August 24, 2018

Project No. 18-059-01

VIA EMAIL: (egarritano@orionecosolutions.com)

Mr. Gino Garrintano
1974862 Ontario Inc.
#4 Cardico Drive
Stouffville, Ontario L4A 2G5

Re: Subsurface Investigation and Remediation Program
Buchanan Northern Hardwood Site
94 Vibert Road, Thunder Bay, ON

North Rock Environmental Inc. (North Rock) is pleased to provide this report summarizing the results of the subsurface investigation and remediation work completed at the Buchanan Northern Hardwood Site, located at 94 Vibert Road, in Thunder Bay, Ontario (Figure 1).

The purpose of the current investigation work was to assess soil quality in areas of potential environmental concern identified in the Phase 1 Environmental Site Assessment (ESA), as well as to remediate any environmental impacts identified during the investigation work.

1.0 Site Setting and Key Features

Site setting and key site features are provided in the below table and shown on Figure 2 (attached).

Site Setting and Key Features		
Site Location and Description		The site is located at 94 Vibert Road, in Oliver-Paipoonge, Ontario. (Figures 1 and 2).
Key Buildings and Structures		The site consists of the former sawmill and office building and related structures, a former scale and scale shack, fueling station, pumphouse and pond, industrial wells, work sheds, boiler stack, kilns, fire suppression sheds and valves, and chip and shaving storage and loading structures.
Surrounding Properties	North	Undeveloped land, Industrial/Commercial properties
	South	CN Rail line, Residential Properties, Kaministiquia River
	East	Residential Properties
	West	CN Rail line, Residential Properties
Topography and Drainage		The subject site is generally flat with a slight slope to the south-southeast
Surface Water		Kaministiquia River is located approximately 300 m south of the site.
Depth to Groundwater and		Groundwater was encountered at depths ranging

Bedrock	between 3.0 and 3.5 m during the investigation work. Bedrock was not encountered during the investigation work.
Overburden Geology	The overburden geology in the subject area consisted of sand and gravel fill and fine silty sand to the maximum depth investigated.

2.0 Methodology

2.1 Monitoring and Sampling

On August 3, 2018, North Rock supervised the advancement of six test pits (TP1 to TP3, TP5 to TP7) and three hand auger holes (HA4, HA8 and HA9) to assess soil in areas of environmental concern identified in the Phase 1 ESA completed for the site, which included several aboveground fuel storage tanks (ASTs) located across the site. The ASTs and sample locations are shown on Figures 2 and 3, respectively. Photographs of the subsurface investigation work are provided in Appendix A.

All test pits were advanced by Pete's Backhoe Services using a track-mounted excavator. An experienced North Rock environmental field technician supervised the test pitting and logged each location to document the soil conditions encountered (i.e. type, texture, moisture, colour, odour, evidence of impacts, etc.) and depth to the apparent groundwater table.

Soil samples were collected at regular depth intervals for field testing purposes as well as for potential laboratory analysis of contaminants of concern. Field testing consisted of the screening for organic vapour concentrations (OVCs) to assess for petroleum hydrocarbon (PHC) related impacts. OVC screening was completed in general accordance with the Environment Canada Contaminated Sites Program Technical Assistance Bulletin (TAB #1) *Jar Headspace Analytical Screening Procedure.* Soil samples collected for field screening were placed into a new polyethylene bag for on-site OVC screening using a Photo-Ionization Detector (PID), calibrated to 100 parts per million (ppm) isobutylene standard prior to sample assessment. The maximum OVC reading was recorded for each sample and this information was used to assess for the presence of PHC impacts as well as to assist in sample selection for laboratory analysis.

2.2 Soil Remediation

On August 15, 2018, North Rock supervised the remedial excavation of impacted soil identified in the area of a former fuel oil AST (soil sample HA4) located on the east side of the mill building. All impacted soil was excavated and transported by Pete's Backhoe Services, an Ontario Ministry of the Environment and Climate Change (MOECC) licensed waste hauler, to the Lappe Industrial Landfill Site for disposal as non-hazardous waste. Photographs of the remediation work are provided in Appendix A.

Representative soil samples were collected from the sidewalls (SS1 to SS8) and floor (FS1 to FS4) of the remediation excavation for field testing purposes and potential laboratory analysis. The remedial excavation area and associated soil sample locations are shown on Figure 4.

Following remedial activities, the excavation area was backfilled and compacted with granular materials.

2.3 Laboratory Analysis

ALS Laboratory Group (ALS), a Canadian Association for Laboratory Accreditation (CALA) certified and accredited independent laboratory, conducted chemical analysis of potential contaminants of concern in the collected soil samples. All analyses were performed following recognized standard methodologies.

A summary of the analytical program is provided in the below table:

Task	Soil Sample ID	Parameters Analyzed
Subsurface Investigation	TP1-S6, TP2-S7, TP3-S9, TP5-S10, TP6-S7, TP7-S8, HA4-S2, HA8-S4 and HA9-S4.	Benzene, toluene, ethylbenzene, xylenes (BTEX), and petroleum hydrocarbon (PHC) fractions F1 to F4.
Remediation	FS2, FS4, SS1, SS5 and SS8.	

2.4 Quality Assurance/Quality Control (QA/QC)

Environmental investigation work was completed in accordance with QA/QC procedures outlined in the MOECC Standards Development Branch *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*.

Clean disposable nitrile gloves were worn during sampling and then discarded and replaced after collecting each sample to prevent sample contamination and to maintain sample integrity. None of the maximum hold times were exceeded.

The QA/QC program also included the collection of the below blind field replicate sample to assess the accuracy of the laboratory.

QA/QC Program		
Matrix	**Sample ID**	**Replicate ID**
Soil	TP7-S8	TP7-S10

2.5 Assessment and Remediation Criteria

Soil assessment and remediation criteria for the site were selected using the Generic Approach as provided in the MOECC *Guideline for Use at Contaminated Sites in Ontario,* revised 1997, and the MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,* dated April 15, 2011 (MOECC Criteria).

