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Drinking Water and Environmental
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Ministère de l'Environnement de la
Protection de la nature et des Parcs
Division de la conformité en matière
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Direction régionale du Centre-Ouest

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December 9, 2020

MEMORANDUM

TO: Phillip Hull
Senior Environmental Officer
Niagara District Office

FROM: Rui Zeng
Air Quality Analyst
Technical Support Section, West Central Region

RE: **Former GM Property Air Monitoring Survey, St. Catharines, Ontario**

At the request of the Niagara District Office of the Ontario Ministry of the Environment, Conservation and Parks (MECP), the Technical Support Section of West Central Region conducted an air monitoring survey in the vicinity of the former General Motors (GM) property in St. Catharines, Ontario. The property (282 Ontario Street, 285 Ontario Street, and 10 Pleasant Avenue) is surrounded on the North and East sides by residential properties and the South side by commercial interests and further additional residential properties. Residents and neighbouring property owners have expressed concern that the piles of debris left after demolition activities may have released and may continue to release contaminants into the air. The purpose of the air monitoring survey is to measure potential fugitive emissions from the property and determine if the results indicate any potential off-site concerns to the general public. The air monitoring survey has collected Hi-vol air samples, both upwind and downwind, on ten (10) sampling dates, and three (3) monthly dustfall samples from July 30, 2020 to October 31, 2020. The results collected during this time are presented in this memo.

Monitoring Activities

During the survey, the Technical Support Section installed a total of three sampling stations close to the property line of the former GM property for the measurements of total suspended particulate matter (TSP), metals, and dustfall. One Hi-vol sampler and

one portable meteorological sensor were deployed on municipal property at the Haig Bowl Arena, located at 17 Beech St. (Station 27097). Another Hi-vol sampler was deployed at the Region of Niagara Carlton Street Reservoir Pumping Station, located at 15 Carlton St (Station 27094). In addition, a dustfall sampler was deployed on Haig St, near the intersection of Haig St and Carlton St (Station 27096). A map of the sampling locations can be found in Appendix A.

Hi-vol samples were collected when the sampling locations were forecast to be predominantly downwind of the former GM property, a potential source of fugitive emissions. Hi-vol samples were collected on July 30, Aug 4, Aug 8, Aug 13-14, Aug 18, Aug 25, Aug 29, Oct 7, Oct 16, and Oct 24 at both Stations 27097 and 27094. The dustfall samples are monthly samples and were collected in August, September, and October 2020.

The Hi-vol samplers draw a known volume of air (40 cubic feet per minute) through a pre-weighed filter for a 24-hour period to collect suspended particulate matter, including any suspended metals (Copper, Nickel, Cadmium, Chromium, Lead, Iron, Manganese, Vanadium, and Zinc). These samples were analyzed for mass loading expressed in micrograms per meter cubed.

The dustfall sampler collects any particles in air that settle down over a given area and time under the influence of gravity. Dustfall sample results are expressed in g/m²/30days. A semi-quantitative measurement was provided for the identification of different types of materials contained in the dustfall sample.

Both types of samples, Hi-vol and dustfall, were analyzed by a stereoscopic and polarized microscope, and a scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA) for the identification of the particles contained in the samples. Following the analysis, any samples that were found to contain synthetic fibres were subsequently sent to EMSL Canada Inc., a third-party laboratory accredited for asbestos analysis. Qualitative asbestos analysis by transmission electron microscopy (TEM) and filtration technique were used to confirm any presence or absence of asbestos in the samples.

Results/Conclusions

Table 1 and Table 2 list the concentrations of suspended particulate matter and metals measured at Stations 27094 and 27097. The monitoring results were compared to Ontario Regulation 419/05 Air Pollution – Local Air Quality (O.Reg. 419/05) and Ambient Air Quality Criteria (AAQC). O.Reg. 419/05 is a regulation that sets legal limits for contaminants in air. It *“works within the province’s air management framework by regulating air contaminants released into communities by various sources, including local industrial and commercial facilities.”* An Ambient Air Quality Criteria (AAQC) is *“a concentration of a contaminant in air that is protective against adverse effects on health and/or the environment. AAQCs are most commonly used in environmental assessments, special studies using ambient air monitoring data, assessment of general air quality in a community and annual reporting on air quality across the province.”*

Table 1: Summary of Monitoring Results at Station 27094 (Pumping Station)

Sample Date	Predominant Wind Direction	Concentration (µg/m ³)									
		Suspended Particulate Matter	Copper	Nickel	Cadmium	Chromium	Lead	Iron	Manganese	Vanadium	Zinc
O. Reg. 419/05 24-hr Standard and Ambient Air Quality Criteria		120	50	0.2	0.025	0.5	0.5	4.0	0.4	2	120
30-Jul-20	NW	19	0.081	0.001	0.005	0.002	0.005	0.36	0.013	0.002	0.001
04-Aug-20	NW	6	0.054	0.001	0.005	0.002	0.005	0.1	0.005	0.002	0.001
08-Aug-20	S, NW	14	0.055	0.001	0.005	0.002	0.005	0.24	0.01	0.002	0.001
13-Aug-20	NE	60	0.34	0.001	0.005	0.0054	0.0053	0.95	0.032	0.003	0.001
18-Aug-20	NW	13	0.069	0.001	0.005	0.002	0.005	0.22	0.009	0.002	0.001
25-Aug-20	NW, SW	29	0.075	0.001	0.005	0.002	0.005	0.39	0.013	0.019	0.37
29-Aug-20	W, SW	4	0.041	0.001	0.005	0.002	0.005	0.13	0.007	0.022	0.36
07-Oct-20	NW	12	0.052	0.001	0.005	0.002	0.005	0.19	0.007	0.002	0.001
16-Oct-20	NW, SW, SE	21	0.06	0.001	0.005	0.002	0.005	0.27	0.01	0.002	0.001
24-Oct-20	NW	4	0.051	0.001	0.005	0.002	0.005	0.11	0.005	0.019	0.39

Table 2: Summary of Monitoring Results at Station 27097 (Arena)

Sample Date	Predominant Wind Direction	Concentration (µg/m ³)									
		Suspended Particulate Matter	Copper	Nickel	Cadmium	Chromium	Lead	Iron	Manganese	Vanadium	Zinc
O. Reg. 419/05 24-hr Standard and Ambient Air Quality Criteria		120	50	0.2	0.025	0.5	0.5	4.0	0.4	2	120
30-Jul-20	NW	19	0.045	0.001	0.005	0.0029	0.005	0.37	0.014	0.002	0.001
04-Aug-20	NW	8	0.052	0.001	0.005	0.002	0.005	0.11	0.009	0.002	0.001
08-Aug-20	S, NW	21	0.052	0.001	0.005	0.002	0.005	0.31	0.01	0.002	0.001
13-Aug-20	NE	40	0.051	0.001	0.005	0.0031	0.0065	0.69	0.027	0.002	0.001
18-Aug-20	NW	16	0.038	0.001	0.005	0.002	0.005	0.3	0.015	0.002	0.001
25-Aug-20	NW, SW	27	0.042	0.001	0.005	0.002	0.005	0.41	0.013	0.002	0.001
29-Aug-20	W, SW	12	0.037	0.001	0.005	0.002	0.005	0.14	0.003	0.018	0.35
07-Oct-20	NW	12	0.03	0.001	0.005	0.0022	0.005	0.21	0.008	0.002	0.001
16-Oct-20	NW, SW, SE	17	0.048	0.001	0.005	0.002	0.005	0.26	0.013	0.002	0.001
24-Oct-20	NW	5	0.029	0.001	0.005	0.002	0.005	0.098	0.003	0.02	0.37

As shown in Table 1 and Table 2, the maximum measured 24-hour concentration of suspended particulate matter was $60 \mu\text{g}/\text{m}^3$ and $40 \mu\text{g}/\text{m}^3$ at Station 27094 and Station 27097 respectively. There were no exceedances observed in suspended particulate matter, Copper, Nickel, Cadmium, Chromium, Lead, Iron, Manganese, Vanadium, or Zinc. The measurements were all significantly below their respective O. Reg. 419/05 24-hour standards and AAQCs, even in the samples collected downwind of the potential source. All of the measurements of Cadmium and Nickel, and most of the measurements of Chromium, Lead, Vanadium, and Zinc were below their respective method detection limits.

Wind roses are used to depict the observed wind speeds and wind directions. Using a polar coordinate system of gridding, the frequency of winds over a time period is plotted by wind direction, with color bands showing wind speed ranges. The direction of the longest spoke shows the wind direction with the greatest frequency. Meteorological data from Station 27097 was used to determine corresponding local 1-minute measurements for wind speed and wind direction during the sampling events. The 24-hour wind roses in Appendix B display the predominant wind directions for each sampling period.

On October 7, 70% of the winds were from the Northwest direction, resulting in Station 27094 (Pumping Station) being directly upwind and Station 27097 (Arena) being directly downwind of the GM property. However, both stations measured the same concentrations of suspended particulate matter ($12 \mu\text{g}/\text{m}^3$) on that day. Similarly, 67% and 77% of the winds were from the Northwest direction on July 30 and Oct 24, and both upwind and downwind stations observed almost same and comparably low suspended particulate matter concentrations. Therefore, the off-site suspended particulate emissions from the former GM property to the downwind area were not observed.

The results of the microscope and SEM-EDXRA analyses are summarized in Appendix C. SEM-EDXRA results show the presence of different particles in the samples by analyzing the spectra of randomly selected particles. Hi-vol and dustfall samples mainly contained normal road dust particles (calcite, dolomite, silica, silicates, etc.).

Under the microscope, coloured and colourless minerals, biological materials, trace synthetic fibers, tire wear particles, and metal fragments were observed in the Hi-vol samples. Seven Hi-vol samples collected at Station 27094 and Station 27097 were found to contain trace synthetic fibers in the original microscopic analysis. These seven Hi-vol samples were sent for further analysis for asbestos, provided by the accredited third-party asbestos laboratory. There was no asbestos detected in any of these samples as shown in the lab report in Appendix D.

Under the microscope, the dustfall samples were mainly comprised of biological material and minerals, with biological material being the majority. No synthetic fibres were found in the dustfall samples. Therefore, they were not sent out for further asbestos analysis. Total insoluble content refers to the soluble portion and the insoluble portion of a dustfall sample. In general, dustfall samples include particles less than

1.0mm in size. As shown in Table 3, the total insoluble contents of the dustfall samples are all below the AAQC of 7 g/m² per 30 days.

Table 3: Dustfall Sample Results at Station 27096

Sample Period	Predominant Wind Direction	Total Insoluble Content (g/m ² /30D)	Biological Material (vol%)	Minerals (vol%)
August 2020	S	2	65%	35%
September 2020	S	2.4	80%	20%
October 2020	S	3	70%	30%

Note: the 30-Day Dustfall AAQC guideline is 7 g/m²

The monthly wind roses for August, September, and October 2020 are shown as Figures 11- 13 in Appendix B. It can be seen that the predominant winds during these three months consistently came from the South direction, which places the dustfall sampler downwind of the former GM property. The maximum winds for these three months were all above 20km/hr, which has the potential to carry particles from the facility to the neighboring residents.

Overall, Hi-vol and dustfall samples mainly contained normal road dusts. No asbestos was found in the Hi-vol samples which detected trace synthetic fibers. The measurements of suspended particulate matter and metals were significantly lower than the O. Reg. 419/05 24-hour Standards and AAQC at both stations. The amount of dust collected in the dustfall jars were also well below the AAQC guideline. Also, no elevated concentrations of suspended particulate matter were observed in the downwind samples, therefore off-site fugitive emissions from the former GM property to the general public were not observed.

If you have any questions, please do not hesitate to contact me.

Sincerely,



Rui Zeng
Air Quality Analyst, WCR

c.
Natalie Stacey, Air, Pesticides and Environmental Planning Supervisor, WCR (A)
Kim Groombridge, Manager, Niagara District Office
Katy Potter, Supervisor, Niagara District Office

Encl.

