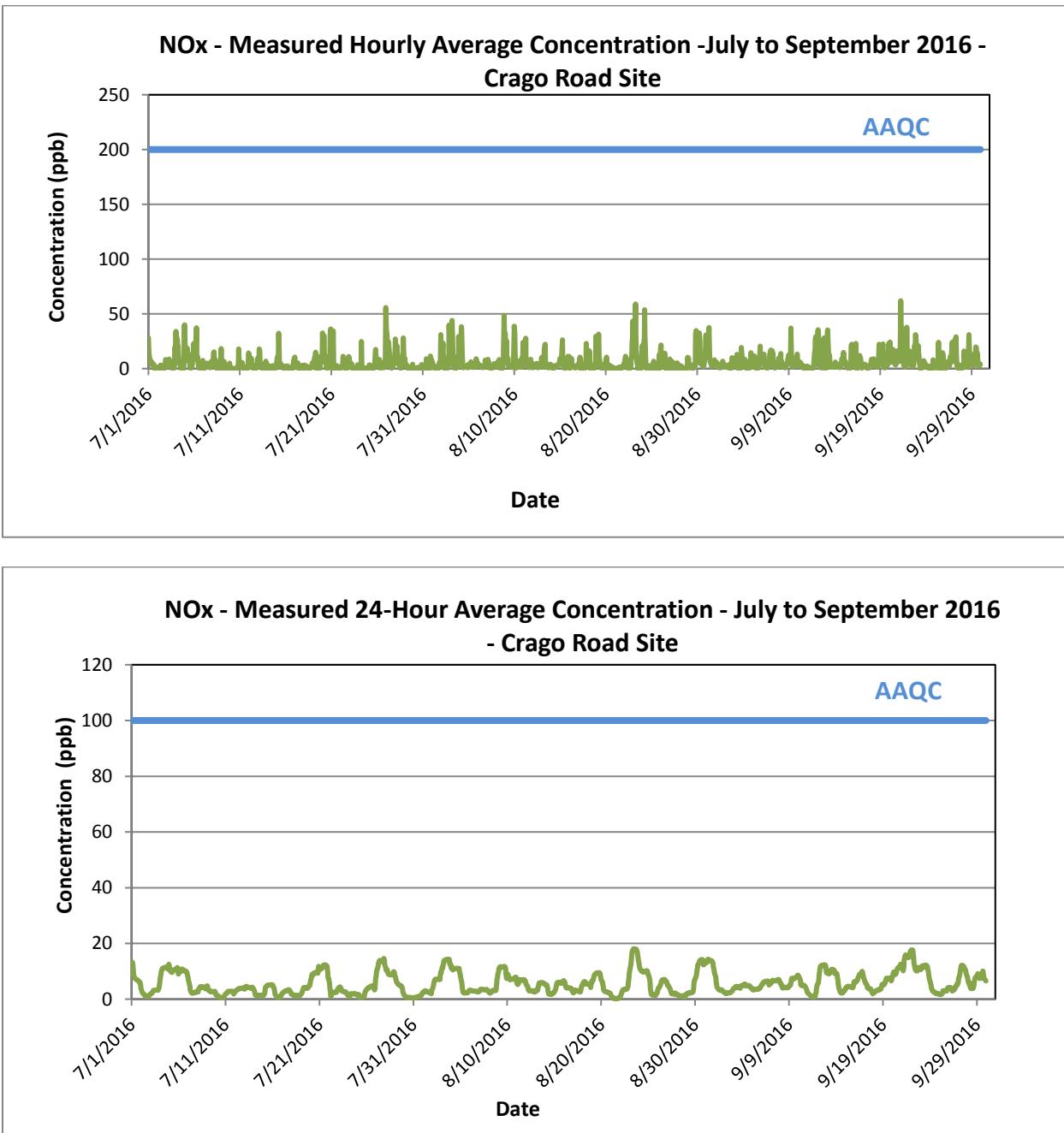
**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