The following criteria was considered applicable at the site:

- *MOECC Table 3, Generic Site Condition Standards for Use in a Non-Potable Ground Water Condition for Industrial/Commercial/Community Property Uses* with coarse grained soils.

3.0 Results

3.1 Field Results

Soil field results are summarized on Table 1 and sample locations are shown on Figures 3 and 4.

Soil conditions in the immediate vicinity of the sawmill generally consisted of coarse sand and gravel fill to the maximum depth investigated of approximately 4 m below ground surface (mbgs). Soil conditions in the vicinity of the retention pond pumphouse consisted of fine silty sand to the maximum depth investigated of approximately 1.2 mbgs. Groundwater was encountered at depths ranging from 3 to 3.5 mbgs. Bedrock was not encountered during the investigation work.

OVCs in soil ranged from background levels of 0 parts per million (ppm) at several sample locations to levels indicative of PHC impacts of 658 ppm at HA4-S2.

3.2 Analytical Results

Soil analytical results are summarized in Table 2, and provided on the Laboratory Analytical Reports in Appendix B.

Exceedances of the applicable MOECC criteria are summarized in the below table.

Summary of MOECC Exceedances			
Sample Type	**Sample ID**	**Sample Depth**	**MOECC Exceedances**
Soil	HA4-S2	0.6 m	PHC Fractions F1 to F3

Impacted soil at HA4 is limited to the shallow soil (<2.5 m) adjacent to a heating fuel oil tank located on the east side of the building as shown on Figures 3 and 4. Impacts in this area are likely the result of historical small spills during AST filling activities.

Concentrations of all other parameters submitted for both the subsurface investigation and remediation work were below the applicable MOECC criteria and considered acceptable.

All laboratory QA/QC results were within acceptable ranges and considered valid, including the results for the field replicate sample.

3.3 Remediation Results

During the soil remediation work at the former fuel AST (soil sample location HA4), approximately 6 m^3 of impacted soil was excavated across an estimated area of 8 m^2 to a maximum depth of 2.4 mbgs. The excavated area is shown on Figure 4.

Concentrations of BTEX and PHCs from the final excavation limits were below the MOECC criteria and considered acceptable.

All impacted soil was transported by Pete's Backhoe Services to the Lappe Landfill site for disposal as non-hazardous waste.

Following remedial activities, the excavation area was backfilled and compacted with granular materials.

4.0 Conclusions

The following conclusions are provided based on the current investigation results.

- On August 3, 2018, test pits and hand auger holes were advanced at the site to assess soil quality in areas of potential environmental concern identified in the Phase 1 ESA as well as prepare a proposed remedial action plan to address any environmental impacts identified during the investigation work.

- Exceedances of the MOECC criteria were measured for concentrations of PHC fractions F1 to F3 in soil from HA4, located adjacent to a heating fuel oil AST located on the east side of the mill building. Impacted soil at this location is limited to the shallow soil (<2.5 m) and likely the result of historical small spills during AST filling activities.

- Concentrations of BTEX and PHCs in all other soil sample locations across the site were below the MOECC Table 3 criteria and considered acceptable.

- On August 15, 2018, the impacted soil identified at HA4, at a former fuel oil AST, was excavated and transported by Pete's Backhoe Services to the Lappe Industrial Landfill Site for disposal as non-hazardous waste. Approximately 6 m^3 of impacted soil was removed over any area of 8 m^2.

- Based on the current results, no further investigation or remediation work is considered warranted at the site.

5.0 Closure

We trust that the above report meets with your current requirements. If you have any questions or require clarifications, please contact the undersigned at 807.633.7866.

Sincerely,

NORTH ROCK ENVIRONMENTAL INC.

Jason Garatti, M.Sc.Eng., P.Geo.
Senior Hydrogeologist and Environmental Scientist
North Rock Environmental Inc.
jgaratti@nrock.ca

Attachments: Tables 1 and 2
Figures 1 to 4
Appendix A: Photographs
Appendix B: Laboratory Analytical Reports

Tables

Table 1
Summary of Field Results
Buchanan Northern Hardwood
94 Vibert Road, Oliver Paipoonge, Ontario