Appendix A: Former GM Property Air Monitoring Survey, St. Catharines -- Air Monitoring Station Locations

Appendix B: Wind Roses

Appendix C: Microscope and SEM-EDXRA Results

Appendix D: Asbestos Analysis Report

Appendix E: MECP Lab Report

Appendix A: Former GM Property Air Monitoring
Survey, St. Catharines -- Air Monitoring Station
Locations



Station 27094
Suspended particulate matter
Metals

Station 27096
Dustfall

Station 27097
Suspended particulate matter
Metals
Meteorological data

Legend:

-  Air Monitoring Station
-  Former GM Site
-  City Owned Property
-  Regional Owned Property

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Appendix B: Wind Roses



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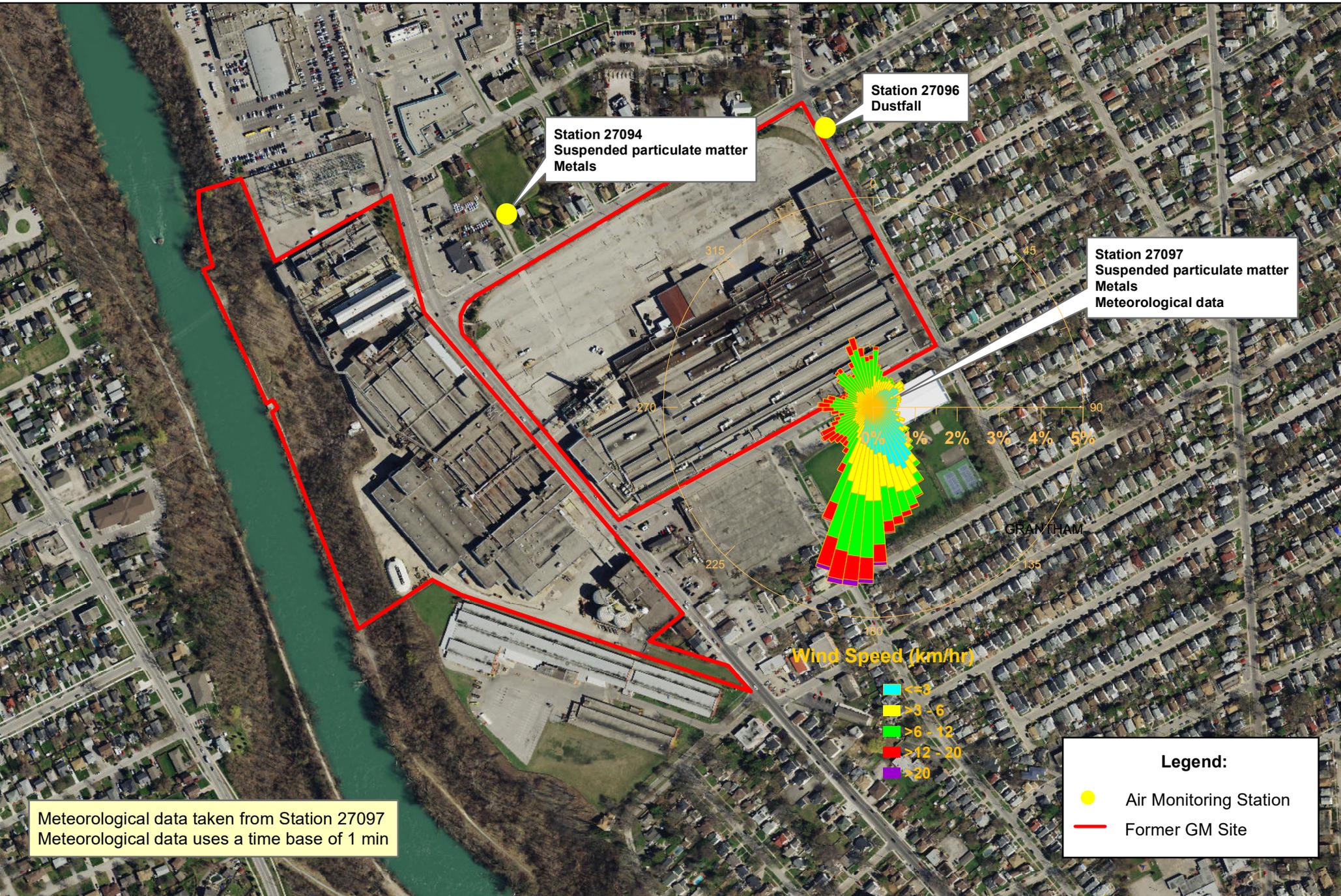


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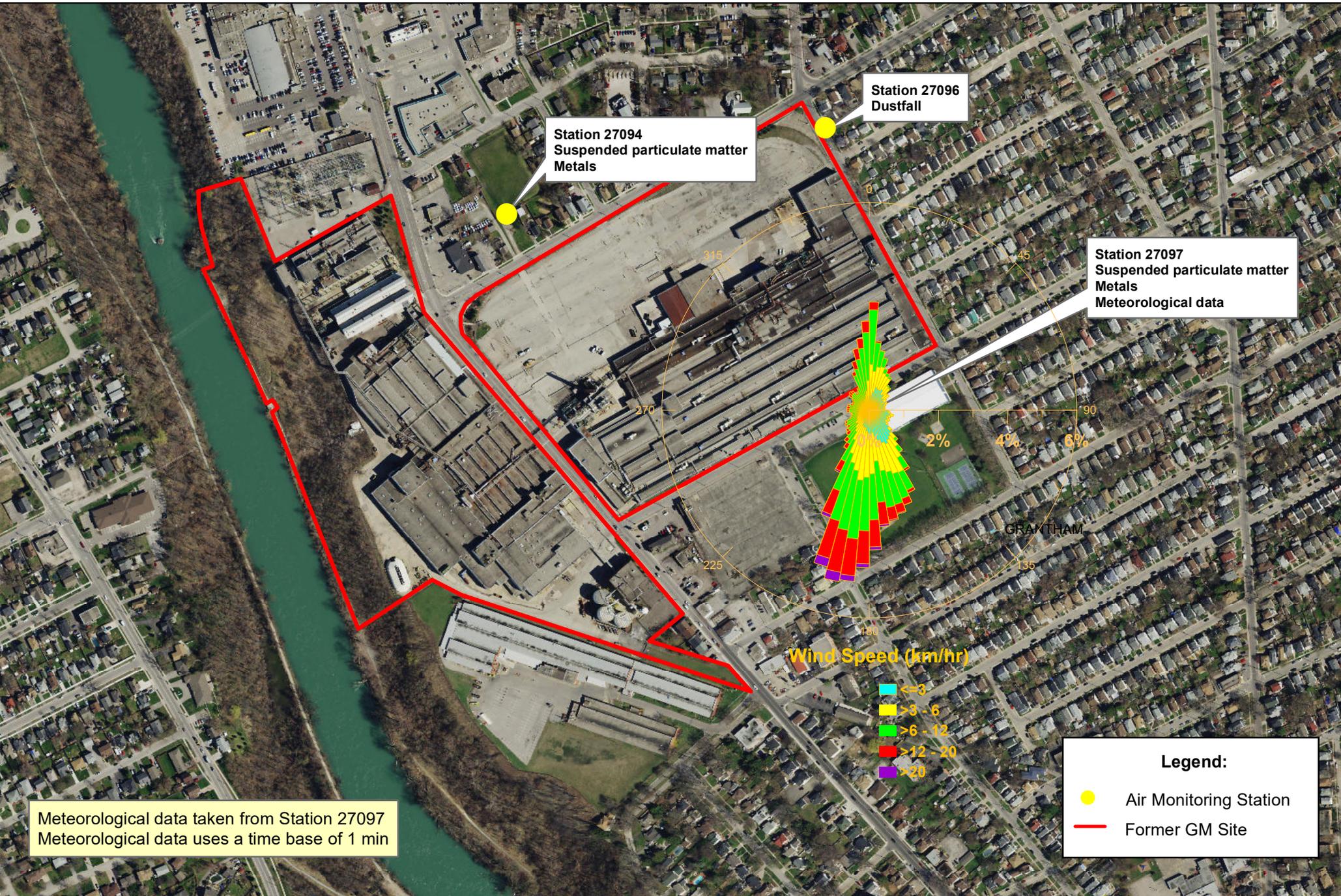
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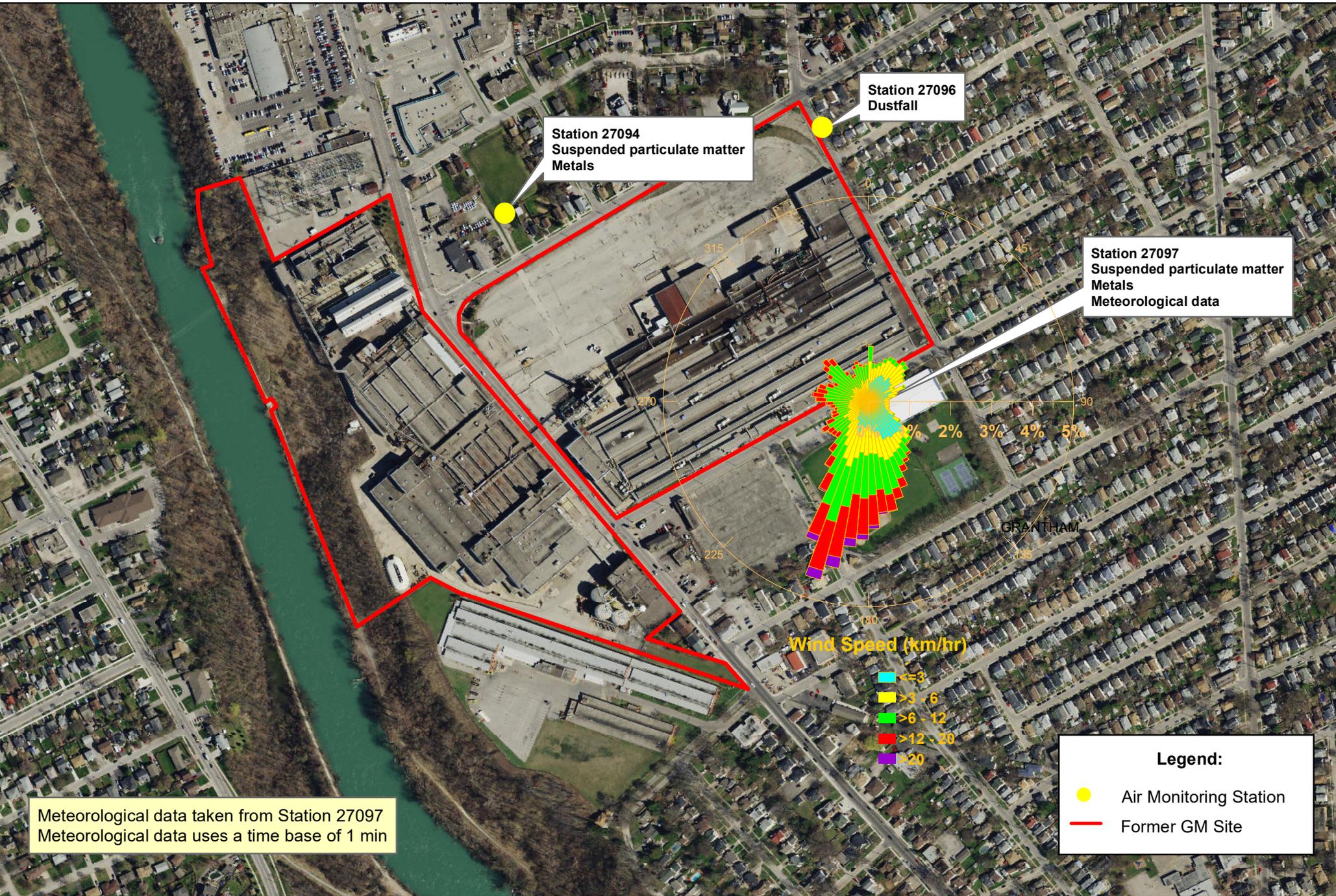


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Appendix C: Microscope and SEM-EDXRA Results

Table 1 Microscope and SEM-EDXRA Results at Station 27097 and Station 27094 (part1)

	View Under Microscope		SEM-EDXRA	
	Station 27097	Station 27094	Station 27097	Station 27094
30-Jul-20	Colored and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter A few biological materials were found	Colored and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter A few biological materials were found Trace synthetic fibers were present	Out of 40 randomly selected particles scanned: 3 were calcite, 5 were dolomite, 2 were silica, 4 were biological materials and the rest particles were silicates	Out of 45 randomly selected particles scanned: 3 were calcite, 7 were dolomite, 3 were silica, 7 were biological materials and the rest particles were silicates
04-Aug-20	Colored and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter. A few biological materials were found Trace synthetic fibers were present	Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter A few biological materials were found Trace synthetic fibers were present Trace particles with reflective surface were found, likely metal fragments	Out of 40 randomly selected particles scanned: 3 were calcite, 5 were dolomite, 2 were silica, 3 were biological materials, 1 particle contained high titanium content and the rest particles were silicates	Out of 40 randomly selected particles scanned: 3 were calcite, 8 were dolomite, 4 were silica, 4 were biological materials, 1 was gypsum and the rest particles were silicates
08-Aug-20	Colored and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter. A few biological materials were found Trace synthetic fibers were present	Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter A few biological materials were found Trace particles with reflective surface were found, likely metal fragments	Out of 45 randomly selected particles scanned: 3 were calcite, 3 were dolomite, 2 were silica, 3 were biological materials, 1 was gypsum, 1 particle contained high titanium content and the rest particles were silicates	Out of 40 randomly selected particles scanned: 3 were calcite, 4 were dolomite, 3 were silica, 4 were biological materials, 1 particle contained high iron content, likely iron sulfate, and the rest particles were silicates
13-Aug-20	Colored and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter. A few biological materials were found	Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter A few biological materials were found Trace tire wires and fly ash were also found Trace particles with reflective surface were present, likely metal fragments	Out of 40 randomly selected particles scanned: 2 were calcite, 8 were dolomite, 3 were silica, 3 were biological materials, 1 particle contained relatively high titanium content and the rest particles were silicates	Out of 45 randomly selected particles scanned: 1 was calcite, 1 was dolomite, 3 were silica, 4 were biological materials, 1 was iron oxide and the rest particles were silicates

Table 1 Microscope and SEM-EDXRA Results at Station 27097 and Station 27094 (part2)