Appendix C NOX Data Summaries and Time History Plots
November 7, 2016

Appendix C NO_x DATA SUMMARIES AND TIME HISTORY PLOTS

		NOx		Crago Road																										
		July		2016																										
Hour		ppb																												
Day	Hour	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300					
1	28.2	15.8	13.1	9.4	6.8	7.9	4.1	4.2	5.8	5.9	5.3	3.6	3.8	2.4	4.1	1.9	0.1	0.0	0.0	0.0	0.0	0.0	1.2	24	28.2	0.0	5.2	0	0	
2	1.4	1.2	1.5	1.2	1.0	1.5	0.5	0.0	3.2	1.6	2.8	1.5	0.2	0.1	0.9	0.0	0.0	0.0	0.0	0.9	3.6	8.2	3.6	24	8.2	0.0	1.8	0	0	
3	2.8	2.2	3.4	3.5	4.3	5.1	8.7	6.7	4.8	5.3	3.4	1.5	1.1	0.9	0.0	0.0	0.1	1.2	0.8	0.3	0.7	19.2	16.4	20.4	24	20.4	0.0	4.7	0	0
4	34.0	27.6	29.9	18.5	26.6	18.4	20.3	11.9	7.3	4.9	5.8	4.0	2.1	0.8	0.0	0.3	2.4	0.0	2.1	0.0	0.0	3.6	39.0	40.0	24	40.0	0.0	12.5	0	0
5	26.8	12.7	8.3	11.1	15.5	14.8	18.7	10.8	14.5	7.7	7.1	10.7	5.6	2.2	0.3	2.2	0.8	1.1	1.7	4.4	6.7	9.3	12.7	23.1	24	26.8	0.3	9.5	0	0
6	15.0	21.1	16.5	14.2	18.2	14.0	37.3	12.9	8.3	11.1	8.3	2.6	1.3	1.2	0.0	0.8	3.8	1.0	1.5	1.9	0.9	3.7	1.7	7.5	24	37.3	0.0	8.5	0	0
7	0.5	1.5	1.6	0.6	1.4	4.0	1.0	3.0	2.4	4.9	3.2	2.1	1.6	2.8	1.7	1.5	2.1	3.3	0.7	2.9	6.3	5.2	2.4	2.5	24	6.3	0.5	2.5	0	0
8	2.4	1.8	3.2	14.1	15.2	7.6	6.2	5.1	8.2	5.2	2.4	0.3	3.2	0.4	0.4	0.5	1.6	0.0	2.9	0.2	2.6	0.5	9.0	18.2	24	18.2	0.0	4.6	0	0
9	3.8	3.6	1.9	0.8	0.0	3.6	6.4	2.0	1.9	1.0	0.6	0.3	1.4	1.3	0.6	0.3	0.4	0.4	1.2	2.2	4.9	0.9	0.0	24	6.4	0.0	1.7	0	0	
10	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.2	0.0	0.0	0.2	1.1	1.1	5.7	18.0	4.0	5.7	24	18.0	0.0	1.6	0	0
11	6.0	2.8	2.7	2.1	3.7	4.5	5.5	2.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.8	0.0	0.0	1.4	7.1	14.2	24	14.2	0.0	2.3	0	0
12	13.0	7.5	3.9	4.3	7.8	8.0	9.4	3.4	2.3	1.7	0.8	0.3	2.0	0.9	3.1	0.5	0.1	1.2	0.0	0.4	1.2	1.7	8.1	9.8	24	13.0	0.0	3.8	0	0
13	7.9	8.3	5.6	18.0	16.3	6.5	4.0	3.0	1.4	1.1	0.2	0.6	1.1	0.0	0.0	0.4	0.8	0.2	0.6	0.5	6.9	1.5	2.1	2.9	24	18.0	0.0	3.7	0	0
14	0.9	3.6	1.6	0.0	0.0	0.5	0.9	1.7	2.1	1.0	1.5	1.2	0.3	0.3	0.6	2.7	1.1	0.3	0.4	1.2	1.4	1.3	0.6	24	3.6	0.0	1.1	0	0	
15	2.1	6.3	10.5	3.7	7.6	13.0	32.3	15.3	3.1	4.0	4.7	2.4	1.8	3.7	2.4	2.2	1.1	0.7	0.4	1.2	2.2	1.4	0.7	1.7	24	32.3	0.4	5.2	0	0
16	0.6	0.4	0.0	0.2	0.8	2.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.3	0.2	3.8	7.7	8.2	8.1	24	8.2	0.0	1.5	0	0
17	10.6	5.8	3.0	2.7	3.1	3.5	3.6	1.7	5.3	1.1	0.0	1.9	0.0	1.5	0.0	2.2	1.9	2.4	0.3	0.0	3.0	0.4	2.9	24	10.6	0.0	2.4	0	0	
18	0.8	0.5	1.5	3.4	1.3	0.5	0.9	1.0	1.7	1.2	1.8	0.9	0.8	0.8	0.5	0.4	0.4	0.6	1.1	2.5	2.4	5.4	3.8	24	5.4	0.4	1.5	0	0	
19	5.5	5.0	4.3	8.2	9.7	9.7	13.2	15.1	7.2	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.1	0.6	6.7	11.3	5.2	5.5	9.3	24	15.1	0.0	4.9	0	0
20	10.4	32.4	20.8	18.3	30.2	25.8	9.8	12.0	10.6	9.6	5.2	0.9	1.6	0.2	0.0	1.2	0.7	3.1	3.0	2.6	5.7	31.2	36.3	11.1	24	36.3	0.0	11.8	0	0
21	2.2	10.5	25.8	26.7	24.6	34.4	C	C	C	C	C	C	0.4	0.0	0.3	2.9	0.0	1.3	0.1	1.1	0.1	0.0	0.1	18	34.4	0.0	7.3	0	0	
22	1.3	0.7	2.0	1.5	1.8	3.9	4.8	11.2	10.7	7.9	2.7	0.4	1.6	0.6	2.8	1.7	0.2	1.1	0.7	0.8	3.3	7.2	11.1	8.1	24	11.2	0.2	3.7	0	0
23	5.3	5.6	4.5	5.1	3.3	2.6	4.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	3.5	1.8	1.6	24	5.6	0.0	1.7	0	0	
24	1.4	1.4	0.2	2.8	0.0	0.0	5.1	24.8	1.4	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.6	0.0	0.0	0.7	0.0	0.0	24	24.8	0.0	1.6	0	0	
25	0.0	0.0	0.1	2.4	3.6	0.5	1.8	0.9	0.0	0.4	0.8	2.6	1.4	0.5	0.3	2.0	0.9	0.7	1.7	11.3	17.5	12.8	7.7	24	17.5	0.0	3.1	0	0	
26	4.7	5.5	2.9	4.5	4.6	4.9	8.3	1.5	0.6	0.2	1.4	5.6	5.1	3.2	1.2	1.5	1.3	1.0	0.8	3.2	2.2	1.3	23.9	55.9	24	55.9	0.2	6.1	0	0
27	38.7	28.2	32.4	24.0	13.7	14.2	24.2	20.8	15.5	9.4	7.4	1.7	1.9	1.0	0.2	2.9	2.7	4.7	1.7	9.0	7.6	8.8	10.2	16.0	24	38.7	0.2	12.4	0	0
28	26.9	18.2	10.6	16.7	20.8	13.8	13.6	4.3	6.4	6.2	5.2	2.7	1.6	0.5	0.0	1.4	1.9	4.9	3.6	6.6	15.3	28.0	11.8	8.2	24	28.0	0.0	9.6	0	0
29	8.5	9.3	2.7	3.1	3.3	3.8	3.1	1.9	1.3	0.0	0.0	0.3	0.1	0.1	0.0	0.6	1.3	0.0	2.1	2.4	4.0	0.6	0.0	24	9.3	0.0	2.0	0	0	
30	0.0	1.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.9	1.2	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	3.8	24	3.8	0.0	0.5	0	0
31	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	1.4	0.0	0.5	0.9	4.9	0.2	0.0	0.2	11.6	7.2	8.5	2.1	24	11.6	0.0	2.0	0	0
Count	31	31	31	31	31	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	738						
Maximum	38.7	32.4	32.4	26.7	30.2	34.4	37.3	24.8	15.5	11.1	8.3	10.7	5.6	3.7	4.1	2.9	4.9	4.9	3.6	11.3	17.5	31.2	39.0	55.9	24					
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18						
Average	8.5	7.8	6.9	7.1	7.9	7.3	8.2	6.1																						