Sample ID	Date	Depth (m)	Organic Vapours (ppm)	Odour	Soil Description
TP1-S1	03-Aug-18	0.3	2	No PHC Odour	Sand and Gravel Fill, Brown, Loose, Dry
TP1-S2	03-Aug-18	0.8-1.0	0	No PHC Odour	Med Sand and Silt, Brown, Loose, Dry
TP1-S3	03-Aug-18	1-1.5	0	No PHC Odour	Fine to Med Silty Sand, Brown, Loose, Dry
TP1-S4	03-Aug-18	1.5-1.8	2	No PHC Odour	Med to Coarse Sand, Brown, Loose, Moist
TP1-S5	03-Aug-18	1.8-2.3	1	No PHC Odour	Med to Coarse Sand, Brown, Loose, Moist
TP1-S6	03-Aug-18	2.3-2.8	0	No PHC Odour	Med to Coarse Sand, Brown, Loose, Very Moist
TP2-S1	03-Aug-18	0-0.3	1	No PHC Odour	Fine Sand, Brown, Loose, Dry
TP2-S2	03-Aug-18	0.3-0.6	2	No PHC Odour	Fine Sand, Some Gravel, Trace Wood Debris, Brown, Loose, Dry
TP2-S3	03-Aug-18	1.0-1.3	1	No PHC Odour	Fine Silty Sand, Brown, Loose, Dry
TP2-S4	03-Aug-18	1.7-2.0	0	No PHC Odour	Med Sand, Brown, Loose, Moist
TP2-S5	03-Aug-18	2.0-2.4	0	No PHC Odour	Coarse Sand, Brown, Loose, Moist
TP2-S6	03-Aug-18	2.4-2.9	0	No PHC Odour	Coarse Sand, Trace Gravel, Brown, Loose, Very Moist
TP2-S7	03-Aug-18	2.9-3.5	0	No PHC Odour	Coarse Sand, Trace Gravel, Brown, Loose, Wet
TP3-S1	03-Aug-18	0-0.3	2	No PHC Odour	Med Silty Sand and Gravel Fill, Brown
TP3-S2	03-Aug-18	0.3-0.6	5	No PHC Odour	Med to Coarse Sand and Gravel Fill, Brown
TP3-S3	03-Aug-18	0.6-0.9	5	No PHC Odour	Fine to Med Silty Sand, Some Gravel, Light Brown
TP3-S4	03-Aug-18	0.9-1.2	4	No PHC Odour	Fine to Med Silty Sand, Some Gravel, Light Brown
TP3-S5	03-Aug-18	1.2-1.5	4	No PHC Odour	Fine to Med Sand, Some Gravel, Brown
TP3-S6	03-Aug-18	1.5-2.0	2	No PHC Odour	Coarse Sand, Trace Gravel, Dark Brown, Moist
TP3-S7	03-Aug-18	2.0-2.5	4	No PHC Odour	Coarse Sand, Trace Gravel, Dark Brown, Very Moist
TP3-S8	03-Aug-18	2.5-3	2	No PHC Odour	Med Sand, Brown, Moist
TP3-S9	03-Aug-18	3.0-3.5	3	No PHC Odour	Med Sand, Brown, Wet
HA4-S1	03-Aug-18	0-0.3	548	PHC Odour	Coarse Sand, Some Gravel, Brown, Loose, Moist, PHC Odour
HA4-S2	03-Aug-18	0.3-0.6	658	PHC Odour	Coarse Sand, Some Gravel, Brown, Loose, Moist, PHC Odour
TP5-S1	03-Aug-18	0-0.3	0	No PHC Odour	Fill, Brown, Loose, Dry
TP5-S2	03-Aug-18	0.3-0.7	0	No PHC Odour	Fill, Brown, Loose, Dry
TP5-S3	03-Aug-18	0.7-1.0	0	No PHC Odour	Fine to Med Silty Sand, Light Brown, Loose, Dry
TP5-S4	03-Aug-18	1.0-1.3	0	No PHC Odour	Fine to Med Silty Sand, Light Brown, Loose, Dry
TP5-S5	03-Aug-18	1.3-1.5	0	No PHC Odour	Fine to Med Sand, Some Gravel, Brown, Moist
TP5-S6	03-Aug-18	1.5-2.0	0	No PHC Odour	Med to Coarse Sand Some Gravel, Brown, Moist
TP5-S7	03-Aug-18	2.0-2.5	0	No PHC Odour	Med to Coarse Sand Some Gravel, Brown, Moist
TP5-S8	03-Aug-18	2.5-2.8	0	No PHC Odour	Med to Coarse Sand Some Gravel, Brown, Moist
TP5-S9	03-Aug-18	2.8-3.5	0	No PHC Odour	Med to Coarse Sand Some Gravel, Brown, Moist
TP5-S10	03-Aug-18	3.5-4.0	0	No PHC Odour	Med to Coarse Sand Some Gravel, Brown, Wet

Table 1
Summary of Field Results
Buchanan Northern Hardwood
94 Vibert Road, Oliver Paipoonge, Ontario

Sample ID	Date	Depth (m)	Organic Vapours (ppm)	Odour	Soil Description
TP6-S1	03-Aug-18	0-0.5	6	No PHC Odour	Fine to Med Silty Sand, Trace Gravel, Light Brown, Dry
TP6-S2	03-Aug-18	0.5-1.0	5	No PHC Odour	Fine to Med Silty Sand, Trace Gravel, Light Brown, Dry
TP6-S3	03-Aug-18	1.0-1.5	6	No PHC Odour	Med to Coarse Sand and Gravel, Brown, Dry
TP6-S4	03-Aug-18	1.5-2.0	6	No PHC Odour	Med to Coarse Sand and Gravel, Brown, Moist
TP6-S5	03-Aug-18	2.0-2.5	2	No PHC Odour	Med to Coarse Sand, Brown, Moist
TP6-S6	03-Aug-18	2.5-3.0	0	No PHC Odour	Med to Coarse Sand, Brown, Moist
TP6-S7	03-Aug-18	3.0-3.5	2	No PHC Odour	Coarse Sand, Dark Brown, Wet
TP7-S1	03-Aug-18	0-0.3	5	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
TP7-S2	03-Aug-18	0.3-0.9	5	No PHC Odour	Med to Coarse Silty Sand Some Gravel, Brown, Dry
TP7-S3	03-Aug-18	0.9-1.6	4	No PHC Odour	Coarse Sand and Gravel, Dark Brown, Moist
TP7-S4	03-Aug-18	1.6-2.1	4	No PHC Odour	Coarse Sand and Gravel, Dark Brown, Moist
TP7-S5	03-Aug-18	2.1-2.6	5	No PHC Odour	Coarse Sand and Gravel, Dark Brown, Moist
TP7-S6	03-Aug-18	2.6-3.1	5	No PHC Odour	Coarse Sand some Gravel, Dark Brown, Wet
TP7-S7	03-Aug-18	3.1-3.5	5	No PHC Odour	Coarse Sand some Gravel, Dark Brown, Wet
TP7-S8	03-Aug-18	3.5-3.9	6	No PHC Odour	Coarse Sand, Trace Gravel, Dark Brown, Wet
HA8-S1	03-Aug-18	0-0.3	5	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA8-S2	03-Aug-18	0.3-0.6	4	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA8-S3	03-Aug-18	0.6-0.9	5	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA8-S4	03-Aug-18	0.9-1.2	6	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA9-S1	03-Aug-18	0-0.3	0	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA9-S2	03-Aug-18	0.3-0.6	3	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA9-S3	03-Aug-18	0.6-0.9	5	No PHC Odour	Fine Silty Sand, Light Brown, Moist
HA9-S4	03-Aug-18	0.9-1.2	5	No PHC Odour	Fine Silty Sand, Light Brown, Moist
FS1	15-Aug-18	0.8	0	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
FS2	15-Aug-18	0.8	0	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
FS3	15-Aug-18	2.4	1	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Moist
FS4	15-Aug-18	2.4	1	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Moist
SS1	15-Aug-18	0.3	1	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS2	15-Aug-18	0.3	1	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS3	15-Aug-18	0.3	0	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS4	15-Aug-18	0.3	1	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS5	15-Aug-18	0.9	2	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS6	15-Aug-18	1.6	2	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS7	15-Aug-18	1.6	2	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry
SS8	15-Aug-18	1.6	1	No PHC Odour	Coarse Sand and Gravel Fill, Brown, Dry