	View Under Microscope		SEM-EDXRA	
	Station 27097	Station 27094	Station 27097	Station 27094
18-Aug-20	<p>Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter</p> <p>A few biological materials were found</p> <p>Trace synthetic fibers were present</p> <p>Trace particles with reflective surface were found, likely metal fragments.</p>	<p>Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter</p> <p>A few biological materials were found.</p>	<p>Out of 40 randomly selected particles scanned: 1 was calcite, 4 were dolomite, 2 were silica, 4 were biological materials, 1 was gypsum, 2 particles contained high copper content, likely copper debris, and the rest particles were silicates</p>	<p>Out of 40 randomly selected particles scanned: 8 was dolomite, 5 were silica, 8 were biological materials, 1 particle was likely clinker dust and the rest particles were silicates.</p>
25-Aug-20	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Some biological materials were found</p> <p>Trace synthetic fibers were also found</p>	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Some biological materials were found</p> <p>Trace tire wear particles were also found</p>	<p>Out of 45 randomly selected particles scanned: 2 were calcite, 3 were dolomite, 5 were silica, 3 were biological materials and the rest particles were silicates</p>	<p>Out of 45 randomly selected particles scanned: 4 were calcite, 6 were dolomite, 5 were silica, 8 were biological materials and the rest particles were silicates</p>
29-Aug-20	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Some biological materials were found</p> <p>Trace synthetic fibers were also found</p>	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Some biological materials were found</p> <p>Trace tire wear particles were also found</p> <p>Trace white paint sphere were also present</p>	<p>Out of 45 randomly selected particles scanned: 5 were calcite, 5 were dolomite, 6 were silica, 15 were biological materials and the rest particles were silicates</p>	<p>Out of 45 randomly selected particles scanned: 4 were calcite, 3 were dolomite, 2 were silica, 15 were biological materials and the rest particles were silicates</p>
07-Oct-20	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Trace biological materials were found</p>	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Trace biological materials were found</p>	<p>Out of 45 randomly selected particles scanned: 2 were calcite, 5 were dolomite, 3 contained iron oxide and the rest particles were likely silicates</p>	<p>Out of 45 randomly selected particles scanned: 2 were calcite, 5 were dolomite, 2 were silica, the rest particles were likely silicates</p>
16-Oct-20	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Some biological materials were found</p>	<p>Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter</p> <p>Trace biological materials were found</p>	<p>Out of 45 randomly selected particles scanned: 5 were calcite, 14 were dolomite, 3 were silica, 2 biological materials, the rest particles were silicates</p>	<p>Out of 45 randomly selected particles scanned: 3 were calcite, 5 were dolomite, 1 was silica, 6 were biological materials, 1 was like iron oxide, the rest particles were silicates</p>

Table 1 Microscope and SEM-EDXRA Results at Station 27097 and Station 27094 (part3)

	View Under Microscope		SEM-EDXRA	
	Station 27097	Station 27094	Station 27097	Station 27094
24-Oct-20	Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter Some biological materials were found	Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter Some biological materials were found	Out of 45 randomly selected particles scanned: 2 were calcite, 3 were dolomite, 3 were silica, 3 were biological materials, 1 contained high content of titanium and iron, the rest particles were silicates	Out of 45 randomly selected particles scanned: 12 were calcite, 8 were dolomite, 5 were silica, 3 were biological materials, 1 was like iron oxide, the rest particles were silicates

Table 2 Microscope and SEM-EDXRA Results at Station 27096

		Station 27096	
		View Under Microscope	SEM-EDXRA
August	<p>35% of colored and colorless minerals were present, mainly at the size of 50 to 100 microns in diameter</p> <p>65% of biological materials were found</p> <p>Trace tire wear particles were also present</p> <p>No magnetic particles were found</p>	<p>The examples of EDX spectra showed the presence of the following elements : silica, dolomite, and silicates</p>	
September	<p>Around 20% of colored and colorless minerals were present, mainly at the size of 20 to 100 microns in diameter</p> <p>Around 80% of biological materials were found</p> <p>Trace tire wear particles were also present</p> <p>No magnetic particles were found</p>	<p>The examples of EDX spectra showed the presence of the following elements: silica, calcium carbonate, dolomite, and silicates (feldspar)</p>	
October	<p>Around 30% of colored and colorless minerals were present, mainly at the size of 20 to 100 microns in diameter</p> <p>Around 70% of biological materials were found</p> <p>No magnetic particles were found</p>	<p>The examples of EDX spectra showed the presence of the following elements: silica, dolomite, aluminosilicates, and biological materials</p>	

Appendix D: Asbestos Analysis Report

**EMSL Canada Inc.**

2756 Slough Street, Mississauga, ON L4T 1G3

Phone/Fax: (289) 997-4602 / (289) 997-4607

<http://www.EMSL.com>torontolab@emsl.com

EMSL Canada Or 552013952

CustomerID: 55MNSE42

CustomerPO:

ProjectID:

Attn: **Kim Groombridge**
Ministry of the Environment
301 St.Paul Street
9th Floor, Suite 15
St.Catherines, ON L2R 7R4

Phone: (289) 668-0119
 Fax:
 Received: 10/29/2020 09:01 AM
 Analysis Date: 11/5/2020
 Collected: 8/25/2020

Test Report:Qualitative Asbestos Analysis by Transmission Electron Microscopy (TEM) and Filtration Technique

Sample	Description	TEM Result	Notes
C266225-0002 552013952-0001	Hi-vol filter, sampling date 04 Aug 2020, Station 27097	None Detected	
C266225-0003 552013952-0002	Hi-vol filter, sampling date 08 Aug 2020, Station 27097	None Detected	
C266225-0005 552013952-0003	Hi-vol filter, sampling date 18 Aug 2020, Station 27097	None Detected	
C266480-0001 552013952-0004	Hi-vol filter, sampling date 25 Aug 2020, Station 27097	None Detected	
C266480-0002 552013952-0005	Hi-vol filter, sampling date 29 Aug 2020, Station 27097	None Detected	
C266226-0001 552013952-0006	Hi-vol filter, sampling date 30 July 2020, Station 27094	None Detected	
C266226-0002 552013952-0007	Hi-vol filter, sampling date 04 Aug 2020, Station 27094	None Detected	

Analyst(s)

Anne Balayboa (7)

Matthew Davis or other approved signatory
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. This is a presence/absence screen only
 Samples analyzed by EMSL Canada Inc. Mississauga, ON

Report Amended: 12/02/2020 12:14:09 Replaces the Initial Report 11/05/2020 17:57:45. Reason Code: Client-Change to Project

Appendix E: MECP Lab Report

Login: **C266225**

Print Date: Dec. 02, 2020 09:44 AM By REPORTADMIN

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Program Code 130113102 Program: MOE OPERATIONS DIVISION
 Study: AIR,INDUSTRY,PRIVATE NETWORKS
 Project: WEST CENTRAL REG. TECH SUPPORT
 Activity: POINT SOURCE MONITORING
 Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

Mail this copy to :

ORSINI, MARK
MOE - HAMILTON REGIONAL OFFICE
119 KING STREET WEST, 12TH FLOOR
HAMILTON,ONT
L8P 4Y7

Final reports to : WCR-AIR-DATA
 ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Sep. 17, 2020

Inquiries to : ROBERT TOOLEY
 JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: 27097 GM SURVEY - HAIG BOWL ARENA - M. ORSINI 289-442-7659

The results relate only to items tested.

To provide customer service feedback on this report and/or other services provided by LaSB, please contact the LaSB HelpDesk at 416-235-6030 or the Customer Service Manager at 416-235-5831

This report contains confidential information intended only for the person(s) to whom it is addressed. Any unauthorized disclosure, copying, other distribution of this report, or taking any action on its content is strictly prohibited. If you have received this report in error, please contact the LaSB HelpDesk at 416-235-6030 or the Customer Service Manager at 416-235-5831

Login: C266225

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Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
1	27097	27097 30/JUL/2020 4956 1631	30 JUL 2020		5	
	Sample ID C266225-0001	Sample Comment Description				

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

UTM:

Zone	Easting	Northing	Collection Method	Map Datum	Accuracy (metres)
230	641239	4780939	GPS	NAD83	2-5M

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
2	27097	27097 04/AUG/2020 4961 1631	04 AUG 2020		5	
	Sample ID C266225-0002	Sample Comment Description				

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
3	27097	27097 08/AUG/2020 4973 1631	08 AUG 2020		5	
	Sample ID C266225-0003	Sample Comment Description				

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
4	27097	27097 13/AUG/2020 4975 1631	13 AUG 2020		5	
	Sample ID C266225-0004	Sample Comment Description				

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
5	27097	27097 18/AUG/2020 4988 1631	18 AUG 2020		5	
	Sample ID C266225-0005	Sample Comment Description				

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Login: C266225

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Field ID:	1	2
Sample ID:	C266225-0001	C266225-0002
MOE*LIMS ID:	2020AG35-00006	2020AG35-00007
Station ID:	27097	27097
Collect Date:	30 JUL 2020	04 AUG 2020
Sample Location Description:	27097 30/JUL/2020 4956 1631	27097 04/AUG/2020 4961 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.045	ug/m3			.002	17-SEP-2020	0.052	ug/m3			.002	17-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	17-SEP-2020	.005	ug/m3	<MDL		.005	17-SEP-2020
	Chromium	0.0029	ug/m3			.002	17-SEP-2020	.002	ug/m3	<MDL		.002	17-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	17-SEP-2020	.005	ug/m3	<MDL		.005	17-SEP-2020
	Iron	0.37	ug/m3			.005	17-SEP-2020	0.11	ug/m3			.005	17-SEP-2020
	Manganese	0.014	ug/m3			.003	17-SEP-2020	0.009	ug/m3			.003	17-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	17-SEP-2020	.002	ug/m3	<MDL		.002	17-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	17-SEP-2020	See Non-Target Textual result				0	17-SEP-2020
3288L1	Particulate; total suspended	19.0	ug/m3			1.3	14-SEP-2020	8.00	ug/m3			1.3	14-SEP-2020

Login: C266225

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Field ID:	3	4
Sample ID:	C266225-0003	C266225-0004
MOE*LIMS ID:	2020AG35-00008	2020AG35-00009
Station ID:	27097	27097
Collect Date:	08 AUG 2020	13 AUG 2020
Sample Location Description:	27097 08/AUG/2020 4973 1631	27097 13/AUG/2020 4975 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.052	ug/m3			.002	17-SEP-2020	0.051	ug/m3			.002	17-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	17-SEP-2020	.005	ug/m3	<MDL		.005	17-SEP-2020
	Chromium	.002	ug/m3	<MDL		.002	17-SEP-2020	0.0031	ug/m3			.002	17-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	17-SEP-2020	0.0065	ug/m3			.005	17-SEP-2020
	Iron	0.31	ug/m3			.005	17-SEP-2020	0.69	ug/m3			.005	17-SEP-2020
	Manganese	0.010	ug/m3			.003	17-SEP-2020	0.027	ug/m3			.003	17-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	17-SEP-2020	.002	ug/m3	<MDL		.002	17-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	17-SEP-2020	See Non-Target Textual result				0	17-SEP-2020
3288L1	Particulate; total suspended	21.0	ug/m3			1.3	14-SEP-2020	40.0	ug/m3			1.3	14-SEP-2020

Login: C266225

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Field ID: 5
 Sample ID: C266225-0005
 MOE*LIMS ID: 2020AG35-00010
 Station ID: 27097
 Collect Date: 18 AUG 2020
 Sample Location Description: 27097 18/AUG/2020 4988 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.038	ug/m3			.002	17-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	17-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	17-SEP-2020
	Chromium	.002	ug/m3	<MDL		.002	17-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	17-SEP-2020
	Iron	0.30	ug/m3			.005	17-SEP-2020
	Manganese	0.015	ug/m3			.003	17-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	17-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	17-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	17-SEP-2020
3288L1	Particulate; total suspended	16.0	ug/m3			1.3	14-SEP-2020

Login: **C266225**

Print Date: Dec. 02, 2020 09:44 AM By REPORTADMIN

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CODE DESCRIPTION
 <MDL LESS THAN METHOD DETECTION LIMIT

NON-TARGET TEXTUAL RESULT

Sample ID: C266225-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266225-0002	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266225-0003	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266225-0004	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266225-0005	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:

TEXT COMMENTS

Sample ID: C266225-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C266225
 Station ID: 27095
 AUTHORED BY: Grace Bu
 Date: September 17, 2020

These samples were received from the West Central Region. Samples were collected from the Haig Bowl Arena, 17 beach str. St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C266225-0001
 Filter number: 4956
 Sample Date: July 30, 2020

The sample was comprised of a light grey color glass filter in an envelope.

Login: C266225

NON- TARGET TEXTUAL RESULT

Sample ID: C266225-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter
- A few biological materials were found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 3 were calcite, 5 were dolomite, 2 were silica, 4 were biological materials and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (36%), O (45%), Si (18%)
Minor (Atomic %): Na, Al (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (16%), C (31%), O (48%)
Minor (Weight %): Na, Mg, Al, Si, Fe (<2%)
Mainly contained calcite.

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (22%), O (59%), Ca (9%), Mg (10%)
Minor (Atomic %): Si (<1%)
Mainly contained dolomite

Another spectrum showed the presence of the following elements:
Major (Weight%): C (50%), O (29%), Al (4%), Si (10%) and K (5%)
Minor (Weight %): Na, Fe (<1%)
Mainly contained silicates.

Sample ID: C266225-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266225-0002
Filter number: 4961
Sample Date: August 04, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.
- Trace synthetic fibers were present.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 3 were calcite, 5 were dolomite, 2 were silica, 3 were biological materials, 1 particle contained high titanium content and the rest particles were silicates.