Figure C-1 Time History Plots of Measured Hourly Average and 24-Hour Average NO_x Concentrations – Crago Road Station



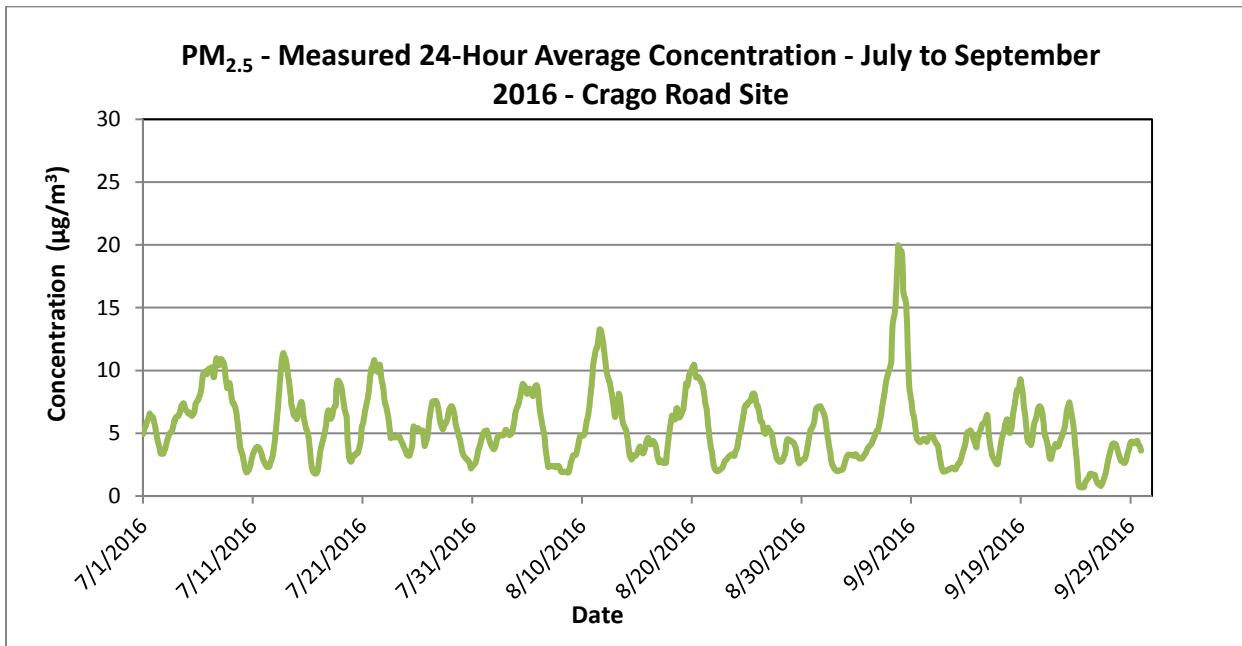
**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