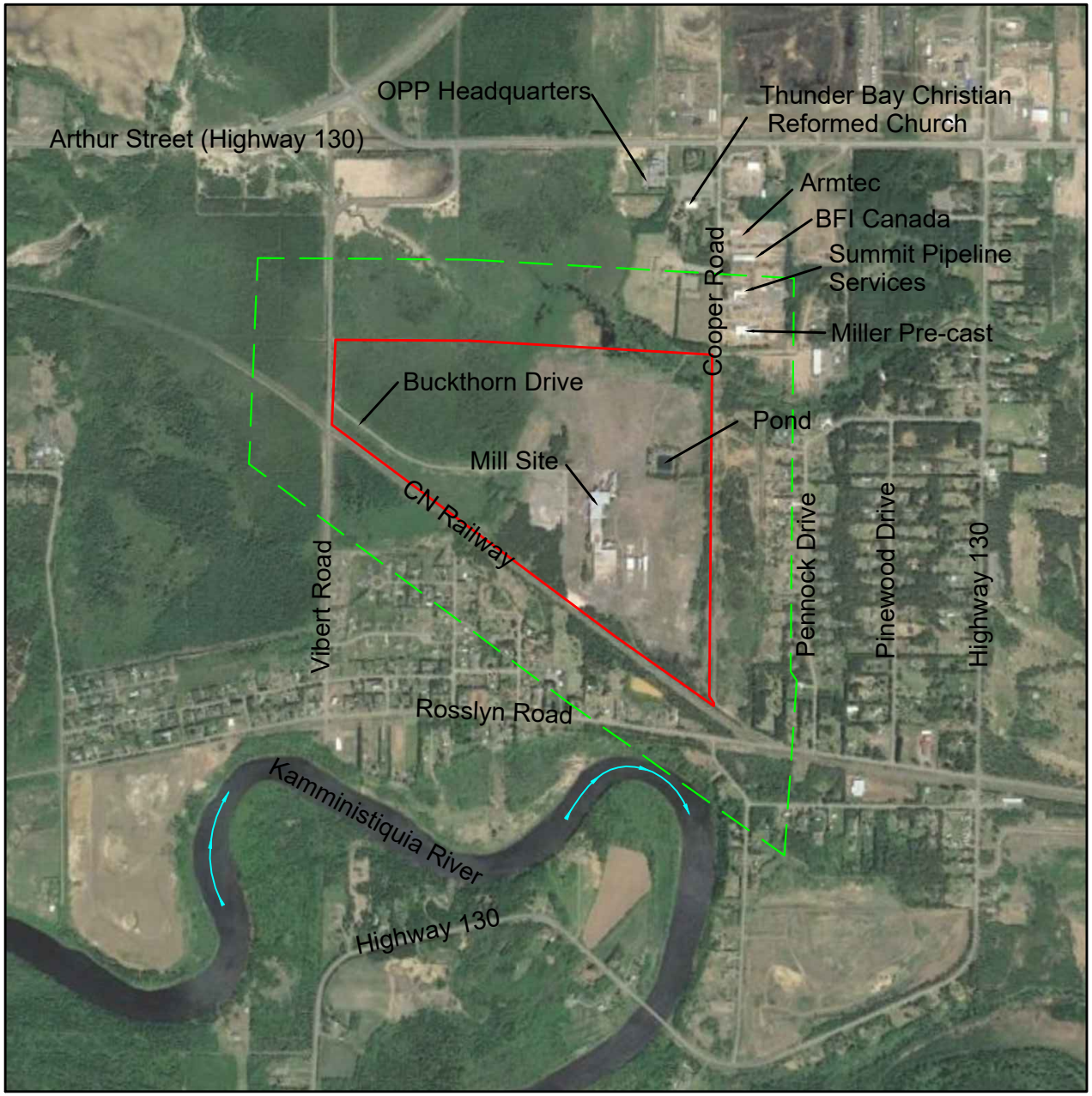
Notes:
Table to be read in conjunction with accompanying report
PHC = Petroleum Hydrocarbon

Table 2
Summary of Soil Analytical Results
Buchanan Northern Hardwood
94 Vibert Road, Oliver Paipoonge, Ontario

Sample ID	Date	Depth (m)	Organic Vapours (ppm)	Benzene	Toluene	Ethylbenzene	Xylenes	Petroleum Hydrocarbon Fractions			
								F1	F2	F3	F4
TP1-S6	3-Aug-2018	2.3-2.8	0	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
TP2-S7	3-Aug-2018	2.9-3.5	0	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
TP3-S9	3-Aug-2018	3-3.5	3	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
HA4-S2	3-Aug-2018	0.3-0.9	658	<0.0068	<0.080	<0.018	<0.072	**105**	**5400**	**3450**	<50
TP5-S10	3-Aug-2018	3.5-4	0	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
TP6-S7	3-Aug-2018	3-3.5	2	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
TP7-S8	3-Aug-2018	3.5-3.9	6	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
TP7-S10	3-Aug-2018	3.5-4.0	0	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
HA8-S4	3-Aug-2018	0.9-1.2	6	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
HA9-S4	3-Aug-2018	0.9-1.2	5	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	<50	<50
FS2	15-Aug-2018	0.8	0	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	141	57
FS4	15-Aug-2018	2.4	1	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	59	<50
SS1	15-Aug-2018	0.3	1	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	131	66
SS5	15-Aug-2018	0.9	2	<0.0068	<0.080	<0.018	<0.072	<5.0	<10	127	<50
SS8	15-Aug-2018	1.6	1	<0.0068	<0.080	<0.018	<0.050	<5.0	<10	89	<50
MOECC Table 3 Criteria				**0.32**	**68**	**9.5**	**26**	**55**	**230**	**1700**	**3300**