The examples of EDX spectra were as below:

Login: C266225

NON- TARGET TEXTUAL RESULT

Sample ID: C266225-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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One spectrum showed the presence of the following elements:
Major (Atomic%): C (27%), O (61%), Ca (11%)
Minor (Atomic %): Na, Si (<1%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (38%), Si (13%), O (47%)
Minor (Atomic %): Na, Mg, Al, K, Ca (<2%)
Mainly contained silica.

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (23%), O (58%), Ca (9%), and Mg (10%)
Contained dolomite

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (33%), O (52%), and Ti (8%)
Minor (Atomic %): Si (3%), Na, Al (<2%) and Mg, K, Fe (<1%)
High titanium content particle

Sample ID: C266225-0003	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266225-0003
Filter number: 4973
Sample Date: August 08, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.
- Trace synthetic fibers were present.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 3 were calcite, 3 were dolomite, 2 were silica, 3 were biological materials, 1 was gypsum, 1 particle contained high titanium content and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (27%), O (55%), Ca (17%)
Minor (Atomic %): Na (<1%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (12%), Si (31%), O (57%)
Contained silica.

Login: C266225

NON- TARGET TEXTUAL RESULT

Sample ID: C266225-0003	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
Major (Weight%): C (33%), O (35%), Al (5%), Si(16%) and Fe(6%)
Minor (Weight %): Na, Mg, Ca (<1%) and K (3%)
Mainly contained silicates.

Another spectrum showed the presence of the following elements:
Major (Weight%): C (25%), O (46%), S (10%), Na (5%) and Ca (13%)
Minor (Weight %): Si (2%)
Mainly contained gypsum

Another spectrum showed the presence of the following elements:
Major (Weight %): C (53%), O (15%), Ti (18%), and Fe (12%)
Minor (Weight %): Na, Al, Si (<1%)
High titanium content particle.

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (20%), O (59%), Ca (11%), and Mg(10%)
Contained dolomite

Sample ID: C266225-0004	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266225-0004
Filter number: 4975
Sample Date: August 13, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 2 were calcite, 8 were dolomite, 3 were silica, 3 were biological materials, 1 particle contained relatively high titanium content and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Weight %): C (21%), O (53%), Ca (21%)
Minor (Weight %): Mg (2%) and Na, Al, Si (<2%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (22%), Si (28%), O (51%)
Mainly contained silica.

Login: C266225

NON- TARGET TEXTUAL RESULT

Sample ID: C266225-0004	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
Major (Weight%): C (26%), O (42%), Al (8%), and Si (16%)
Minor (Weight %): Na (4%), Ca (3%) and K, Fe (<1%)
Mainly contained silicates

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (24%), O (60%), Ca (7%), and Mg (8%)
Minor (Atomic %): Na and Si (<1%)
Mainly contained dolomite

Another spectrum showed the presence of the following elements:
Major (Weight %): C (36%), O (41%), Ti (5%), Ca (5%) and Si (6%)
Minor (Weight %): Na, Mg, S, K, Fe (<3%)
Relatively high titanium content particle

Sample ID: C266225-0005	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266225-0005
Filter number:4988
Sample Date: August 18, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.
- Trace synthetic fibers were present.
- Trace particles with reflective surface were found, likely metal fragments.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 1 was calcite, 4 were dolomite, 2 were silica, 4 were biological materials, 1 was gypsum, 2 particles contained high copper content, likely copper debris, and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic %): C (49%), O (41%), Si (10%)
Minor (Atomic %): Br (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (22%), Mg (8%), O (56%) and Ca (10%)
Minor (Atomic %): Na (2%) and Si (<1%)
Mainly contained dolomite.

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (45%), O (35%), Al (4%), K (4%) and Si (11%)

NON- TARGET TEXTUAL RESULT

Sample ID: C266225-0005	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Mainly contained silicates

Another spectrum showed the presence of the following elements:

Major (Atomic%): C (22%), O (56%), S (9%), and Ca (10%)

Minor (Atomic %): Na (2%)

Mainly contained gypsum

Another spectrum showed the presence of the following elements:

Major (Weight %): C (21%), O (10%) and Cu (63%)

Minor (Weight %): Na (4%), S (1%) and Si (<1%)

High copper content particle.

Summary/Conclusion:

C266225-0001, 0002, 0003, 0004 and 0005 mainly contained normal road dusts. Trace amounts of particles with high metal contents were found in sample C266225-0002, 0003, 0004 and 0005.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C266225-0001	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266225-0001	AG	E3092A	ID3092	2224	17-SEP-20
C266225-0001	AG	E3288A	TSP3288	2213	15-SEP-20
C266225-0002	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266225-0002	AG	E3092A	ID3092	2224	17-SEP-20
C266225-0002	AG	E3288A	TSP3288	2213	15-SEP-20
C266225-0003	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266225-0003	AG	E3092A	ID3092	2224	17-SEP-20
C266225-0003	AG	E3288A	TSP3288	2213	15-SEP-20
C266225-0004	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266225-0004	AG	E3092A	ID3092	2224	17-SEP-20
C266225-0004	AG	E3288A	TSP3288	2213	15-SEP-20
C266225-0005	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266225-0005	AG	E3092A	ID3092	2224	17-SEP-20
C266225-0005	AG	E3288A	TSP3288	2213	15-SEP-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

Login: **C266480**

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

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Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Sep. 28, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: 27097 GM SURVEY - HAIG BOWL AREANA

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Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
1	27097	27097 25/AUG/2020 5000 1631	Date	Time	Zone	
	Sample ID C266480-0001	Sample Comment Description	25 AUG 2020		5	

LIMS Products Requested:

AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG	E3288A	TSP3288
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UTM:

Zone	Easting	Northing	Collection Method	Map Datum	Accuracy (metres)
230	641239	4780939	GPS	NAD83	2-5M

Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
2	27097	27097 29/AUG/2020 5010 1631	Date	Time	Zone	
	Sample ID C266480-0002	Sample Comment Description	29 AUG 2020		5	

LIMS Products Requested:

AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG	E3288A	TSP3288
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Login: C266480

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Field ID:	1	2
Sample ID:	C266480-0001	C266480-0002
MOE*LIMS ID:	2020AG38-00001	2020AG38-00002
Station ID:	27097	27097
Collect Date:	25 AUG 2020	29 AUG 2020
Sample Location Description:	27097 25/AUG/2020 5000 1631	27097 29/AUG/2020 5010 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.042	ug/m3			.002	24-SEP-2020	0.037	ug/m3			.002	24-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	24-SEP-2020	.001	ug/m3	<MDL		.001	24-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	24-SEP-2020	.005	ug/m3	<MDL		.005	24-SEP-2020
	Chromium	.002	ug/m3	<MDL		.002	24-SEP-2020	.002	ug/m3	<MDL		.002	24-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	24-SEP-2020	.005	ug/m3	<MDL		.005	24-SEP-2020
	Iron	0.41	ug/m3			.005	24-SEP-2020	0.14	ug/m3			.005	24-SEP-2020
	Manganese	0.013	ug/m3			.003	24-SEP-2020	.003	ug/m3	<MDL		.003	24-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	24-SEP-2020	0.018	ug/m3			.002	24-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	24-SEP-2020	0.35	ug/m3			.001	24-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	23-SEP-2020	See Non-Target Textual result				0	23-SEP-2020
3288L1	Particulate; total suspended	27.0	ug/m3			1.3	22-SEP-2020	12.0	ug/m3			1.3	22-SEP-2020

Login: **C266480**

CODE DESCRIPTION
<MDL LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C266480-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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Sample ID: C266480-0002	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C266480-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C266480
Station ID: 27095
AUTHORED BY: Grace Bu
Date: September 23, 2020

These samples were received from the West Central Region. Samples were collected from the Haig Bowl Arena, 17 beech str. St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C266480-0001
Filter number: 5000
Sample Date: August 25, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Some biological materials were found.
- Trace synthetic fibers were also found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 2 were calcite, 3 were dolomite, 5 were silica, 3 were biological materials and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (22%), O (52%), Si (25%)
Minor (Atomic %): Na, Al (<1%)
Mainly contained silica

Login: C266480

NON- TARGET TEXTUAL RESULT

Sample ID: C266480-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (22%), C (26%), O (51%)
Minor (Weight %): Si (<1%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Weight %): C (27%), O (48%), Ca (13%), Mg (8%)
Minor (Weight %): Na, Si, Al (<2%)
Mainly contained dolomite

Another spectrum showed the presence of the following elements:
Major (Weight%): C (29%), O (44%), Al (5%), Si (15%) and K (6%)
Minor (Weight %): Na (<2%)
Mainly contained silicates

Sample ID: C266480-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266480-0002
Filter number: 5010
Sample Date: August 29, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size from 10 to 50 microns in diameter.
- Some biological materials were found.
- Trace synthetic fibers were also found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 5 were calcite, 5 were dolomite, 6 were silica, 15 were biological materials and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Weight %): C (31%), O (47%), Si (18%)
Minor (Weight %): Na (3%) and Al, Ca (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (25%), C (20%), O (50%)
Minor (Weight %): Na (4%) and Cu (<1%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (23%), O (57%), Ca (9%), Mg (10%)
Mainly contained dolomite

Login: C266480

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NON- TARGET TEXTUAL RESULT

Sample ID: C266480-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
 Major (Weight%): C (34%), O (38%), Na (5%), Al (6%), Si (17%)
 Minor (Weight %): Ca (<1%)
 Mainly contained silicates

Summary/Conclusion:

C266480-0001 and 0002 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C266480-0001	AG	E3070A	HIVOL3070	2225	24-SEP-20
C266480-0001	AG	E3092A	ID3092	2224	23-SEP-20
C266480-0001	AG	E3288A	TSP3288	2213	22-SEP-20
C266480-0002	AG	E3070A	HIVOL3070	2225	24-SEP-20
C266480-0002	AG	E3092A	ID3092	2224	23-SEP-20
C266480-0002	AG	E3288A	TSP3288	2213	22-SEP-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

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Login: **C267059**

Print Date: Oct. 28, 2020 09:05 AM By REPORTADMIN

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

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Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Oct. 28, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: GM SURVEY HAIG BOWL ARENA 17 BEECH ST ST. CATHARINES 27097

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Login: C267059

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Field Id	Station ID	Sample Location Description	Sampling			Sampler
1	27097	27097 07/OCT/2020 4984 1631	Date	Time	Zone	Information
	Sample ID	Sample Comment Description	07 OCT 2020		5	
	C267059-0001					
LIMS Products Requested:						
AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG E3288A TSP3288

Login: **C267059**

Print Date: Oct. 28, 2020 09:05 AM By REPORTADMIN

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Field ID: 1
 Sample ID: C267059-0001
 MOE*LIMS ID: 2020AG42-00025
 Station ID: 27097
 Collect Date: 07 OCT 2020
 Sample Location Description: 27097 07/OCT/2020 4984 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3070L1	Copper	0.03	ug/m3				.002	21-OCT-2020
	Nickel	.001	ug/m3	<MDL			.001	21-OCT-2020
	Cadmium	.005	ug/m3	<MDL			.005	21-OCT-2020
	Chromium	0.0022	ug/m3				.002	21-OCT-2020
	Lead	.005	ug/m3	<MDL			.005	21-OCT-2020
	Iron	0.21	ug/m3				.005	21-OCT-2020
	Manganese	0.008	ug/m3				.003	21-OCT-2020
	Vanadium	.002	ug/m3	<MDL			.002	21-OCT-2020
	Zinc	.001	ug/m3	<MDL			.001	21-OCT-2020
3092L1	NT: Identification	See Non-Target Textual result					0	22-OCT-2020
3288L1	Particulate; total suspended	12.0	ug/m3				1.3	20-OCT-2020

Login: C267059

CODE	DESCRIPTION
<MDL	LESS THAN METHOD DETECTION LIMIT

NON-TARGET TEXTUAL RESULT

Sample ID: C267059-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C267059-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C267059
Station ID: 27097
AUTHORED BY: Grace Bu
Date: October 19, 2020

These samples were received from the West Central Region. Samples were collected from the Haig Bowl Arena, 17 beech str. St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C267059-0001
Filter number: 4984
Sample Date: October 07, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Trace biological materials were found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 2 were calcite, 5 were dolomite, 3 contained iron oxide and the rest particles were likely silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (42%), O (32%), Fe (19%)
Minor (Atomic %): Na, Mg, Al, Si, S, Ca, Mn, Cu, Zn, Sn (<1%)
Likely contained Iron oxide

Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (18%), C (43%), O (36%)
Minor (Weight %): Na, Mg, Al, Si, S, Fe (<1%)
Contained calcite

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NON- TARGET TEXTUAL RESULT

Sample ID: C267059-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
 Major (Atomic %): C (27%), O (56%), Ca (8%), Mg (8%)
 Minor (Atomic %): Na, Si (<1%)
 Mainly contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight%): C (39%), O (46%), Al (5%), Si (7%)
 Minor (Weight %): Mg, K, Ca, Fe (<1%), Na (<2%)
 Contained silicates

Summary/Conclusion:

C267059-0001 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C267059-0001	AG	E3070A	HIVOL3070	2225	22-OCT-20
C267059-0001	AG	E3092A	ID3092	2224	22-OCT-20
C267059-0001	AG	E3288A	TSP3288	2213	21-OCT-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

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Login: **C267293**

Print Date: Nov. 04, 2020 07:51 AM By REPORTADMIN

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

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HAMILTON,ONT
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Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Nov. 04, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: GM SURVEY HAIG BOWL ARENA 17 BEECH ST. ST. CATHARINES