Appendix D PM2.5 Data Summaries and Time History Plots
November 7, 2016

Appendix D PM_{2.5} DATA SUMMARIES AND TIME HISTORY PLOTS

		PM _{2.5} - Crago Road August 2016 (µg/m ³)																													
		Hour																													
Day		0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average		
1		6.3	5.2	4.5	3.9	3.1	3.2	3.9	4.0	3.6	3.4	2.9	3.2	3.1	3.0	2.8	2.6	3.6	3.1	3.0	3.4	4.0	4.8	3.5	5.1	24	6.3	2.6	3.7		
2		6.6	6.9	6.4	6.4	7.4	7.8	7.0	6.4	7.0	5.5	3.3	2.5	3.6	3.3	3.4	3.2	3.3	2.7	2.7	3.3	3.4	5.9	6.6	7.3	24	7.8	2.5	5.1		
3		8.9	9.1	6.5	5.7	6.3	6.8	4.2	4.1	6.3	3.6	3.6	4.1	4.2	3.9	3.9	4.4	7.7	5.7	6.5	8.2	9.6	11.5	14.7	12.3	24	14.7	3.6	6.7		
4		11.3	10.9	10.2	7.8	7.5	8.3	8.3	7.7	8.7	8.1	8.7	10.3	9.0	8.5	6.9	6.2	5.0	4.8	6.8	7.4	6.8	8.1	9.5	9.5	24	11.3	4.8	8.2		
5		10.2	11.8	12.3	12.5	9.9	8.5	7.6	6.8	6.8	6.2	6.6	6.3	6.9	7.7	8.0	8.9	11.8	11.4	7.9	8.2	8.2	8.4	7.3	4.9	24	12.5	4.9	8.5		
6		5.0	3.4	2.8	2.3	2.2	2.2	1.9	1.7	2.0	1.9	2.0	1.6	2.6	3.0	2.1	1.6	2.5	1.4	1.5	1.7	1.8	1.7	2.0	4.1	24	5.0	1.4	2.3		
7		5.5	3.8	3.5	2.9	2.3	2.1	1.8	1.5	1.8	2.1	2.3	1.7	1.7	1.8	1.8	1.8	3.3	2.2	2.0	1.9	1.7	1.7	1.8	24	5.5	1.5	2.3			
8		2.0	1.8	1.7	1.8	1.8	1.9	2.0	1.9	2.3	2.3	2.0	1.8	1.8	1.6	1.5	1.7	2.4	1.9	1.9	2.3	2.4	2.2	6.1	6.5	24	6.5	1.5	2.5		
9		5.7	3.9	5.0	5.4	4.8	3.4	2.3	2.1	1.8	2.1	2.6	3.2	4.2	4.7	5.3	6.2	6.6	6.6	6.9	6.7	6.6	6.4	5.4	6.9	24	6.9	1.8	4.8		
10		6.8	4.9	4.9	4.2	4.5	4.8	4.6	6.2	8.1	8.3	6.9	7.6	7.6	8.9	10.2	12.7	13.4	13.6	14.4	15.9	15.7	14.0	15.7	18.0	24	18.0	4.2	9.7		
11		20.6	12.3	10.0	9.3	9.4	9.4	10.6	8.1	8.7	9.7	11.6	14.5	14.4	16.2	16.5	16.5	13.7	11.9	13.1	10.6	10.0	10.4	11.0	11.6	24	20.6	8.1	12.1		
12		11.3	4.6	2.3	2.1	2.4	3.1	3.6	3.9	4.8	6.5	8.5	10.6	14.3	14.7	10.6	10.6	9.0	6.7	7.2	6.2	3.9	4.0	3.6	3.6	24	14.7	2.1	6.6		
13		4.3	4.7	6.8	7.2	9.2	8.1	11.1	10.3	10.4	10.4	6.0	6.2	7.7	7.0	2.1	1.6	1.2	1.2	1.8	4.1	2.5	1.2	2.5	24	11.1	1.2	5.4			
14		3.0	2.0	1.4	1.5	1.8	3.3	3.8	2.5	4.4	5.2	4.5	4.4	6.5	5.8	5.1	3.9	3.0	2.2	2.2	2.1	2.1	2.0	2.6	3.5	24	6.5	1.4	3.3		
15		4.4	3.9	3.8	3.9	4.4	5.3	5.1	4.6	3.1	2.5	2.2	2.6	3.2	3.6	5.4	5.7	4.7	4.3	5.4	5.9	6.6	7.1	6.3	5.0	24	7.1	2.2	4.5		
16		5.5	5.3	2.1	2.4	2.2	2.3	2.8	2.3	3.6	5.2	3.7	3.9	3.0	4.1	3.4	2.8	4.7	1.6	1.3	1.3	1.4	1.6	1.8	2.0	24	5.5	1.3	2.9		
17		2.7	2.3	2.6	2.9	3.2	3.4	C	C	C	C	C	3.7	3.6	3.8	3.9	3.8	3.8	9.4	8.2	7.5	7.6	8.9	7.6	6.5	19	9.4	2.3	5.0		
18		7.4	6.9	7.1	7.0	6.9	7.8	6.8	4.6	5.6	6.5	3.4	2.6	2.9	9.5	15.2	7.7	4.4	3.9	3.9	4.6	5.0	6.2	7.9	8.0	24	15.2	2.6	6.3		
19		9.2	8.9	9.2	9.6	9.3	8.9	9.1	12.6	15.3	11.2	14.7	10.6	10.4	10.4	8.7	10.3	8.3	10.0	10.3	7.7	7.1	8.7	9.8	10.4	24	15.3	7.1	10.0		
20		10.8	11.1	11.0	10.7	10.8	11.3	8.2	5.3	6.2	8.1	10.4	11.4	11.2	10.1	8.4	9.8	8.2	7.5	9.6	5.1	5.2	6.8	9.4	8.8	24	11.4	5.1	9.0		
21		7.4	6.3	6.0	5.3	4.5	2.9	2.6	2.7	2.7	1.8	1.5	1.4	1.4	1.6	1.4	1.5	1.9	2.0	1.7	1.8	1.6	1.8	1.6	2.7	24	7.4	1.4	2.7		
22		2.1	2.8	3.0	2.9	2.9	2.4	2.2	2.1	2.1	2.1	2.1	2.0	1.9	1.9	2.1	2.2	3.0	2.4	2.1	2.6	3.6	4.2	4.5	4.6	24	4.6	1.9	2.7		
23		4.2	4.2	3.4	4.0	3.4	3.9	3.9	2.7	2.8	3.3	2.9	2.8	2.4	2.5	3.0	3.3	2.6	1.7	2.0	2.1	2.6	3.6	6.4	8.0	24	8.0	1.7	3.4		
24		7.7	5.6	5.6	5.9	7.4	8.1	9.8	8.2	7.0	5.8	5.8	5.8	7.2	7.6	8.1	7.6	7.8	8.0	7.2	7.6	7.1	7.2	7.5	7.8	24	9.8	5.6	7.2		
25		7.0	6.7	7.5	7.8	8.3	10.1	10.1	8.3	6.7	6.6	7.9	10.7	11.3	9.9	8.4	8.6	8.0	7.4	4.0	2.8	3.4	3.3	2.7	3.6	24	11.3	2.7	7.1		
26		7.6	6.2	3.4	3.4	3.7	4.2	4.9	4.5	5.1	6.7	7.2	7.7	6.2	4.9	5.1	5.6	5.8	6.3	6.6	5.8	5.6	4.7	4.6	4.7	24	7.7	3.4	5.4		
27		4.2	3.5	3.4	3.3	3.3	2.9	2.8	2.1	1.8	2.0	2.0	1.9	1.7	1.8	1.9	1.8	2.0	2.2	2.8	3.5	5.1	4.3	3.3	2.6	24	5.1	1.7	2.8		
28		3.4	3.6	3.5	3.7	3.2	3.8	3.7	3.2	3.9	4.3	4.3	4.3	4.5	6.4	8.1	8.8	7.9	5.4	3.9	3.6	3.3	3.2	3.3	24	8.8	3.2	4.4			
29		3.0	3.0	2.9	2.7	3.1	3.4	3.2	2.3	1.9	1.9	2.2	2.4	2.4	2.1	2.2	2.7	2.3	2.0	1.9	2.1	3.0	4.4	5.2	4.1	24	5.2	1.9	2.8		
30		4.0	3.4	3.5	3.4	3.5	3.9	3.9	2.8	3.2	4.3	5.5	6.9	6.7	7.9	7.4	6.1	7.2	8.8	7.3	6.5	6.7	5.8	5.8	24	8.8	2.8	5.4			
31		5.4	5.5	5.9	6.5	7.5	8.4	9.8	10.2	8.4	6.1	6.4	7.2	8.1	8.0	6.2	7.2	7.8	9.7	6.3	5.2	4.4	4.0	3.6	3.5	24	10.2	3.5	6.7		
Count		31	31	31	31	31	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	739					
Maximum		20.6	12.3	12.3	12.5	10.8	11.3	11.1	12.6	15.3	11.2	14.7	14.5	14.4	16.2	16.5	16.5	13.7	13.6	14.4	15.9	15.7	14.0	15.7	18.0	24					
Minimum		2.0	1.8	1.4	1.5	1.8	1.9	1.8	1.5	1.8	1.8	1.5	1.4	1.4	1.6	1.4	1.5	1.2	1.2	1.3	1.3	1.4	1.2	1.6	1.6	19					
Average		6.6	5.6	5.2	5.1	5.2	5.4	5.4	4.9	5.2	5.1	5.1	5.3	5.7	6.0	5.8	5.7	5.7	5.4	5.2	5.1	5.2	5.5	5.9	6.1	24					
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100				Maximum Hourly	20.6		
Data		1.9		2.4																											