Notes:
Table to be read in conjunction with accompanying report
Units are expressed in micrograms per gram (µg/g), unless otherwise stated
MOECC Criteria - Ontario Ministry of the Environment and Climate Change, Soil, Ground Water, and Sediment Standards (2011)
Table 3 Criteria - Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
for Industrial/Commercial/Community Property Use with coarse textured soil
Exceedances shown in bold and highlighted text

Figures



Legend

- Phase 1 Study Area
- Phase 1 Subject Property

N

Scale
1:20,000

0 300 600 m

Reference Image : Google Earth Pro

NORTHROCK ENVIRONMENTAL
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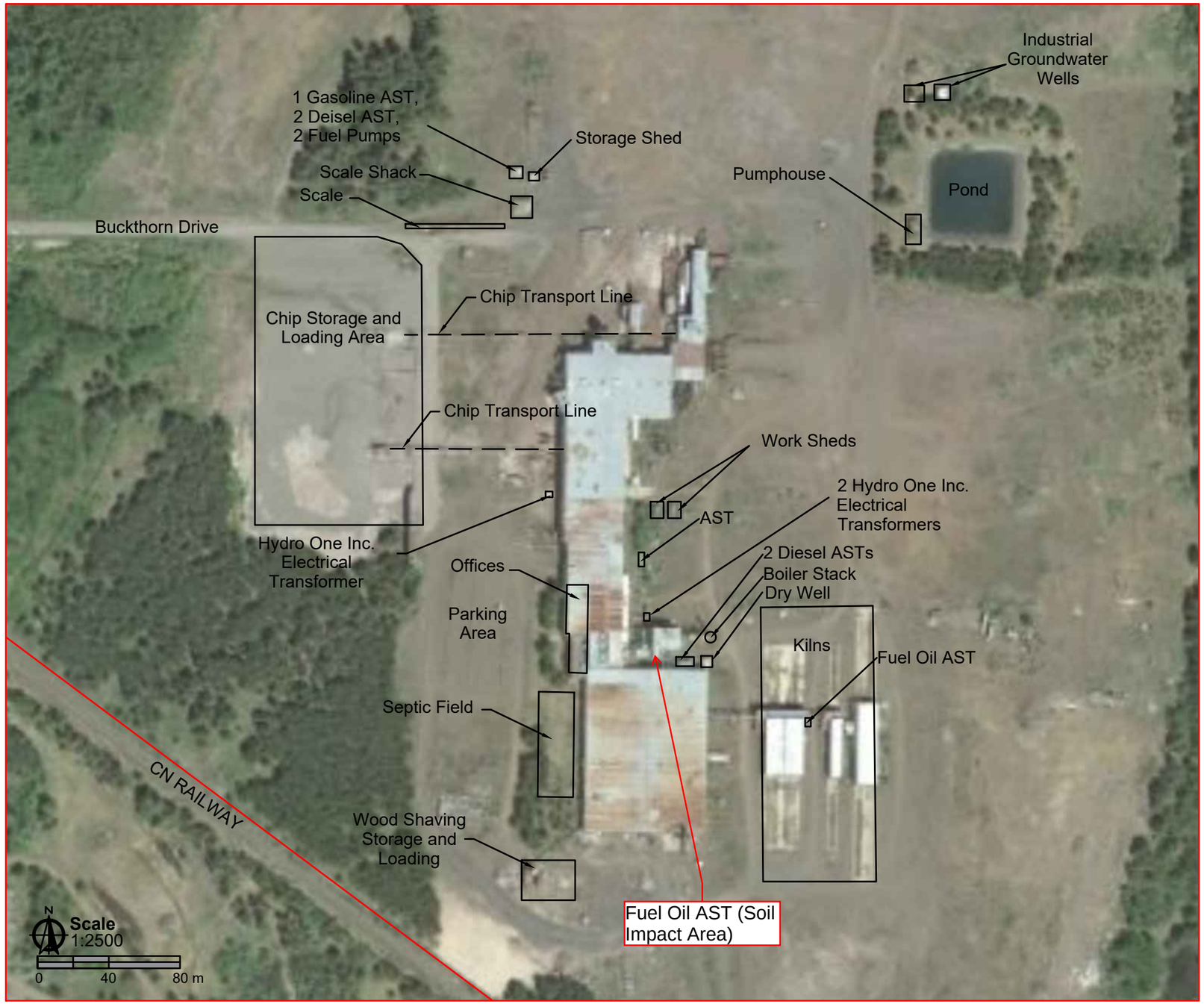
Subsurface Investigation
94 Vibert Road, Oliver Paipoonge, Ontario

Site Location Plan

Drawing No.	Figure 1
Date	July 2018
Ref. No.	18-059-01
Scale	As Shown
Drafter	EM
Approved By	JRG