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Field Id 1	Station ID 27097	Sample Location Description 27097 16/OCT/2020 4987 1631	Sampling Date 16 OCT 2020	Time Zone 5	Sampler Information
	Sample ID C267293-0001	Sample Comment Description			
LIMS Products Requested:					
AG	E3070A	HIVOL3070	AG	E3092A	ID3092
			AG	E3288A	TSP3288

Field Id 2	Station ID 27097	Sample Location Description 27097 24/OCT/2020 5072 1631	Sampling Date 24 OCT 2020	Time Zone 5	Sampler Information
	Sample ID C267293-0002	Sample Comment Description			
LIMS Products Requested:					
AG	E3070A	HIVOL3070	AG	E3092A	ID3092
			AG	E3288A	TSP3288

Login: C267293

Print Date: Nov. 04, 2020 07:51 AM By REPORTADMIN

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Field ID:		1						2							
Sample ID:		C267293-0001						C267293-0002							
MOE*LIMS ID:		2020AG44-00003						2020AG44-00004							
Station ID:		27097						27097							
Collect Date:		16 OCT 2020						24 OCT 2020							
Sample Location Description:		27097 16/OCT/2020 4987 1631						27097 24/OCT/2020 5072 1631							
Sample Comments Description:															
Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3070L1	Copper	0.048	ug/m3				.002	02-NOV-2020	0.029	ug/m3				.002	02-NOV-2020
	Nickel	.001	ug/m3	<MDL			.001	02-NOV-2020	.001	ug/m3	<MDL			.001	02-NOV-2020
	Cadmium	.005	ug/m3	<MDL			.005	02-NOV-2020	.005	ug/m3	<MDL			.005	02-NOV-2020
	Chromium	.002	ug/m3	<MDL			.002	02-NOV-2020	.002	ug/m3	<MDL			.002	02-NOV-2020
	Lead	.005	ug/m3	<MDL			.005	02-NOV-2020	.005	ug/m3	<MDL			.005	02-NOV-2020
	Iron	0.26	ug/m3				.005	02-NOV-2020	0.098	ug/m3				.005	02-NOV-2020
	Manganese	0.013	ug/m3				.003	02-NOV-2020	.003	ug/m3	<MDL			.003	02-NOV-2020
	Vanadium	.002	ug/m3	<MDL			.002	02-NOV-2020	0.02	ug/m3				.002	02-NOV-2020
	Zinc	.001	ug/m3	<MDL			.001	02-NOV-2020	0.37	ug/m3				.001	02-NOV-2020
3092L1	NT: Identification	See Non-Target Textual result					0	02-NOV-2020	See Non-Target Textual result					0	02-NOV-2020
3288L1	Particulate; total suspended	17.0	ug/m3				1.3	30-OCT-2020	5.00	ug/m3				1.3	30-OCT-2020

Login: **C267293**

CODE DESCRIPTION
<MDL LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C267293-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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Sample ID: C267293-0002	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C267293-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C267293
Station ID: 27097
AUTHORED BY: Grace Bu
Date: October 30, 2020

These samples were received from the West Central Region. Samples were collected from 17 Beech St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C267293-0001
Filter number: 4987
Sample Date: October 16, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Some biological materials were found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 5 were calcite, 14 were dolomite, 3 were silica, 2 biological materials, the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Weight%): C (30%), O (48%), Si (18%)
Minor (Weight%): Na (3%), Al (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:

Login: C267293

NON- TARGET TEXTUAL RESULT

Sample ID: C267293-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Major (Weight%): Ca (25%), C (19%), O (56%)
Minor (Weight %): Si (<1%)
Likely contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (24%), O (56%), Ca (11%), Mg (9%)
Minor (Atomic%): Si (<1%)
Contained dolomite

Another spectrum showed the presence of the following elements:
Major (Weight%): C (27%), O (46%), Al (5%), Si (15%) and K (5%)
Minor (Weight %): Na, Ca (<1%)
Likely contained feldspar silicates

Another spectrum showed the presence of the following elements:
Major (Weight%): C (70%), O (28%)
Minor (Weight %): Na (<1%)
Likely contained biological materials

Sample ID: C267293-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C267293-0002
Filter number: 5072
Sample Date: October 24, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Some biological materials were found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 2 were calcite, 3 were dolomite, 3 were silica, 3 were biological materials, 1 contained high content of titanium and iron, the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (21%), O (45%), Si (33%)
Minor (Atomic %): Na (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (17%), C (27%), O (50%)
Minor (Weight %): Na, Mg, Al, S, Fe (<2%), Si (2%)
Likely contained calcite

Login: C267293

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NON- TARGET TEXTUAL RESULT

Sample ID: C267293-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
 Major (Weight %): C (29%), O (49%), Ca (12%), Mg (7%)
 Minor (Weight %): Na, Al, Si, S, K, Fe (<1%)
 Contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight%): C (24%), O (44%), Al (7%), Si (17%), Na (5%)
 Minor (Weight %): Ca (<2%)
 Likely contained silicates

Another spectrum showed the presence of the following elements:
 Major (Weight%): C (27%), O (36%), Ti (12%), Si (7%), Fe (12%)
 Minor (Weight %): Mg, Al, Ca, Mn (<2%)
 Likely contained silicates

Summary/Conclusion:

C267293-0001 and C267293-0002 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C267293-0001	AG	E3070A	HIVOL3070	2225	02-NOV-20
C267293-0001	AG	E3092A	ID3092	2224	02-NOV-20
C267293-0001	AG	E3288A	TSP3288	2213	30-OCT-20
C267293-0002	AG	E3070A	HIVOL3070	2225	02-NOV-20
C267293-0002	AG	E3092A	ID3092	2224	02-NOV-20
C267293-0002	AG	E3288A	TSP3288	2213	30-OCT-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

Login: **C266226**

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

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Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Sep. 17, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: 27094 GM SURVEY - REGION OF NIAGARA CARLTON ST RESERVOIR - M. ORSINI 289-442-7659

The results relate only to items tested.

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Field Id 1	Station ID 27094	Sample Location Description 27094 30/JUL/2020 4957 1631	Sampling Date	Time	Zone	Sampler Information
	Sample ID C266226-0001	Sample Comment Description	30 JUL 2020		5	

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

UTM:

Zone	Easting	Northing	Collection Method	Map Datum	Accuracy (metres)
230	641239	4780939	GPS	NAD83	2-5M

Field Id 2	Station ID 27094	Sample Location Description 27094 04/AUG/2020 4960 1631	Sampling Date	Time	Zone	Sampler Information
	Sample ID C266226-0002	Sample Comment Description	04 AUG 2020		5	

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Field Id 3	Station ID 27094	Sample Location Description 27094 08/AUG/2020 4972 1631	Sampling Date	Time	Zone	Sampler Information
	Sample ID C266226-0003	Sample Comment Description	08 AUG 2020		5	

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Field Id 4	Station ID 27094	Sample Location Description 27094 13/AUG/2020 4974 1631	Sampling Date	Time	Zone	Sampler Information
	Sample ID C266226-0004	Sample Comment Description	13 AUG 2020		5	

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Field Id 5	Station ID 27094	Sample Location Description 27094 18/AUG/2020 4989 1631	Sampling Date	Time	Zone	Sampler Information
	Sample ID C266226-0005	Sample Comment Description	18 AUG 2020		5	

LIMS Products Requested:

AG E3070A HIVOL3070

AG E3092A ID3092

AG E3288A TSP3288

Login: C266226

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Field ID:	1	2
Sample ID:	C266226-0001	C266226-0002
MOE*LIMS ID:	2020AG35-00011	2020AG35-00012
Station ID:	27094	27094
Collect Date:	30 JUL 2020	04 AUG 2020
Sample Location Description:	27094 30/JUL/2020 4957 1631	27094 04/AUG/2020 4960 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.081	ug/m3			.002	17-SEP-2020	0.054	ug/m3			.002	17-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	17-SEP-2020	.005	ug/m3	<MDL		.005	17-SEP-2020
	Chromium	0.0020	ug/m3			.002	17-SEP-2020	.002	ug/m3	<MDL		.002	17-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	17-SEP-2020	.005	ug/m3	<MDL		.005	17-SEP-2020
	Iron	0.36	ug/m3			.005	17-SEP-2020	0.10	ug/m3			.005	17-SEP-2020
	Manganese	0.013	ug/m3			.003	17-SEP-2020	0.005	ug/m3			.003	17-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	17-SEP-2020	.002	ug/m3	<MDL		.002	17-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	17-SEP-2020	See Non-Target Textual result				0	17-SEP-2020
3288L1	Particulate; total suspended	19.0	ug/m3			1.3	14-SEP-2020	6.00	ug/m3			1.3	14-SEP-2020

Login: C266226

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Field ID:	3	4
Sample ID:	C266226-0003	C266226-0004
MOE*LIMS ID:	2020AG35-00013	2020AG35-00014
Station ID:	27094	27094
Collect Date:	08 AUG 2020	13 AUG 2020
Sample Location Description:	27094 08/AUG/2020 4972 1631	27094 13/AUG/2020 4974 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.055	ug/m3			.002	17-SEP-2020	0.34	ug/m3			.002	17-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	17-SEP-2020	.005	ug/m3	<MDL		.005	17-SEP-2020
	Chromium	.002	ug/m3	<MDL		.002	17-SEP-2020	0.0054	ug/m3			.002	17-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	17-SEP-2020	0.0053	ug/m3			.005	17-SEP-2020
	Iron	0.24	ug/m3			.005	17-SEP-2020	0.95	ug/m3			.005	17-SEP-2020
	Manganese	0.010	ug/m3			.003	17-SEP-2020	0.032	ug/m3			.003	17-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	17-SEP-2020	0.0030	ug/m3			.002	17-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	17-SEP-2020	.001	ug/m3	<MDL		.001	17-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	17-SEP-2020	See Non-Target Textual result				0	17-SEP-2020
3288L1	Particulate; total suspended	14.0	ug/m3			1.3	14-SEP-2020	60.0	ug/m3			1.3	14-SEP-2020

Login: **C266226**

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Field ID: 5
 Sample ID: C266226-0005
 MOE*LIMS ID: 2020AG35-00015
 Station ID: 27094
 Collect Date: 18 AUG 2020
 Sample Location Description: 27094 18/AUG/2020 4989 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	MDL	Analysis Date
3070L1	Copper	0.069	ug/m3			.002	17-SEP-2020
	Nickel	.001	ug/m3	<MDL		.001	17-SEP-2020
	Cadmium	.005	ug/m3	<MDL		.005	17-SEP-2020
	Chromium	.002	ug/m3	<MDL		.002	17-SEP-2020
	Lead	.005	ug/m3	<MDL		.005	17-SEP-2020
	Iron	0.22	ug/m3			.005	17-SEP-2020
	Manganese	0.009	ug/m3			.003	17-SEP-2020
	Vanadium	.002	ug/m3	<MDL		.002	17-SEP-2020
	Zinc	.001	ug/m3	<MDL		.001	17-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result				0	17-SEP-2020
3288L1	Particulate; total suspended	13.0	ug/m3			1.3	14-SEP-2020

Login: **C266226**

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CODE DESCRIPTION
 <MDL LESS THAN METHOD DETECTION LIMIT

NON-TARGET TEXTUAL RESULT

Sample ID: C266226-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266226-0002	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266226-0003	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266226-0004	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
Sample ID: C266226-0005	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:

TEXT COMMENTS

Sample ID: C266226-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C266226
 Station ID: 27094
 AUTHORED BY: Grace Bu
 Date: September 17, 2020

These samples were received from the West Central Region. The samples were collected from the Region of Niagara Carlton Str. Reservoir, 15 Carlton Str. St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C266226-0001
 Filter number: 4957
 Sample Date: July 30, 2020

The sample was comprised of a light grey color glass filter in an envelope.

Login: C266226

NON- TARGET TEXTUAL RESULT

Sample ID: C266226-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.
- Trace synthetic fibers were present.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 3 were calcite, 7 were dolomite, 3 were silica, 7 were biological materials and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (21%), O (60%), Mg (10%) and Ca (9%)
Minor (Atomic %): Si (<1%)
Mainly contained dolomite

Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (21%), C (24%) and O (53%)
Minor (Weight %): Na, Cu, Si (<2%)
Mainly contained calcite.

Another spectrum showed the presence of the following elements:
Major (Weight %): C (13%), O (54%), and Si (28%)
Minor (Weight %): Ca (3%) and Na, Mg, Al (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Weight%): C (23%), O (46%), Al (7%) and Si (14%)
Minor (Weight %): Na (3%), Fe (3%) and Mg, K, Ca (<2%)
Mainly contained silicates.

Sample ID: C266226-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266226-0002
Filter number: 4960
Sample Date: August 04, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.
- Trace synthetic fibers were present.
- Trace particles with reflective surface were found, likely metal fragments.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 3 were calcite, 8 were dolomite, 4 were silica, 4 were biological materials, 1 was gypsum and the rest particles were silicates.