Figure D-1 Time History Plot of Measured 24-Hour Average PM_{2.5} Concentrations – Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

Appendix E Continuous Parameter Edit Log
November 7, 2016

Appendix E CONTINUOUS PARAMETER EDIT LOG

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program							
Contact	Greg Crooks / Connie Lim / Tim Hung	Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com			
Station number:	N/A	Station Name:	Crago Road					
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	SO2	Instrument make & model:	Teledyne Monitor Labs Sulphur Dioxide Analyzer				Serial Number:	1228
Data edit period	Start date:	1-Jul-16	End date:	30-Sep-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	21-Sep-16	BB	Data Review	7/17/2016	00:00	7/18/2016	23:00	SO2 concentrations were low due to negative zero drifting and low measurements. Measurements appear to be reasonable so no adjustments were made to the data.
2	13-Oct-16	BB	Data Review	7/24/2016	00:00	8/17/2016	23:00	SO2 concentrations elevated during July 24. Concentrations were consistent with Courtice measurements and winds were from the east, indicating an SO2 emissions source in the direction of Ontario Hydro/St. Mary's cement. Data deemed valid.
3	13-Oct-16	BB	Data Review	7/28/2016	00:00	7/29/2016	23:00	SO2 concentrations elevated during September 28. Concentrations were consistent with Courtice measurements and winds were from the east, indicating an SO2 emissions source in the direction of St. Mary's cement. Data deemed valid.
4	13-Oct-16	BB	Invalidate	7/21/2016	06:00	7/21/2016	12:00	Monthly calibration
5	13-Oct-16	BB	Invalidate	8/17/2016	06:00	8/17/2016	10:00	Monthly calibration
6	13-Oct-16	BB	Invalidate	9/23/2016	09:00	9/23/2016	10:00	Monthly calibration
7	13-Oct-16	BB	Invalidate	7/22/2016	13:00	8/18/2016	05:00	SO2 concentrations were low due to small negative zero drifting (less than 5 ppb) and low measurements. Measurements appear to be reasonable so no adjustments were made to the data.
8	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.

Examples of Acceptable Edit Actions:

Add offset of

Delete hours

Zero Correction

Slope Correction

Manual data entry for missing, but collected data

Invalidating span & zero check data

Invalidating data due to equipment malfunctions and power failures.

Invalidating data when instrumentation off-line

Marking data as out-of-range

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program									
Contact	Greg Crooks / Connie Lim / Tim Hung	Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com					
Station number:	N/A	Station Name:	Crago Road							
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON							
Pollutant or parameter:	NOx	Instrument make & model:	API Model 200E Chemiluminescence Analyzer		Serial Number:	1424				
Data edit period	Start date:	1-Jul-16	End date:	30-Sep-16	Time Zone : EST					
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason		
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)			
1	21-Sep-16	BB	Data Review	7/1/2016	00:00	8/31/2016	23:00	Reviewed NOX, SO2, and PM2.5 Data for July and August. Zeros in hourly data are from slightly negative measurements that are less than 5 ppb below zero. Measurements were reviewed and appear to be valid. No adjustments made.		
2	21-Sep-16	BB	Data Review	8/2/2016	00:00	8/29/2016	23:00	NOx was zeroed on site on August 2, 17, and 29 at -1.4, -4.1, and -1.5 ppb respectively. Since zeroing was for values less than 5 ppb, no adjustments to data were made.		
3	13-Oct-16	BB	Data Review	7/24/2016	00:00	7/26/2016	23:00	NOx concentrations elevated on July 24 and July 26. Concentrations were consistent with Courtice measurements and winds were from the east. Concentration of NO and NO2 were comparable, suggesting that St. Mary's cement was a possible emission source. Data deemed valid.		
4	13-Oct-16	BB	Data Review	8/9/2016	00:00	8/11/2016	23:00	NOx concentrations elevated on August 9 and 10. Concentrations were consistent with Courtice and Rundle measurements and winds were from the north, suggesting highway 401 as a possible emission source. Concentration of NO and NO2 were comparable, further supporting an intermediate distance from the source, such as the highway for railway. Data deemed valid.		
5	13-Oct-16	BB	Data Review	9/28/2016	00:00	9/28/2016	23:00	NOx concentrations elevated on September 28. Concentrations were consistent with Courtice measurements and winds were from the east suggesting operations at Ontario Hydro or St. Mary's cement as a possible emission source. Concentration of NO2 were comparable to NO, indicating an intermediate distance source. SO2 also elevated at that time, suggesting the emissions originated from St. Mary's cement facility. Data deemed valid.		
6	13-Oct-16	BB	Invalidate	7/21/2016	06:00	7/21/2016	12:00	Monthly calibration		
7	13-Oct-16	BB	Invalidate	8/17/2016	06:00	8/17/2016	10:00	Monthly calibration		
8	13-Oct-16	BB	Invalidate	9/23/2016	09:00	9/23/2016	10:00	Monthly calibration		
9	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.		

Examples of Acceptable Edit Actions:

Add offset of

Delete hours

Zero Correction

Slope Correction

Manual data entry for missing, but collected data

InValidating span & zero check data

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Marking data as out-of-range