Legend

Phase 1 Subject Property



Reference Image : Google Earth Pro

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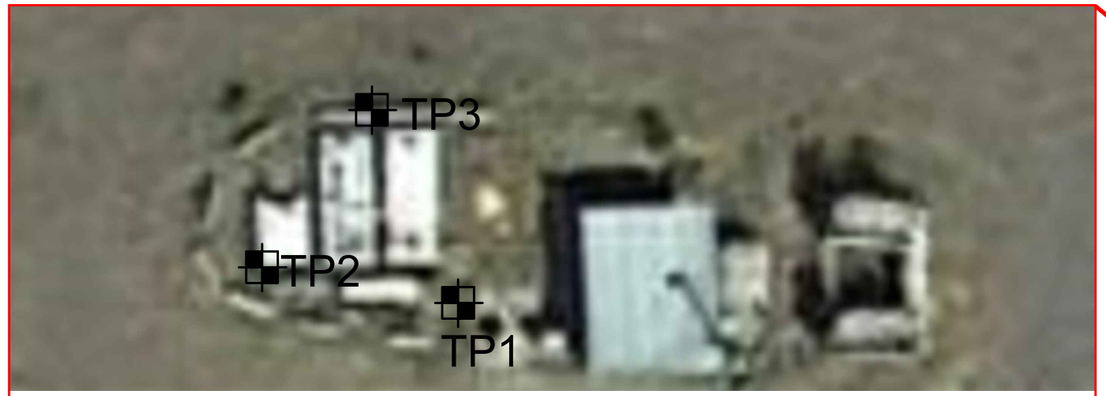
Subsurface Investigation
94 Vibert Road, Oliver Paipoonge, Ontario

Site Layout

Drawing No.	Figure 2		
Date	July 2018		
Ref. No.	18-059-01	Scale	As Shown
Drafter	EM	Approved By	JRG



Legend

TP6 Test Pit Location

N

Scale
1:200

0 4 8 m

Legend

Estimated Remediation Area

HA4 Hand Auger Location

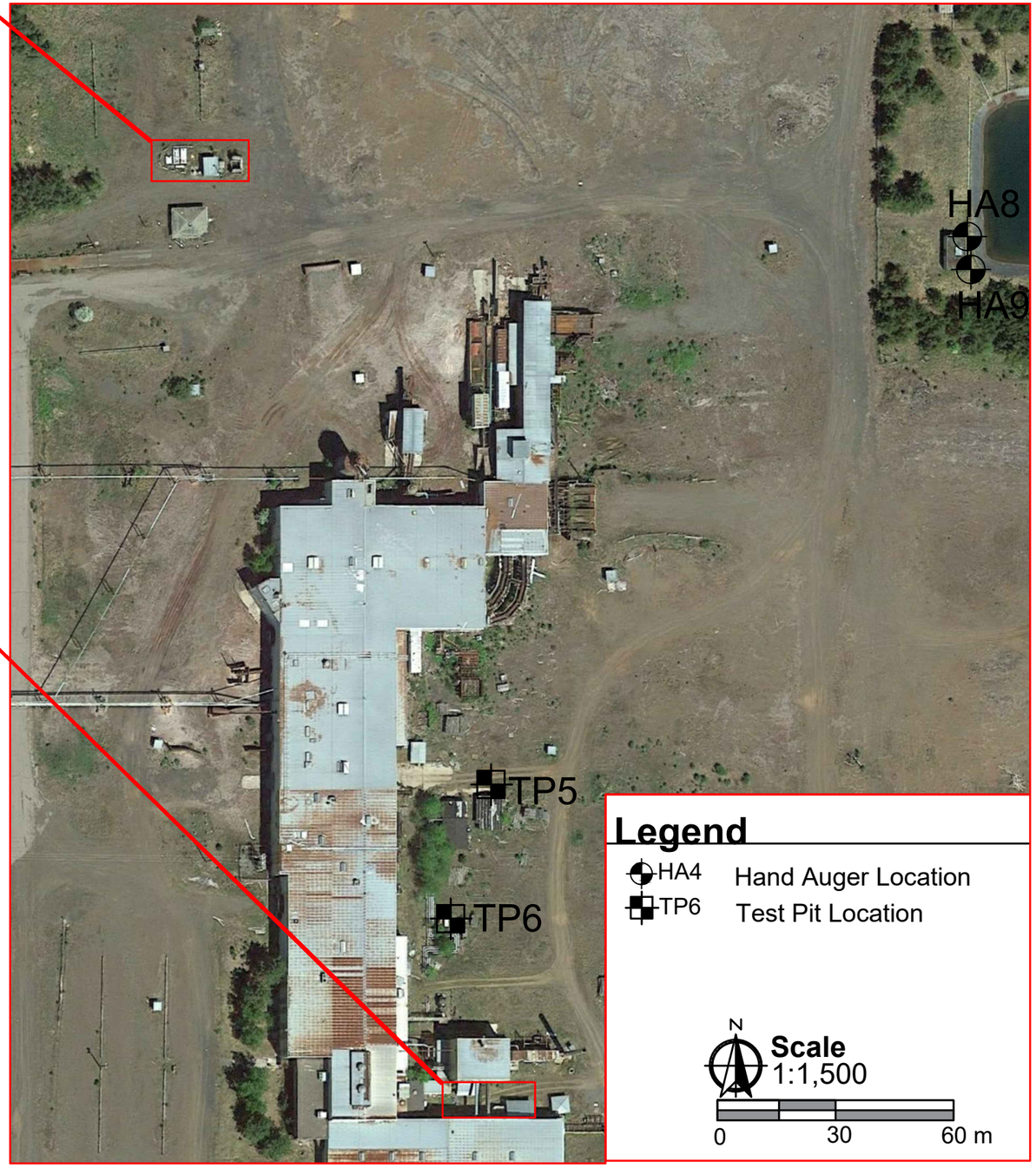
TP6 Test Pit Location

N

Scale
1:200

0 4 8 m

Reference Image : Google Earth Pro



Legend

HA4 Hand Auger Location

TP6 Test Pit Location

N

Scale
1:1,500

0 30 60 m

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94 Vibert Road, Oliver Paipoonge, Ontario

Test Pit
Location Plan

Drawing No.	Figure 3		
Date	August 2018		
Ref. No.	18-059-01	Scale	As Shown
Drafter	CS	Approved By	JRG