Login: C266226

NON- TARGET TEXTUAL RESULT

Sample ID: C266226-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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The examples of EDX spectra were as below:

One spectrum showed the presence of the following elements:

Major (Atomic%): C (35%), O (53%), Mg (6%) and Ca (5%)

Minor (Atomic %): Na, Si, Cu (<1%)

Mainly contained dolomite

Another spectrum showed the presence of the following elements:

Major (Atomic %): C (28%), O (57%), and Si (14%)

Contained silica

Another spectrum showed the presence of the following elements:

Major (Weight %): C (14%), O (46%), Na (7%), Al (10%) and Si (21%)

Minor (Weight %): Ca (3%)

Mainly contained silicates

Another spectrum showed the presence of the following elements:

Major (Weight %): C (26%), O (49%) and Ca (23%)

Minor (Weight %): Na, Si (<2%)

Mainly contained calcite

Another spectrum showed the presence of the following elements:

Major (Atomic%): C (35%), O (52%), S (5%) and Ca (6%)

Minor (Atomic %): Na, Si (<2%)

Mainly contained gypsum

Sample ID: C266226-0003	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266226-0003

Filter number: 4972

Sample Date: August 08, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:

- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.

- A few biological materials were found.

- Trace particles with reflective surface were found, likely metal fragments.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 3 were calcite, 4 were dolomite, 3 were silica, 4 were biological materials, 1 particle contained high iron content, likely iron sulfate, and the rest particles were silicates.

The examples of EDX spectra were as below:

Login: C266226

NON- TARGET TEXTUAL RESULT

Sample ID: C266226-0003	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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One spectrum showed the presence of the following elements:
Major (Weight %): C (33%), O (41%), K (5%) and Si (14%)
Minor (Weight %): Na, Mg, S, Ca, Fe (<2%) and Al (4%)
Mainly contained silicates

Another spectrum showed the presence of the following elements:
Major (Weight %): C (24%), O (57%), Ca (17%)
Minor (Weight %): Na, Si (<2%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (22%), O (58%), Mg (9%) and Ca (11%)
Minor (Atomic %): Fe (<1%)
Mainly contained dolomite

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (28%), O (56%) and Si (16%)
Contained silica

Another spectrum showed the presence of the following elements:
Major (Weight %): C (21%), O (21%), S (19%) and Fe (28%)
Minor (Weight %): Na (3%), Si (3%) and Mg, Al, K, Ca (<2%)
A particle with high iron and sulfur content.

Sample ID: C266226-0004	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266226-0004
Filter number: 4974
Sample Date: August 13, 2020

The sample was comprised of a grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.
- Trace tire wires and fly ash were also found.
- Trace particles with reflective surface were present, likely metal fragments.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 1 was calcite, 1 was dolomite, 3 were silica, 4 were biological materials, 1 was iron oxide and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic %): C (15%), O (59%) and Si (24%)

Login: C266226

NON- TARGET TEXTUAL RESULT

Sample ID: C266226-0004	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Minor (Atomic %): Na, Mg, Al, K (<1%)
Contained silica

Another spectrum showed the presence of the following elements:
Major (Weight %): C (18%), O (49%), Al (7%), Na (5%) and Si (16%)
Minor (Weight %): Mg (1%) and K, Fe (2%)
Mainly contained silicates

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (20%), O (58%) and Ca (21%)
Minor (Atomic %): Al, Si, K (<1%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (22%), O (61%), Mg (9%) and Ca (8%)
Minor (Atomic %): Na, S (<1%)
Mainly contained dolomite

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (24%), O (44%) and Fe (18%)
Minor (Atomic %): Na (3%) and Si, Cl, Ca, Cu (<1%)
Mainly contained iron oxide

Sample ID: C266226-0005	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266226-0005
Filter number: 4989
Sample Date: August 18, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Color and colorless minerals were present, mainly at the size from 5 to 40 microns in diameter.
- A few biological materials were found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 40 randomly selected particles scanned: 8 was dolomite, 5 were silica, 8 were biological materials, 1 particle was likely clinker dust and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic %): C (27%), O (54%), Mg (9%) and Ca (9%)
Minor (Atomic %): Si, Cu (<1%)
Mainly contained dolomite

NON- TARGET TEXTUAL RESULT

Sample ID: C266226-0005	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
 Major (Weight %): C (37%), O (40%) and Si (11%)
 Minor (Weight %): Na (3%), Al (4%) and K (4%)
 Mainly contained silicates

Another spectrum showed the presence of the following elements:
 Major (Atomic %): O (61%) and Si (38%)
 Minor (Atomic %): Al (<1%)
 Contained silica

Another spectrum showed the presence of the following elements:
 Major (Weight %): C (21%), O (48%) and Ca (27%)
 Minor (Weight %): Na (3%) and Si (1%)
 Mainly contained calcite

Another spectrum showed the presence of the following elements:
 Major (Atomic %): C (27%), O (55%), Si (4%) and Ca (10%)
 Minor (Atomic %): Na (3%) and Mg, Al (<1%)
 Likely contained clinker dust

Summary/Conclusion:

C266226-0001, 0002, 0003, 0004 and 0005 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C266226-0001	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266226-0001	AG	E3092A	ID3092	2224	17-SEP-20
C266226-0001	AG	E3288A	TSP3288	2213	15-SEP-20
C266226-0002	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266226-0002	AG	E3092A	ID3092	2224	17-SEP-20
C266226-0002	AG	E3288A	TSP3288	2213	15-SEP-20
C266226-0003	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266226-0003	AG	E3092A	ID3092	2224	17-SEP-20
C266226-0003	AG	E3288A	TSP3288	2213	15-SEP-20
C266226-0004	AG	E3070A	HIVOL3070	2225	17-SEP-20

C266226-0004	AG	E3092A	ID3092	2224	17-SEP-20
C266226-0004	AG	E3288A	TSP3288	2213	15-SEP-20
C266226-0005	AG	E3070A	HIVOL3070	2225	17-SEP-20
C266226-0005	AG	E3092A	ID3092	2224	17-SEP-20
C266226-0005	AG	E3288A	TSP3288	2213	15-SEP-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

Login: **C266481**

Print Date: Sep. 28, 2020 06:09 PM By REPORTADMIN

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

Mail this copy to :

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MOE - HAMILTON REGIONAL OFFICE
119 KING STREET WEST, 12TH FLOOR
HAMILTON,ONT
L8P 4Y7

Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Sep. 28, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: 27094 GM SURVEY - REGION OF NIAGARA CARLTON ST. RESERVOIR

The results relate only to items tested.

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Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
1	27094	27094 25/AUG/2020 5001 1631	Date	Time	Zone	
	Sample ID C266481-0001	Sample Comment Description	25 AUG 2020		5	

LIMS Products Requested:

AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG	E3288A	TSP3288
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UTM:

Zone	Easting	Northing	Collection Method	Map Datum	Accuracy (metres)
230	641239	4780939	GPS	NAD83	2-5M

Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
2	27094	27094 29/AUG/2020 5011 1631	Date	Time	Zone	
	Sample ID C266481-0002	Sample Comment Description	29 AUG 2020		5	

LIMS Products Requested:

AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG	E3288A	TSP3288
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Sample Comments Description:		1							2						
Field ID:		C266481-0001							C266481-0002						
Sample ID:		2020AG38-00003							2020AG38-00004						
MOE*LIMS ID:		27094							27094						
Station ID:		25 AUG 2020							29 AUG 2020						
Collect Date:		27094 25/AUG/2020 5001 1631							27094 29/AUG/2020 5011 1631						
Sample Location Description:															
Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3070L1	Copper	0.075	ug/m3				.002	24-SEP-2020	0.041	ug/m3				.002	24-SEP-2020
	Nickel	.001	ug/m3	<MDL			.001	24-SEP-2020	.001	ug/m3	<MDL			.001	24-SEP-2020
	Cadmium	.005	ug/m3	<MDL			.005	24-SEP-2020	.005	ug/m3	<MDL			.005	24-SEP-2020
	Chromium	.002	ug/m3	<MDL			.002	24-SEP-2020	.002	ug/m3	<MDL			.002	24-SEP-2020
	Lead	.005	ug/m3	<MDL			.005	24-SEP-2020	.005	ug/m3	<MDL			.005	24-SEP-2020
	Iron	0.39	ug/m3				.005	24-SEP-2020	0.13	ug/m3				.005	24-SEP-2020
	Manganese	0.013	ug/m3				.003	24-SEP-2020	0.007	ug/m3				.003	24-SEP-2020
	Vanadium	0.019	ug/m3				.002	24-SEP-2020	0.022	ug/m3				.002	24-SEP-2020
	Zinc	0.37	ug/m3				.001	24-SEP-2020	0.36	ug/m3				.001	24-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result					0	23-SEP-2020	See Non-Target Textual result					0	23-SEP-2020
3288L1	Particulate; total suspended	29.0	ug/m3				1.3	22-SEP-2020	4.00	ug/m3				1.3	22-SEP-2020

Login: C266481

Print Date: Sep. 28, 2020 06:09 PM By REPORTADMIN

**** REPRINTED ****

CODE DESCRIPTION
<MDL LESS THAN METHOD DETECTION LIMIT

NON-TARGET TEXTUAL RESULT

Sample ID: C266481-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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Sample ID: C266481-0002	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C266481-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C266481
Station ID: 27094
AUTHORED BY: Grace Bu
Date: September 23, 2020

These samples were received from the West Central Region. Samples were collected from the Region of Niagara Carlton St. Reservoir, 15 Carlton St, Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C266481-0001
Filter number: 5001
Sample Date: August 25, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter
- Some biological materials were found.
- Trace tire wear particles were also found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 4 were calcite, 6 were dolomite, 5 were silica, 8 were biological materials and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Weight %): C (12%), O (38%), Si (50%)
Mainly contained silica

Another spectrum showed the presence of the following elements:

NON- TARGET TEXTUAL RESULT

Sample ID: C266481-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Major (Weight%): Ca (28%), C (18%), O (51%)
Minor (Weight %): Na, Mg, Si (<2%)
Mainly contained calcite.

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (28%), O (56%), Ca (7%), Mg (8%)
Minor (Atomic %): Na (<1%)
Mainly contained dolomite
Another spectrum showed the presence of the following elements:
Major (Weight%): C (20%), O (50%), Si (22%)
Minor (Weight %): Al (4%), K (4%) and Na (<2%)
Mainly contained silicates.

Sample ID: C266481-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C266481-0002
Filter number: 5011
Sample Date: August 29, 2020

The sample was comprised of a light grey color glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size from 10 to 50 microns in diameter
- Some biological materials were found.
- Trace tire wear particles were also found.
- Trace white paint sphere were also present.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 4 were calcite, 3 were dolomite, 2 were silica, 15 were biological materials and the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic %): C (58%), O (27%), Si (15%)
Minor (Atomic %): Na (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Atomic %): Ca (13%), C (26%), O (61%)
Minor (Atomic %): Mg, Si (<1%)
Mainly contained calcite

Another spectrum showed the presence of the following elements:

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NON- TARGET TEXTUAL RESULT

Sample ID: C266481-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Major (Atomic %): C (24%), O (60%), Ca (8%), Mg (9%)
 Mainly contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight %): C (8%), O (47%), Na (8%), Al (9%), Si (27%)
 Minor (Weight %): Ca, Fe (<1%)
 Mainly contained silicates

Summary/Conclusion:

C266481-0001 and 0002 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C266481-0001	AG	E3070A	HIVOL3070	2225	24-SEP-20
C266481-0001	AG	E3092A	ID3092	2224	23-SEP-20
C266481-0001	AG	E3288A	TSP3288	2213	22-SEP-20
C266481-0002	AG	E3070A	HIVOL3070	2225	24-SEP-20
C266481-0002	AG	E3092A	ID3092	2224	23-SEP-20
C266481-0002	AG	E3288A	TSP3288	2213	22-SEP-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ****

Login: **C267060**

Print Date: Oct. 28, 2020 09:06 AM By REPORTADMIN

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Program Code 130113102 Program: MOE OPERATIONS DIVISION
 Study: AIR,INDUSTRY,PRIVATE NETWORKS
 Project: WEST CENTRAL REG. TECH SUPPORT
 Activity: POINT SOURCE MONITORING
 Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

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HAMILTON,ONT
L8P 4Y7

Final reports to : WCR-AIR-DATA
 ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Oct. 28, 2020

Inquiries to : ROBERT TOOLEY
 JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: GM SURVEY REGION OF NIAGARA CARLTON ST RESERVOIR 15 CARLTON ST ST. CATHARINES

The results relate only to items tested.