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program							
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A	Station Name:	Crago Road					
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	PM2.5	Instrument make & model:	Thermo Sharp 5030 Synchronized Hybrid Ambient Real-time	Serial Number:	CM 0269			
Data edit period	Start date:	1-Jul-16	End date:	30-Sep-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	22-Sep-16	BB	Manual Data Entry	8/5/2016	19:00	8/6/2016	16:00	Data downloaded directly from monitor manually entered because of a HVPS issue affecting the instrument's analog output to the data logger.
2	22-Sep-16	BB	Manual Data Entry	8/12/2016	15:00	8/15/2016	14:00	Data downloaded directly from monitor manually entered because of a HVPS issue affecting the instrument's analog output to the data logger.
3	22-Sep-16	BB	Manual Data Entry	8/21/2016	00:00	8/22/2016	08:00	Data downloaded directly from monitor manually entered because of a HVPS issue affecting the instrument's analog output to the data logger.
4	13-Oct-16	BB	Invalidate	7/21/2016	06:00	7/21/2016	12:00	Monthly calibration
5	13-Oct-16	BB	Invalidate	8/17/2016	06:00	8/17/2016	10:00	Monthly calibration
6	13-Oct-16	BB	Invalidate	9/23/2016	09:00	9/23/2016	10:00	Monthly calibration
7	13-Oct-16	BB	Data Review	7/18/2016	14:00	7/18/2016	15:00	PM2.5 concentrations elevated compared to Courtice and Rundle. Winds from the North-northwest. Minute data appears to be valid with no sudden change in concentration during this period. Possibly due to agricultural activities. Data deemed valid.
8	13-Oct-16	BB	Data Review	9/7/2016	07:00	9/7/2016	19:00	PM2.5 concentrations elevated on September 7. PM2.5 also elevated at Courtice and Rundle stations. Winds from the east when concentrations high, indicating source from St. Mary's Cement. Data deemed valid.
9	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.

Examples of Acceptable Edit Actions:

Add offset of

Delete hours

Zero Correction

Slope Correction

Manual data entry for missing, but collected data

Invalidating span & zero check data

Invalidating data due to equipment malfunctions and power failures.

Invalidating data when instrumentation off-line

Marking data as out-of-range

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program							
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A	Station Name:	Crago Road					
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	Temperature	Instrument make & model:	Campbell Scientific Model HMP60					
Data edit period	Start date: 1-Jul-16	End date: 30-Sep-16					Time Zone : EST	
Edit #	Edit date	Editor's Name	Edit Action	Starting	Ending	Reason		
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program							
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A	Station Name:	Crago Road					
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	Rainfall	Instrument make & model:	Texas Electronic TE525M					
Data edit period	Start date: 1-Jul-16	End date: 30-Sep-16					Time Zone : EST	
Edit #	Edit date	Editor's Name	Edit Action	Starting	Ending	Reason		
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.

Examples of Acceptable Edit Actions:

- Add offset of
- Delete hours
- Zero Correction
- Slope Correction
- Manual data entry for missing, but collected data
- Invalidating span & zero check data
- Invalidating data due to equipment malfunctions and power failures.
- Invalidating data when instrumentation off-line
- Marking data as out-of-range

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program							
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A	Station Name:	Crago Road					
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	Relative Humidity	Instrument make & model:	Campbell Scientific Model HMP60					
Data edit period	Start date:	1-Jul-16	End date:	30-Sep-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting	Ending	Reason		
				Date (dd/mm/yyyy)	Hour (xx:xx)			
1	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.

EDIT LOG TABLE

Project Name	Durham York Energy Centre Ambient Air Monitoring Program							
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A	Station Name:	Crago Road					
Station address:	Crago Road	Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON					
Pollutant or parameter:	Wind Speed/Wind Direction	Instrument make & model:	Met One Instruments Inc. Model 034B					
Data edit period	Start date:	1-Jul-16	End date:	30-Sep-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting	Ending	Reason		
				Date (dd/mm/yyyy)	Hour (xx:xx)			
1	19-Oct-16	BB	Invalidate	9/16/2016	10:00	9/16/2016	12:00	Reset of Data Logger caused data logger to lose monitoring data for this period. Data invalidated.
2	19-Oct-16	BB	Invalidate	7/28/2016	16:00	7/29/2016	00:00	Instrument down for maintenance. Data invalidated.

Examples of Acceptable Edit Actions:

- Add offset of
- Delete hours
- Zero Correction
- Slope Correction
- Manual data entry for missing, but collected data
- Invalidating span & zero check data
- Invalidating data due to equipment malfunctions and power failures.
- Invalidating data when instrumentation off-line
- Marking data as out-of-range

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

Appendix F Metals Data Summary
November 7, 2016

Appendix F METALS DATA SUMMARY

Metals and Total Particulates		Crago Station																																		
Location Date	dd/mm/yyyy	Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago												
	hh:mm	05/07/2016		11/07/2016		17/07/2016		23/07/2016		29/07/2016		04/08/2016		10/08/2016		16/08/2016		22/08/2016		28/08/2016		03/09/2016		09/09/2016		15/09/2016		21/09/2016								
	Hours	0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00										
Start Time	hh:mm	0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00										
Sample Duration	Hours	23.95		23.34		23.5		23		24.41		23.29		23.66		23.96		23.32		23.48		22.81		24.36		23.37		23.5		23.89						
Technician	TH	TH		TH		TH		TH		TH		TH		TH		TH		TH		TH		TH		TH		TH										
Filter Number	16061380	16061724		16061728		16070718		16070722		16070757		16070761		16071243		16071247		16071266		16071270		16081900		16081904		16082281		16082285								
Analytical Report #	B6E0143	B6E4988		B6F4140		B6F6611		B6G2471		B6G6192		B6H2054		B6H5398		B6I2906		B6I5065		B6J0664		B6L5876		B6K2141		B6K5676		B6K9801								
Total Volumetric Flow	Am³/sample	1541.34		1505.72		1496.03		1468.72		1539.19		1608.95		1665.38		1532.86		1555.59		1532.99		1644.54		1549.72		1578.62		1621.35								
Analytical Results		Units			Value			RDL																												
Particulate	mg	80.5			5.0			30.9			43.7			5.0			49.3			5.0			74.1			5.0										
Total Mercury (Hg)	µg	0.03			<0.02			0.02			<0.02			0.02			0.03			<0.02			0.02			0.03										
Aluminum (Al)	µg	312			50			157			50			212			50			204			50			361										
Antimony (Sb)	µg	<10			10			<10			10			<10			10			<10			10			<10										
Arsenic (As)	µg	<6.0			6.0			<6.0			6.0			<6.0			6.0			<6.0			6.0			<6.0										
Barium (Ba)	µg	26.2			1.0			7.2			1.0			12.0			1.0			8.6			1.0			17.5										
Beryllium (Be)	µg	<1.0			1.0			<1.0			1.0			<1.0			1.0			<1.0			1.0			<1.0										
Bismuth (Bi)	µg	<6.0			6.0			<6.0			6.0			<6.0			6.0			<6.0			6.0			<6.0										
Boron (B)	µg	8.0			<6.0			6.0</																												