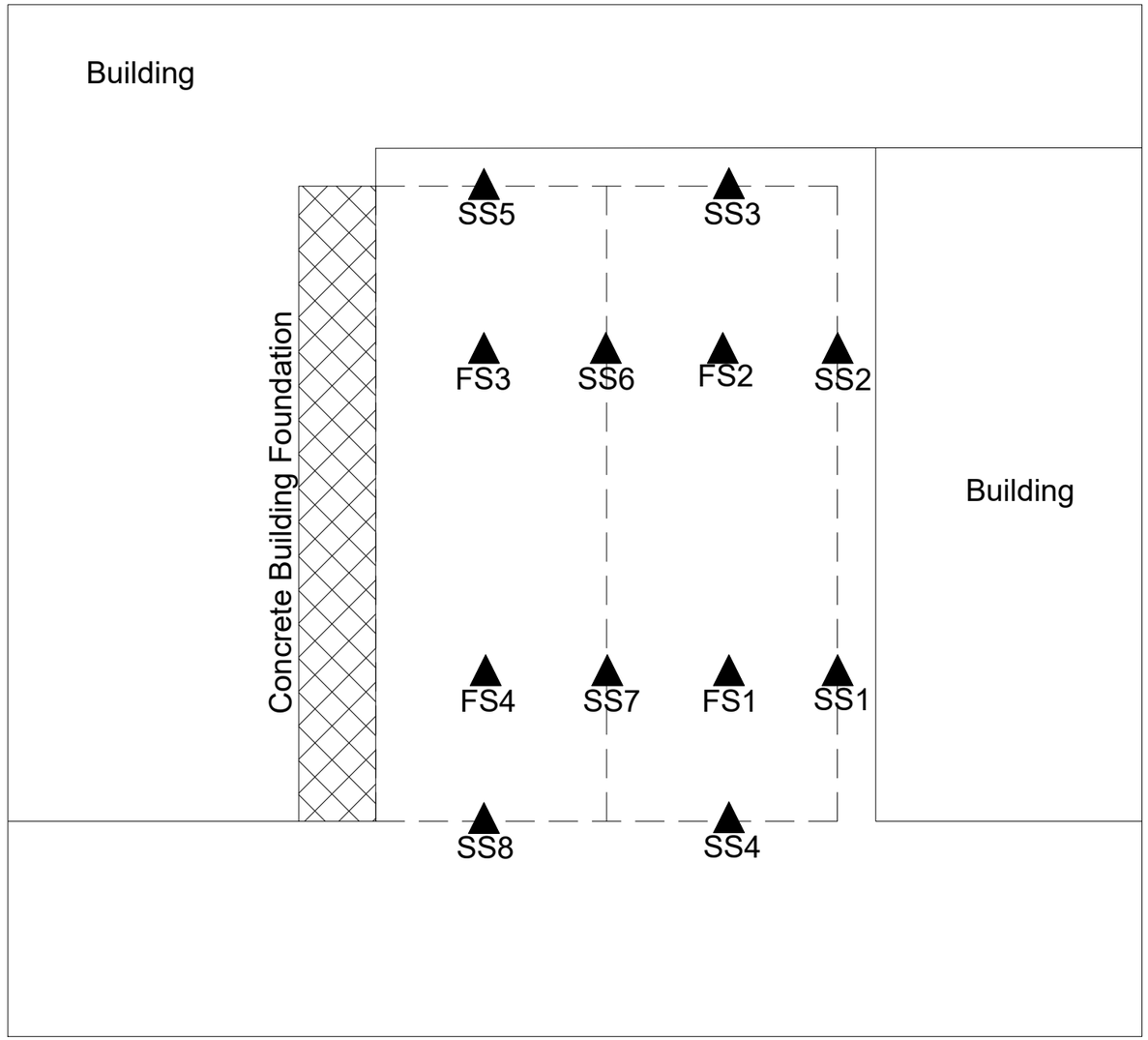
Legend

Remediation Area (8 m^2)

N

Scale
1:200

0 5 10 m



Legend

SS1 Soil Sample Location

Concrete Building Foundation

N

Scale
1:30

0 0.75 1.5 m

Reference Image : Google Earth Pro

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94 Vibert Road, Oliver Paipoonge, Ontario

Remediation Area

Drawing No.	Figure 4		
Date	August 2018		
Ref. No.	18-059-01	Scale	As Shown
Drafter	RS	Approved By	JRG

Appendix A: Photographs

Photo 1:. View facing north showing test pitting in vicinty of fuel tanks.

Photo 2: View facing southwest showing average depth of testpits.

Photo 3: View facing west showing soil type and moisture.

Photo 4: View facing north showing HA4 impacted area.

Photo 5: View facing west-northwest showing removal of fuel tank from impacted area.

Photo 6: View facing north showing impacted area prior to excavation.

Photo 7: View facing north-northeast showing remedial excavation limits.

Photo 8: View facing north-northeast showing final remediated area.

Appendix B: Laboratory Analytical Reports

NORTH ROCK ENVIRONMENTAL
ATTN: Jason Garatti
North Rock Environmental
123 Vimy Street
Thunder Bav ON P7G 1N3

Date Received: 03-AUG-18
Report Date: 09-AUG-18 20:17 (MT)
Version: FINAL

Client Phone: 807-633-7866

Certificate of Analysis

Lab Work Order #: L2141367

Project P.O. #: NOT SUBMITTED
Job Reference: 18-059-01
C of C Numbers:
Legal Site Desc: Northern Hardwoods, O.P.