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Login: C267060

Print Date: Oct. 28, 2020 09:06 AM By REPORTADMIN

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Field Id	Station ID	Sample Location Description	Sampling			Sampler
1	27094	27094 07/OCT/2020 4985 1631	Date	Time	Zone	Information
	Sample ID	Sample Comment Description	07 OCT 2020		5	
	C267060-0001					
LIMS Products Requested:						
AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG E3288A TSP3288

Login: **C267060**

Print Date: Oct. 28, 2020 09:06 AM By REPORTADMIN

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Field ID: 1
 Sample ID: C267060-0001
 MOE*LIMS ID: 2020AG42-00026
 Station ID: 27094
 Collect Date: 07 OCT 2020
 Sample Location Description: 27094 07/OCT/2020 4985 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3070L1	Copper	0.052	ug/m3				.002	21-OCT-2020
	Nickel	.001	ug/m3	<MDL			.001	21-OCT-2020
	Cadmium	.005	ug/m3	<MDL			.005	21-OCT-2020
	Chromium	.002	ug/m3	<MDL			.002	21-OCT-2020
	Lead	.005	ug/m3	<MDL			.005	21-OCT-2020
	Iron	0.19	ug/m3				.005	21-OCT-2020
	Manganese	0.007	ug/m3				.003	21-OCT-2020
	Vanadium	.002	ug/m3	<MDL			.002	21-OCT-2020
	Zinc	.001	ug/m3	<MDL			.001	21-OCT-2020
3092L1	NT: Identification	See Non-Target Textual result					0	22-OCT-2020
3288L1	Particulate; total suspended	12.0	ug/m3				1.3	20-OCT-2020

Login: **C267060**

CODE	DESCRIPTION
<MDL	LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C267060-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C267060-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C267060
Station ID: 27094
AUTHORED BY: Grace Bu
Date: October 19, 2020

These samples were received from the West Central Region. Samples were collected from 15 Carlton. St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C267060-0001
Filter number: 4985
Sample Date: October 07, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Trace biological materials were found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 2 were calcite, 5 were dolomite, 2 were silica, the rest particles were likely silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Atomic%): C (53%), O (36%), Si (11%)
Minor (Atomic %): Na, Ca (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:
Major (Weight%): Ca (24%), C (19%), O (45%)
Minor (Weight %): Na, Al, Si, S (<2%), Fe (3%), Mg (3%)
Likely contained calcite

Login: C267060

Print Date: Oct. 28, 2020 09:06 AM By REPORTADMIN

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NON- TARGET TEXTUAL RESULT

Sample ID: C267060-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
 Major (Weight %): C (20%), O(52%), Ca (16%), Mg (10%)
 Minor (Weight %): Na, Si, Mn, Fe (<1%)
 Contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight%): C (41%), O (38%), Al (4%), Si (11%) and K (4%)
 Minor (Weight %): Na (<2%), Ca (<1%)
 Likely contained feldspar silicates

Summary/Conclusion:

C267060-0001 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C267060-0001	AG	E3070A	HIVOL3070	2225	22-OCT-20
C267060-0001	AG	E3092A	ID3092	2224	22-OCT-20
C267060-0001	AG	E3288A	TSP3288	2213	21-OCT-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ****

Login: **C267292**

Print Date: Nov. 04, 2020 07:50 AM By REPORTADMIN

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

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Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Nov. 04, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: GM SURVEY REGION OF NIAGARA CARLTON ST RESERVOIR 15 CARLTON ST ST. CATHARINES

The results relate only to items tested.

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Login: **C267292**

Print Date: Nov. 04, 2020 07:50 AM By REPORTADMIN

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Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
1	27094	27094 16/OCT/2020 4986 1631	Date	Time	Zone	
	Sample ID C267292-0001	Sample Comment Description	16 OCT 2020		5	
LIMS Products Requested:						
AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG E3288A TSP3288

Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
2	27094	27094 24/OCT/2020 5073 1631	Date	Time	Zone	
	Sample ID C267292-0002	Sample Comment Description	24 OCT 2020		5	
LIMS Products Requested:						
AG	E3070A	HIVOL3070	AG	E3092A	ID3092	AG E3288A TSP3288

Login: C267292

Print Date: Nov. 04, 2020 07:50 AM By REPORTADMIN

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Field ID:	1	2
Sample ID:	C267292-0001	C267292-0002
MOE*LIMS ID:	2020AG44-00001	2020AG44-00002
Station ID:	27094	27094
Collect Date:	16 OCT 2020	24 OCT 2020
Sample Location Description:	27094 16/OCT/2020 4986 1631	27094 24/OCT/2020 5073 1631

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3070L1	Copper	0.06	ug/m3				.002	02-NOV-2020	0.051	ug/m3				.002	02-NOV-2020
	Nickel	.001	ug/m3	<MDL			.001	02-NOV-2020	.001	ug/m3	<MDL			.001	02-NOV-2020
	Cadmium	.005	ug/m3	<MDL			.005	02-NOV-2020	.005	ug/m3	<MDL			.005	02-NOV-2020
	Chromium	.002	ug/m3	<MDL			.002	02-NOV-2020	.002	ug/m3	<MDL			.002	02-NOV-2020
	Lead	.005	ug/m3	<MDL			.005	02-NOV-2020	.005	ug/m3	<MDL			.005	02-NOV-2020
	Iron	0.27	ug/m3				.005	02-NOV-2020	0.11	ug/m3				.005	02-NOV-2020
	Manganese	0.010	ug/m3				.003	02-NOV-2020	0.005	ug/m3				.003	02-NOV-2020
	Vanadium	.002	ug/m3	<MDL			.002	02-NOV-2020	0.019	ug/m3				.002	02-NOV-2020
	Zinc	.001	ug/m3	<MDL			.001	02-NOV-2020	0.39	ug/m3				.001	02-NOV-2020
3092L1	NT: Identification	See Non-Target Textual result					0	02-NOV-2020	See Non-Target Textual result					0	02-NOV-2020
3288L1	Particulate; total suspended	21.0	ug/m3				1.3	30-OCT-2020	4.00	ug/m3				1.3	30-OCT-2020

Login: C267292

CODE DESCRIPTION
<MDL LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C267292-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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Sample ID: C267292-0002	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C267292-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C267292
Station ID: 27094
AUTHORED BY: Grace Bu
Date: October 30, 2020

These samples were received from the West Central Region. Samples were collected from 15 Carlton. St. Catherine, ON.

The samples were examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C267292-0001
Filter number: 4986
Sample Date: October 16, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Some biological materials were found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 3 were calcite, 5 were dolomite, 1 was silica, 6 were biological materials, 1 was like iron oxide, the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Weight%): C (30%), O (46%), Si (19%)
Minor (Weight%): Na (2%), Mg, Al, S, K, Ca, Fe (<1%)
Mainly contained silica

Another spectrum showed the presence of the following elements:

Login: C267292

NON- TARGET TEXTUAL RESULT

Sample ID: C267292-0001	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Major (Weight%): Ca (26%), C (24%), O (47%)
Minor (Weight %): Na, Al, Si (<2%)
Likely contained calcite

Another spectrum showed the presence of the following elements:
Major (Atomic %): C (27%), O (55%), Ca (8%), Mg (8%)
Minor (Atomic %): Na, Si (<2%)
Contained dolomite

Another spectrum showed the presence of the following elements:
Major (Weight%): C (37%), O (38%), Al (6%), Si (11%), Fe (4%)
Minor (Weight %): Na (3%), Mg, S, Cl, K (<2%)
Likely contained silicates

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (21%), O (52%), Fe (21%)
Minor (Atomic%): Na (3%), Al, Si, S, Ca, Cr, Mn (<2%)
Likely contained iron oxide

Another spectrum showed the presence of the following elements:
Major (Atomic%): C (70%), O (27%)
Minor (Atomic%): Na (2%), Si (<1%)
Likely contained biological materials

Sample ID: C267292-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Lab Sample No: C267292-0002
Filter number: 5073
Sample Date: October 24, 2020

The sample was comprised of a light grey colored glass filter in an envelope.

View of the filter under microscopes showed:
- Colored and colorless minerals were present, mainly at the size of 10 to 50 microns in diameter.
- Some biological materials were found.

- SEM-EDXRA Analysis (SEMI-QUANTITATIVE): Out of 45 randomly selected particles scanned: 12 were calcite, 8 were dolomite, 5 were silica, 3 were biological materials, 1 was like iron oxide, the rest particles were silicates.

The examples of EDX spectra were as below:
One spectrum showed the presence of the following elements:
Major (Weight%): C (30%), O (48%), Si (20%)
Minor (Weight%): Na, Al, K (<1%)
Mainly contained silica

NON- TARGET TEXTUAL RESULT

Sample ID: C267292-0002	Matrix : HiVol - Glassfibre	Method : E3092A	Product: ID3092	Parameter: NT: Identification
-------------------------	-----------------------------	-----------------	-----------------	-------------------------------

Another spectrum showed the presence of the following elements:
 Major (Weight%): Ca (28%), C (15%), O (56%)
 Minor (Weight %): Si (<1%)
 Likely contained calcite

Another spectrum showed the presence of the following elements:
 Major (Atomic %): C (14%), O (64%), Ca (12%), Mg (8%)
 Minor (Atomic %): Na, Si, Ti (<2%)
 Contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight%): C (26%), O (33%), Fe (31%), Na (5%)
 Minor (Weight%): Si, S, Ca (<2%)
 Likely contained iron oxide

Another spectrum showed the presence of the following elements:
 Major (Atomic%): C (62%), O (30%)
 Minor (Atomic%): Na, Si, S, Cl, Ca (<2%)
 Likely contained biological materials

Summary/Conclusion:

C267292-0001 and C267292-0002 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C267292-0001	AG	E3070A	HIVOL3070	2225	02-NOV-20
C267292-0001	AG	E3092A	ID3092	2224	02-NOV-20
C267292-0001	AG	E3288A	TSP3288	2213	30-OCT-20
C267292-0002	AG	E3070A	HIVOL3070	2225	02-NOV-20
C267292-0002	AG	E3092A	ID3092	2224	02-NOV-20
C267292-0002	AG	E3288A	TSP3288	2213	30-OCT-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3070A	THE DETERMINATION OF METALS ON GLASS FIBRE AIR FILTERS BY X-RAY FLUORESCENCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

Login: **C267292**

Print Date: Nov. 04, 2020 07:50 AM By REPORTADMIN

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E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3288A	THE DETERMINATION OF SUSPENDED PARTICULATES ON GLASS AND QUARTZ FIBRE AND ON TEFLON FILTERS BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

Login: **C266477**

Print Date: Sep. 28, 2020 06:10 PM By REPORTADMIN

**** REPRINTED ****

Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

Mail this copy to :

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HAMILTON,ONT
L8P 4Y7

Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Sep. 28, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: NIAGARA

The results relate only to items tested.

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Login: **C266477**

Print Date: Sep. 28, 2020 06:10 PM By REPORTADMIN

**** REPRINTED ****

Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
			Date	Time	Zone	
27096	27096	27096 NIAGARA - CLEAR WATER WITH LIGHT PARTICULATE AND SOME SMALL PIECES OF VEGETATION	01 SEP 2020		5	

LIMS Products Requested:			Sample Comment Description					
OD	E3043A	DUST3043	OD	E3046A	DUSTS3046	OD	E3092A	ID3092

UTM:

Zone	Easting	Northing	Collection Method	Map Datum	Accuracy (metres)
230	641564	4781027	GPS	NAD83	2-5M

Login: C266477

Print Date: Sep. 28, 2020 06:10 PM By REPORTADMIN

**** REPRINTED ****

Field ID: 27096
 Sample ID: C266477-0001
 MOE*LIMS ID: 2020OD38-00001
 Station ID: 27096
 Collect Date: 01 SEP 2020
 Sample Location Description: 27096 NIAGARA - CLEAR WATER WITH
 LIGHT PARTICULATE AND SOME SMALL

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3043L1	Dustfall; total insoluble	2	g/m2/30D	<MDL			2	22-SEP-2020
	Dustfall; insoluble	2	g/m2/30D	<MDL			2	22-SEP-2020
3046L2	Coal		%	NDNO				23-SEP-2020
	Coke		%	NDNO				23-SEP-2020
	Graphite		%	NDNO				23-SEP-2020
	Kish/Magnetic Particles		%	NDNO				23-SEP-2020
	Soot		%	NDNO				23-SEP-2020
	Oil Soot		%	NDNO				23-SEP-2020
	Flyash		%	NDNO				23-SEP-2020
	Wood Char		%	NDNO				23-SEP-2020
	Carbonates		%	NDNO				23-SEP-2020
	Biological Material	65	%					23-SEP-2020
	Black Rubber (from tire buffing)		%	NDNO				23-SEP-2020
	Carbon Black		%	NDNO				23-SEP-2020
	Others		%	NDNO				23-SEP-2020
	NT: Identification	See Non-Target Textual result						23-SEP-2020
	Fibres Synthetic		%	NDNO				23-SEP-2020
	Minerals	35	%					23-SEP-2020
	Paint		%	NDNO				23-SEP-2020
3092L1	NT: Identification	See Non-Target Textual result					0	23-SEP-2020

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Print Date: Sep. 28, 2020 06:10 PM By REPORTADMIN

**** REPRINTED ****

CODE	DESCRIPTION
NDNO	NO DATA: NO PARTICLE(S) DETECTED
<MDL	LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C266477-0001	Listid : 3046L2	Parmname : NT: Identification	Value:	Units:	Qual:	Remarks:
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Sample ID: C266477-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C266477-0001	Matrix : Dustfall	Method : E3046A	Product: DUSTS3046	Parameter: NT: Identification
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Black Rubber (from tire buffing): Traces

Sample ID: C266477-0001	Matrix : Dustfall	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C266477
 Station ID: 27096
 AUTHORED BY: Grace Bu
 Date: September 23, 2020

The sample was received from the West Central Region.

The sample was examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C266477-0001
 Sample Date: August 2020
 Description of sample contents/Details: Clear water with light particulate and some small pieces of vegetation

The sample was comprised of small amounts of particulates in an envelope.