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

Appendix G PAHs Data Summary
November 7, 2016

Appendix G PAHS DATA SUMMARY

Polycyclic Aromatic Hydrocarbons		Crago Road Station			Crago 11/07/2016		Crago 23/07/2016		Crago 04/08/2016		Crago 16/08/2016		Crago 28/08/2016		Crago 09/09/2016		Crago 21/09/2016	
Location Date		dd/mm/yyyy		hh:mm	0:00	24.22	0:00	23.19	0:00	23.24	0:00	22.44	0:00	23.37	0:00	23.96	0:00	24.6
Start Time		Sample Duration		Technician	Hours	TH	TH	TH	TH	TH	TH	TH	TH	TH	TH	TH	TH	
Filter Number		Maxaam ID		Analytical Report #	Am³/sample	COL238-01	COL290-01	COL317-01	CRA194-01	CRA225-01	CRA240-01	CRA2761-01	CZC824	DBG420	DCY822	B6J5878	B6K5519	
Total Volumetric Flow					371.72	361.47	364.39	340.72	371.63	385.43	391.07							
Analytical Results		Units		Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	
Benzo(a)pyrene		µg		0.00208	0.020	0.0050	0.030	0.00569	0.020	0.0069	0.030	0.0125	0.020	0.0050	0.030	0.0240	0.030	
1-Methylnaphthalene		µg		1.21	0.10	2.19	0.15	5.26	0.10	1.72	0.15	2.17	0.10	3.63	0.15	3.24	0.15	
2-Methylnaphthalene		µg		2.14	0.10	4.26	0.15	10.1	0.10	2.89	0.15	3.78	0.10	6.53	0.15	5.14	0.15	
Acenaphthene		µg		1.98	0.050	2.38	0.075	6.29	0.050	2.13	0.075	2.57	0.050	3.10	0.075	1.72	0.075	
Acenaphthylene		µg		<0.050	0.050	<0.075	0.075	0.112	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Anthracene		µg		0.172	0.050	<0.075	0.075	0.226	0.050	0.204	0.075	0.294	0.050	<0.075	0.075	0.285	0.075	
Benzo(a)anthracene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Benzo(a)fluorene		µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	
Benzo(b)fluoranthene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Benzo(b)fluorene		µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	
Benzo(e)pyrene		µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	
Benzo(g,h,i)perylene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Benzo(k)fluoranthene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Biphenyl		µg		0.62	0.10	0.98	0.15	2.76	0.10	0.85	0.15	1.23	0.10	1.42	0.15	1.36	0.15	
Chrysene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Dibenz(a,h)anthracene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Dibenzo(a,c) anthracene + Picene		µg		<0.10	0.10	<0.050	0.050	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.15	0.15	<0.15	0.15	
Fluoranthene		µg		0.582	0.050	0.420	0.075	1.20	0.050	0.762	0.075	0.842	0.050	0.960	0.075	0.732	0.075	
Indeno(1,2,3-cd)pyrene		µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	
Naphthalene		µg		4.84	0.072	4.76	0.11	11.7	0.072	5.42	0.11	5.81	0.072	10.3	0.11	14.9	0.11	
o-Terphenyl		µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	
Perylene		µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	
Phenanthrene		µg		3.11	0.050	2.77	0.075	7.16	0.050	3.18	0.075	4.25	0.050	5.61	0.075	4.08	0.075	
Pyrene		µg		0.244	0.050	0.180	0.075	0.496	0.050	0.318	0.075	0.356	0.050	0.480	0.075	0.390	0.075	
Tetralin		µg		0.31	0.10	0.58	0.15	0.73	0.10	0.52	0.15	0.43	0.10	0.82	0.15	1.07	0.15	
Calculated Concentrations		Quarter 3 2016			Crago		Crago		Crago		Crago		Crago		Crago			
		Units	Maximum	Minimum	14	15	16	17	18	19	20							
Benzo(a)pyrene	ng/m³	6.14E-02	5.60E-03	5.60E-03	1.38E-02	1.56E-02	2.03E-02	3.36E-02	1.30E-02	1.64E-02	1.30E-02	8.28E+00	9.42E+00	1.31E+01	1.31E+01	1.31E+01	1.31E+01	
1-Methylnaphthalene	ng/m³	1.44E+01	3.26E+00	3.26E+00	6.06E+00	1.44E+01	5.05E+00	5.84E+00	1.02E+01	1.69E+01	1.69E+01	4.40E+00	4.40E+00	4.40E+00	4.40E+00	4.40E+00	4.40E+00	
2-Methylnaphthalene	ng/m³	2.77E+01	5.76E+00	5.76E+00	1.18E+01	2.77E+01	8.48E+00	1.02E+01	6.92E+00	8.04E+00	8.04E+00	9.59E-02	9.59E-02	9.59E-02	9.59E-02	9.59E-02	9.59E-02	
Acenaphthene	ng/m³	1.73E+01	4.40E+00	5.33E+00	6.58E+00	1.73E+01	6.25E+00	6.92E+00	1.10E-01	6.73E-02	6.73E-02	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	
Acenaphthylene	ng/m³	3.07E-01	6.73E-02	6.73E-02	1.04E-01	3.07E-01	1.10E-01	6.73E-02	9.73E-02	9.73E-02	9.73E-02	7.29E-01	7.29E-01	7.29E-01	7.29E-01	7.29E-01	7.29E-01	
Anthracene	ng/m³	7.91E-01	9.73E-02	4.63E-01	1.04E-01	6.20E-01	5.99E-01	7.91E-01	9.73E-02	9.73E-02	9.73E-02	6.50E-01	6.50E-01	6.50E				