View of the particulates under microscopes showed:
 - 35% of colored and colorless minerals were present, mainly at the size of 50 to 100 microns in diameter
 - 65% of biological materials were found.
 - Trace tire wear particles were also present.
 - No magnetic particles were found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE):
 The examples of EDX spectra were as below:

Login: C266477

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NON- TARGET TEXTUAL RESULT

Sample ID: C266477-0001	Matrix : Dustfall	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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One spectrum showed the presence of the following elements:
 Major (Atomic %): C (19%), O (64%), Si (17%)
 Mainly contained silica

Another spectrum showed the presence of the following elements:
 Major (Atomic %): C (33%), O (53%), Ca (6%), Mg (7%)
 Minor (Atomic %): Si (<2%)
 Mainly contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight %): C (41%), O (26%), Al (5%), Si (17%) and K (12%)
 Mainly contained silicates

Summary/Conclusion:

C266477-0001 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C266477-0001	OD	E3043A	DUST3043	2210	22-SEP-20
C266477-0001	OD	E3046A	DUSTS3046	2224	23-SEP-20
C266477-0001	OD	E3092A	ID3092	2224	23-SEP-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3043A	THE DETERMINATION OF TOTAL DUSTFALL IN AIR PARTICULATE MATTER BY GRAVIMETRY	CONTINGENCY	Method has been developed for the specific purpose of analysis of these types of samples and has not been fully validated; consult with laboratory manager for data interpretation
E3046A	THE DETERMINATION OF DUSTFALL PARTICULATES IN AIR EMISSIONS AND PRECIPITATION BY OPTICAL MICROSCOPY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

Login: **C266907**

Print Date: Oct. 14, 2020 12:25 PM By REPORTADMIN

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

Mail this copy to :

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MOE - HAMILTON REGIONAL OFFICE
119 KING STREET WEST, 12TH FLOOR
HAMILTON,ONT
L8P 4Y7

Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Oct. 14, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: NIAGARA

The results relate only to items tested.

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Login: C266907

Print Date: Oct. 14, 2020 12:25 PM By REPORTADMIN

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Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
1	27096	27096 SEP2020 NO. DAYS EXPOSED 30 NIAGARA	Date	Time	Zone	
	Sample ID C266907-0001	Sample Comment Description	30 SEP 2020		5	
LIMS Products Requested:						
OD	E3043A	DUST3043	OD	E3046A	DUSTS3046	OD E3092A ID3092

Login: C266907

Print Date: Oct. 14, 2020 12:25 PM By REPORTADMIN

**** REPRINTED ****

Field ID: 1
 Sample ID: C266907-0001
 MOE*LIMS ID: 2020OD41-00003
 Station ID: 27096
 Collect Date: 30 SEP 2020
 Sample Location Description: 27096 SEP2020 NO. DAYS EXPOSED 30
 NIAGARA

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3043L1	Dustfall; total insoluble	2.4	g/m2/30D				2	09-OCT-2020
	Dustfall; insoluble	2	g/m2/30D	<MDL			2	09-OCT-2020
3046L2	Coal		%	NDNO				09-OCT-2020
	Coke		%	NDNO				09-OCT-2020
	Graphite		%	NDNO				09-OCT-2020
	Kish/Magnetic Particles		%	NDNO				09-OCT-2020
	Soot		%	NDNO				09-OCT-2020
	Oil Soot		%	NDNO				09-OCT-2020
	Flyash		%	NDNO				09-OCT-2020
	Wood Char		%	NDNO				09-OCT-2020
	Carbonates		%	NDNO				09-OCT-2020
	Biological Material	80	%					09-OCT-2020
	Black Rubber (from tire buffing)		%	NDNO				09-OCT-2020
	Carbon Black		%	NDNO				09-OCT-2020
	Others		%	NDNO				09-OCT-2020
	NT: Identification	See Non-Target Textual result						09-OCT-2020
	Fibres Synthetic		%	NDNO				09-OCT-2020
	Minerals	20	%					09-OCT-2020
	Paint		%	NDNO				09-OCT-2020
3092L1	NT: Identification	See Non-Target Textual result					0	13-OCT-2020

Login: **C266907**

Print Date: Oct. 14, 2020 12:25 PM By REPORTADMIN

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CODE DESCRIPTION
 NDNO NO DATA: NO PARTICLE(S) DETECTED
 <MDL LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C266907-0001	Listid : 3046L2	Parmname : NT: Identification	Value:	Units:	Qual:	Remarks:
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Sample ID: C266907-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C266907-0001	Matrix : Dustfall	Method : E3046A	Product: DUSTS3046	Parameter: NT: Identification
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Black rubber 9from tire buffing): traces

Sample ID: C266907-0001	Matrix : Dustfall	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C266907
 Station ID: 27096
 AUTHORED BY: Grace Bu
 Date: October 09, 2020

The sample was received from the West Central Region.

The sample was examined by means of stereoscopic and polarized microscope, Scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C266907-0001
 Sample Date: September 2020
 Description of sample contents/Details: Brown/red water with light particulate and some small pieces of vegetation

The sample was comprised of small amounts of particulates in an envelope.

View of the particulates under microscopes showed:
 - Around 20% of colored and colorless minerals were present, mainly at the size of 20 to 100 microns in diameter
 - Around 80% of biological materials were found.
 - Trace tire wear particles were also present.
 - No magnetic particles were found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE):

Login: C266907

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NON- TARGET TEXTUAL RESULT

Sample ID: C266907-0001	Matrix : Dustfall	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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The example EDX spectra were as below:

One spectrum showed the presence of the following elements:

Major (Weight%): C (15%), O (59%), Si (26%)

Mainly contained silica

Another spectrum showed the presence of the following elements:

Major (Atomic %): C (37%), O (36%), Ca (25%)

Minor (Atomic %): Mg, Al, Si, P, K, Cu (<1%)

Mainly contained Calcium carbonate

Another spectrum showed the presence of the following elements:

Major (Atomic %): C (38%), O (47%), Ca (7%), Mg (7%)

Minor (Atomic %): Al, Si (<1%)

Mainly contained dolomite

Another spectrum showed the presence of the following elements:

Major (Atomic %): C (42%), O (38%), Al (4%), Si (12%) and K (3%)

Minor (Atomic %): Na, Mg, Cl, Ca (<1%)

Contained silicates (feldspar)

Summary/Conclusion:

C266907-0001 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C266907-0001	OD	E3043A	DUST3043	2210	09-OCT-20
C266907-0001	OD	E3046A	DUSTS3046	2224	13-OCT-20
C266907-0001	OD	E3092A	ID3092	2224	13-OCT-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3043A	THE DETERMINATION OF TOTAL DUSTFALL IN AIR PARTICULATE MATTER BY GRAVIMETRY	CONTINGENCY	Method has been developed for the specific purpose of analysis of these types of samples and has not been fully validated; consult with laboratory manager for data interpretation
E3046A	THE DETERMINATION OF DUSTFALL PARTICULATES IN AIR EMISSIONS AND PRECIPITATION BY OPTICAL MICROSCOPY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

Login: **C267510**

Print Date: Nov. 16, 2020 09:45 PM By REPORTADMIN

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Program Code 130113102
Program: MOE OPERATIONS DIVISION
Study: AIR,INDUSTRY,PRIVATE NETWORKS
Project: WEST CENTRAL REG. TECH SUPPORT
Activity: POINT SOURCE MONITORING
Organization: WCR-HAMILTON DISTRICT OFFICE

Org. Id: 407606

Mail this copy to :

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Final reports to : WCR-AIR-DATA
ORSINI, MARK

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Nov. 16, 2020

Inquiries to : ROBERT TOOLEY
JANET MILLS

Telephone : 416-235-6094
Telephone : 416-235-5831

LOGIN DESCRIPTION: NIAGARA

The results relate only to items tested.

To provide customer service feedback on this report and/or other services provided by LaSB, please contact the LaSB HelpDesk at 416-235-6030 or the Customer Service Manager at 416-235-5831

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Login: **C267510**

Print Date: Nov. 16, 2020 09:45 PM By REPORTADMIN

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Field Id	Station ID	Sample Location Description	Sampling			Sampler Information
1	27096	NIAGARA 27096 OCT. 2020 NO. DAY EXPOSED	Date	Time	Zone	
	Sample ID C267510-0001	32	31 OCT 2020		5	
LIMS Products Requested:		Sample Comment Description				

OD	E3043A	DUST3043	OD	E3046A	DUSTS3046	OD	E3092A	ID3092
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UTM:

Zone	Easting	Northing	Collection Method	Map Datum	Accuracy (metres)
230	641564	4781027	GPS	NAD83	2-5M

Login: C267510

Print Date: Nov. 16, 2020 09:45 PM By REPORTADMIN

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Field ID: 1
 Sample ID: C267510-0001
 MOE*LIMS ID: 2020OD45-00002
 Station ID: 27096
 Collect Date: 31 OCT 2020
 Sample Location Description: NIAGARA 27096 OCT. 2020 NO. DAY EXPOSED 32

Sample Comments Description:

Listid	Parmname	Value	Units	Qual	Rmk1	Rmk2	MDL	Analysis Date
3043L1	Dustfall; total insoluble	3.0	g/m2/30D				2	10-NOV-2020
	Dustfall; insoluble	2	g/m2/30D	<MDL			2	10-NOV-2020
3046L2	Coal		%	NDNO				12-NOV-2020
	Coke		%	NDNO				12-NOV-2020
	Graphite		%	NDNO				12-NOV-2020
	Kish/Magnetic Particles		%	NDNO				12-NOV-2020
	Soot		%	NDNO				12-NOV-2020
	Oil Soot		%	NDNO				12-NOV-2020
	Flyash		%	NDNO				12-NOV-2020
	Wood Char		%	NDNO				12-NOV-2020
	Carbonates		%	NDNO				12-NOV-2020
	Biological Material	70	%					12-NOV-2020
	Black Rubber (from tire buffing)		%	NDNO				12-NOV-2020
	Carbon Black		%	NDNO				12-NOV-2020
	Others		%	NDNO				12-NOV-2020
	NT: Identification	See Non-Target Textual result						12-NOV-2020
	Fibres Synthetic		%	NDNO				12-NOV-2020
	Minerals	30	%					12-NOV-2020
	Paint		%	NDNO				12-NOV-2020
3092L1	NT: Identification	See Non-Target Textual result					0	12-NOV-2020

Login: **C267510**

Print Date: Nov. 16, 2020 09:45 PM By REPORTADMIN

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CODE	DESCRIPTION
NDNO	NO DATA: NO PARTICLE(S) DETECTED
<MDL	LESS THAN METHOD DETECTION LIMIT

NON- TARGET TEXTUAL RESULT

Sample ID: C267510-0001	Listid : 3046L2	Parmname : NT: Identification	Value:	Units:	Qual:	Remarks:
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Sample ID: C267510-0001	Listid : 3092L1	Parmname : NT: Identification	Value: 0	Units: none	Qual:	Remarks:
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TEXT COMMENTS

Sample ID: C267510-0001	Matrix : Dustfall	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Environmental Forensics Section

SUBMISSION: C267510
 Station ID: 27096
 AUTHORED BY: Grace Bu
 Date: November 10, 2020

The sample was received from the West Central Region.

The sample was examined by means of stereoscopic and polarized microscope, scanning electron microscope with an energy dispersive x-ray analyzer (SEM-EDXRA). Micro-physical tests were also performed.

Lab Sample No: C267510-0001
 Sample Date: October 2020
 Description of sample contents/Details: Light yellow water with light particulate, with 2 leaves and some small pieces of vegetation

The sample was comprised of small amounts of particulates in an envelope.

View of the particulates under microscopes showed:
 - Around 30% of colored and colorless minerals were present, mainly at the size of 20 to 100 microns in diameter
 - Around 70% of biological materials were found.
 - No magnetic particles were found.

SEM-EDXRA Analysis (SEMI-QUANTITATIVE):

The example EDX spectra were as below:
 One spectrum showed the presence of the following elements:
 Major (Atomic%): C (11%), O (66%), Si (23%)
 Mainly contained silica

Login: C267510

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NON- TARGET TEXTUAL RESULT

Sample ID: C267510-0001	Matrix : Dustfall	Method : E3092A	Product: ID3092	Parameter: NT: Identification
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Another spectrum showed the presence of the following elements:
 Major (Atomic %): C (30%), O (55%), Ca (7%), Mg (7%)
 Minor (Atomic %): Al, Si (<1%)
 Mainly contained dolomite

Another spectrum showed the presence of the following elements:
 Major (Weight %): C (15%), O (53%), Al (8%), Si (15%), K (3%), Fe (4%)
 Minor (Weight %): Na, Ca (<2%)
 Likely contained aluminosilicates

Another spectrum showed the presence of the following elements:
 Major (Weight %): C (57%), O (42%)
 Minor (Weight %): Ca (<1%)
 Likely contained Biological materials

Summary/Conclusion:

C267510-0001 mainly contained normal road dusts.

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C267510-0001	OD	E3043A	DUST3043	2210	12-NOV-20
C267510-0001	OD	E3046A	DUSTS3046	2224	12-NOV-20
C267510-0001	OD	E3092A	ID3092	2224	12-NOV-20

LaSB Method Summary

Method	Method Description	Status	Status Description
E3043A	THE DETERMINATION OF TOTAL DUSTFALL IN AIR PARTICULATE MATTER BY GRAVIMETRY	CONTINGENCY	Method has been developed for the specific purpose of analysis of these types of samples and has not been fully validated; consult with laboratory manager for data interpretation
E3046A	THE DETERMINATION OF DUSTFALL PARTICULATES IN AIR EMISSIONS AND PRECIPITATION BY OPTICAL MICROSCOPY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3092A	THE IDENTIFICATION OF PARTICULATE MATTER BY QUALITATIVE AND SEMI-QUANTITATIVE TECHNIQUES	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***