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – JULY TO SEPTEMBER 2016**

Appendix H Dioxins and Furans Data Summary
November 7, 2016

Appendix H DIOXINS AND FURANS DATA SUMMARY

Dioxins and Furans	Crago Road Station			Crago			Crago			Crago			Crago		
Location Date	dd/mm/yyyy			23/07/2016			16/08/2016			09/09/2016			21/09/2016		
Start Time	hh:mm			0:00 23.19 TH			0:00 22.44 TH			0:00 23.96 TH			0:00 24.6 TH		
Sample Duration	Hours			COL290-01 CTV386 BGF6619			CRA194-01 CXH702 B6H5420			CRA240-01 DBG420 B6J5878			CX8761-01 ⁵ DCY822 B6K5519		
Technician				Am ³ /sample			361.47			340.72			385.43		
Analytical Results	Units			Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF
2,3,7,8-Tetra CDD *	pg	<4.4	4.4	1	<3.1 (1)	3.1	1	<3.5	3.5	1	<2.9	2.9	1	2.9	1
1,2,3,7,8-Penta CDD *	pg	<4.1	4.1	1	<2.8	2.8	1	<3.3	3.3	1	<3.5	3.5	1	3.5	1
1,2,3,4,7,8-Hexa CDD *	pg	<4.2	4.2	0.1	<3.1	3.1	0.1	<3.2	3.2	0.1	<3.6	3.6	0.1	3.6	0.1
1,2,3,6,7,8-Hexa CDD *	pg	<4.4	4.4	0.1	<3.1	3.1	0.1	<3.3	3.3	0.1	<3.6	3.6	0.1	3.6	0.1
1,2,3,7,8,9-Hexa CDD *	pg	<4.0	4.0	0.1	<2.9	2.9	0.1	<3.0	3.0	0.1	<3.3	3.3	0.1	3.3	0.1
1,2,3,4,6,7,8-Hepta CDD *	pg	7.4	3.1	0.01	4.3	2.7	0.01	6.8	2.7	0.01	11.1	2.3	0.01	2.3	0.01
Octa CDD *	pg	24.8	3.4	0.0003	16.3	3.3	0.0003	32.1	3.4	0.0003	51.5	3.4	0.0003	3.4	0.0003
Total Tetra CDD *	pg	<18 (1)	18		<10 (1)	10		<6.7 (1)	6.7		<4.6 (1)	4.6			
Total Penta CDD *	pg	<16 (1)	16		<8.3 (1)	8.3		<4.1 (1)	4.1		<3.7 (1)	3.7			
Total Hexa CDD *	pg	<19 (1)	19		<16 (1)	16		<11 (1)	11		4.8	3.5			
Total Hepta CDD *	pg	14.1	3.1		4.3	2.7		15.7	2.7		23.3	2.3			
2,3,7,8-Tetra CDF **	pg	<3.6	3.6	0.1	<3.8	3.8	0.1	<3.4	3.4	0.1	3.8	3.0	0.1	3.0	0.1
1,2,3,7,8-Penta CDF **	pg	<3.1	3.1	0.03	<3.6	3.6	0.03	<3.1	3.1	0.03	<3.4	3.4	0.03	3.4	0.03
2,3,4,7,8-Hexa CDF **	pg	<3.1	3.1	0.3	<3.6	3.6	0.3	<3.1	3.1	0.3	<3.4	3.4	0.3	3.4	0.3
1,2,3,4,7,8-Hexa CDF **	pg	<5.3	5.3	0.1	<3.3	3.3	0.1	<2.6	2.6	0.1	<2.8	2.8	0.1	2.8	0.1
1,2,3,6,7,8-Hexa CDF **	pg	<5.1	5.1	0.1	<3.2	3.2	0.1	<2.5	2.5	0.1	<2.7	2.7	0.1	2.7	0.1
2,3,4,6,7,8-Hexa CDF **	pg	<5.6	5.6	0.1	<3.5	3.5	0.1	<2.8	2.8	0.1	<2.9	2.9	0.1	2.9	0.1
1,2,3,7,8,9-Hexa CDF **	pg	<6.0	6.0	0.1	<3.6	3.6	0.1	<2.9	2.9	0.1	<3.1	3.1	0.1	3.1	0.1
1,2,3,4,6,7,8-Hepta CDF **	pg	<3.1	3.1	0.01	3.4	2.3	0.01	<2.9	2.9	0.01	4.8	2.7	0.01	2.7	0.01
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.9	3.9	0.01	<2.7	2.7	0.01	<3.4	3.4	0.01	<3.2	3.2	0.01	3.2	0.01
Octa CDF **	pg	<3.9	3.9	0.0003	4.5	3.3	0.0003	<3.8	3.8	0.0003	4.5	3.1	0.0003	3.1	0.0003
Total Tetra CDF **	pg	<3.6	3.6		<3.8	3.8		<3.4	3.4		3.8	3.0			
Total Penta CDF **	pg	<3.1	3.1		<3.6	3.6		<3.1	3.1		4.5	3.4			
Total Hexa CDF **	pg	<5.5	5.5		<3.4	3.4		<2.7	2.7		3.8	2.9			
Total Hepta CDF **	pg	<3.5	3.5		3.4	2.5		<3.2	3.2		7.9	2.9			
TOTAL TOXIC EQUIVALENCY	pg														

- (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.
(3) EMPC / Merged Peak
(4) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.
(5) Additional dioxin/furan ambient sampling requested by the Regional Municipality of Durham

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Quarter 3 2016			Crago			Crago			Crago			Crago		
				10			11			12			13		
	Units	Maximum	Minimum	23/07/2016			16/08/2016			09/09/2016			21/09/2016		
2,3,7,8-Tetra CDD *	pg/m ³	6.09E-03	3.71E-03	0.006		0.005				0.005			0.004		
1,2,3,7,8-Penta CDD	pg/m ³	5.67E-03	4.11E-03	0.006		0.004				0.004			0.004		
1,2,3,4,7,8-Hexa CDD	pg/m ³	5.81E-03	4.15E-03	0.006		0.005				0.004			0.005		
1,2,3,6,7,8-Hexa CDD	pg/m ³	6.09E-03	4.28E-03	0.006		0.005				0.004			0.005		
1,2,3,7,8,9-Hexa CDD	pg/m ³	5.53E-03	3.89E-03	0.006		0.004				0.004			0.004		
1,2,3,4,6,7,8-Hepta CDD	pg/m ³	2.84E-02	1.26E-02	0.020		0.013				0.018			0.028		
Octa CDD	pg/m ³	1.32E-01	4.78E-02	0.069		0.048				0.083			0.132		
Total Tetra CDD	pg/m ³	2.49E-02	5.88E-03	0.025		0.015				0.009			0.006		
Total Penta CDD	pg/m ³	2.21E-02	4.73E-03	0.022		0.012				0.005			0.005		
Total Hexa															