Christine Paradis
Project Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141367-1 TP1-S6 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	5.73		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	136.7		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	138.7		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	93.8		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	118.8		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-2 TP2-S7 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	6.59		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	115.6		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	116.8		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141367-2 TP2-S7 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Hydrocarbons							
Surrogate: 2-Bromobenzotrifluoride	88.7		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	103.4		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-3 TP3-S9 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	16.3		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	111.0		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	109.4		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	89.9		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	95.1		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-4 TP4-S2 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	8.47		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.040	DLVH	0.040	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.060	DLVH	0.060	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.072		0.072	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	121.8		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	119.7		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	105		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	105		5.0	ug/g		09-AUG-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141367-4 TP4-S2 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Hydrocarbons							
F2 (C10-C16)	5400		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	3450		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	8950		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	119.6		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	99.6		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-5 TP5-S10 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	9.30		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	121.3		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	119.2		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	90.9		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	102.0		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-6 TP6-S7 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	8.29		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141367-6 TP6-S7 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Volatile Organic Compounds							
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	117.6		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	116.1		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	87.6		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	114.9		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-7 TP7-S8 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	6.81		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	128.7		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	131.7		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	87.2		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	104.3		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-8 TP7-S10 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	7.09		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141367-8 TP7-S10 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	127.5		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	130.0		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	88.5		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	109.5		60-140	%	08-AUG-18	09-AUG-18	R4161707
L2141367-9 HA8-S4 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	6.79		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068	VOCJ	0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018	VOCJ	0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080	VOCJ	0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020	VOCJ	0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030	VOCJ	0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	102.8		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	102.3		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0	VOCJ	5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	89.7		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	92.2		60-140	%	08-AUG-18	09-AUG-18	R4161707

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141367-9 HA8-S4 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Hydrocarbons							
Report Remarks : Volatile test was conducted on sample with headspace. Results may be biased low.							
L2141367-10 HA9-S4 Sampled By: EM/RS on 03-AUG-18 @ 12:01 Matrix: Soil							
Physical Tests							
% Moisture	6.65		0.10	%	08-AUG-18	09-AUG-18	R4161739
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	08-AUG-18	09-AUG-18	R4161707
Ethylbenzene	<0.018		0.018	ug/g	08-AUG-18	09-AUG-18	R4161707
Toluene	<0.080		0.080	ug/g	08-AUG-18	09-AUG-18	R4161707
o-Xylene	<0.020		0.020	ug/g	08-AUG-18	09-AUG-18	R4161707
m+p-Xylenes	<0.030		0.030	ug/g	08-AUG-18	09-AUG-18	R4161707
Xylenes (Total)	<0.050		0.050	ug/g		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	123.0		50-140	%	08-AUG-18	09-AUG-18	R4161707
Surrogate: 1,4-Difluorobenzene	122.8		50-140	%	08-AUG-18	09-AUG-18	R4161707
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	08-AUG-18	09-AUG-18	R4161707
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	08-AUG-18	08-AUG-18	R4161867
F3 (C16-C34)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
F4 (C34-C50)	<50		50	ug/g	08-AUG-18	08-AUG-18	R4161867
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161867
Surrogate: 2-Bromobenzotrifluoride	85.8		60-140	%	08-AUG-18	08-AUG-18	R4161867
Surrogate: 3,4-Dichlorotoluene	108.0		60-140	%	08-AUG-18	09-AUG-18	R4161707

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
VOCJ	Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Reference Information

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: NORTH ROCK ENVIRONMENTAL
North Rock Environmental 123 Vimy Street
Thunder Bay ON P7G 1N3
Contact: Jason Garatti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R4161707								
WG2843284-2 LCS								
Benzene			103.4		%		70-130	09-AUG-18
Ethylbenzene			107.7		%		70-130	09-AUG-18
m+p-Xylenes			107.9		%		70-130	09-AUG-18
o-Xylene			106.7		%		70-130	09-AUG-18
Toluene			103.3		%		70-130	09-AUG-18
WG2843284-1 MB								
Benzene			<0.0068		ug/g		0.0068	09-AUG-18
Ethylbenzene			<0.018		ug/g		0.018	09-AUG-18
m+p-Xylenes			<0.030		ug/g		0.03	09-AUG-18
o-Xylene			<0.020		ug/g		0.02	09-AUG-18
Toluene			<0.080		ug/g		0.08	09-AUG-18
Surrogate: 1,4-Difluorobenzene			111.0		%		50-140	09-AUG-18
Surrogate: 4-Bromofluorobenzene			109.1		%		50-140	09-AUG-18
F1-HS-511-WT	**Soil**							
Batch R4161707								
WG2843284-2 LCS								
F1 (C6-C10)			96.0		%		80-120	09-AUG-18
WG2843284-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	09-AUG-18
Surrogate: 3,4-Dichlorotoluene			109.3		%		60-140	09-AUG-18
F2-F4-511-WT	**Soil**							
Batch R4161867								
WG2843535-5 DUP		**L2141367-3**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	08-AUG-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	08-AUG-18
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	08-AUG-18
WG2843535-3 LCS								
F2 (C10-C16)			94.3		%		80-120	08-AUG-18
F3 (C16-C34)			93.3		%		80-120	08-AUG-18
F4 (C34-C50)			96.8		%		80-120	08-AUG-18
WG2843535-2 MB								
F2 (C10-C16)			<10		ug/g		10	08-AUG-18
F3 (C16-C34)			<50		ug/g		50	08-AUG-18
F4 (C34-C50)			<50		ug/g		50	08-AUG-18
Surrogate: 2-Bromobenzotrifluoride			83.8		%		60-140	08-AUG-18

Quality Control Report

Workorder: L2141367 Report Date: 09-AUG-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Soil**							
Batch R4161867								
WG2843535-4 MS		**L2141367-3**						
F2 (C10-C16)			90.5		%		60-140	08-AUG-18
F3 (C16-C34)			99.6		%		60-140	08-AUG-18
F4 (C34-C50)			97.8		%		60-140	08-AUG-18
MOISTURE-WT	**Soil**							
Batch R4161739								
WG2843619-3 DUP		**L2141367-9**						
% Moisture		6.79	6.81		%	0.4	20	09-AUG-18
WG2843619-2 LCS								
% Moisture			99.8		%		90-110	09-AUG-18
WG2843619-1 MB								
% Moisture			<0.10		%		0.1	09-AUG-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

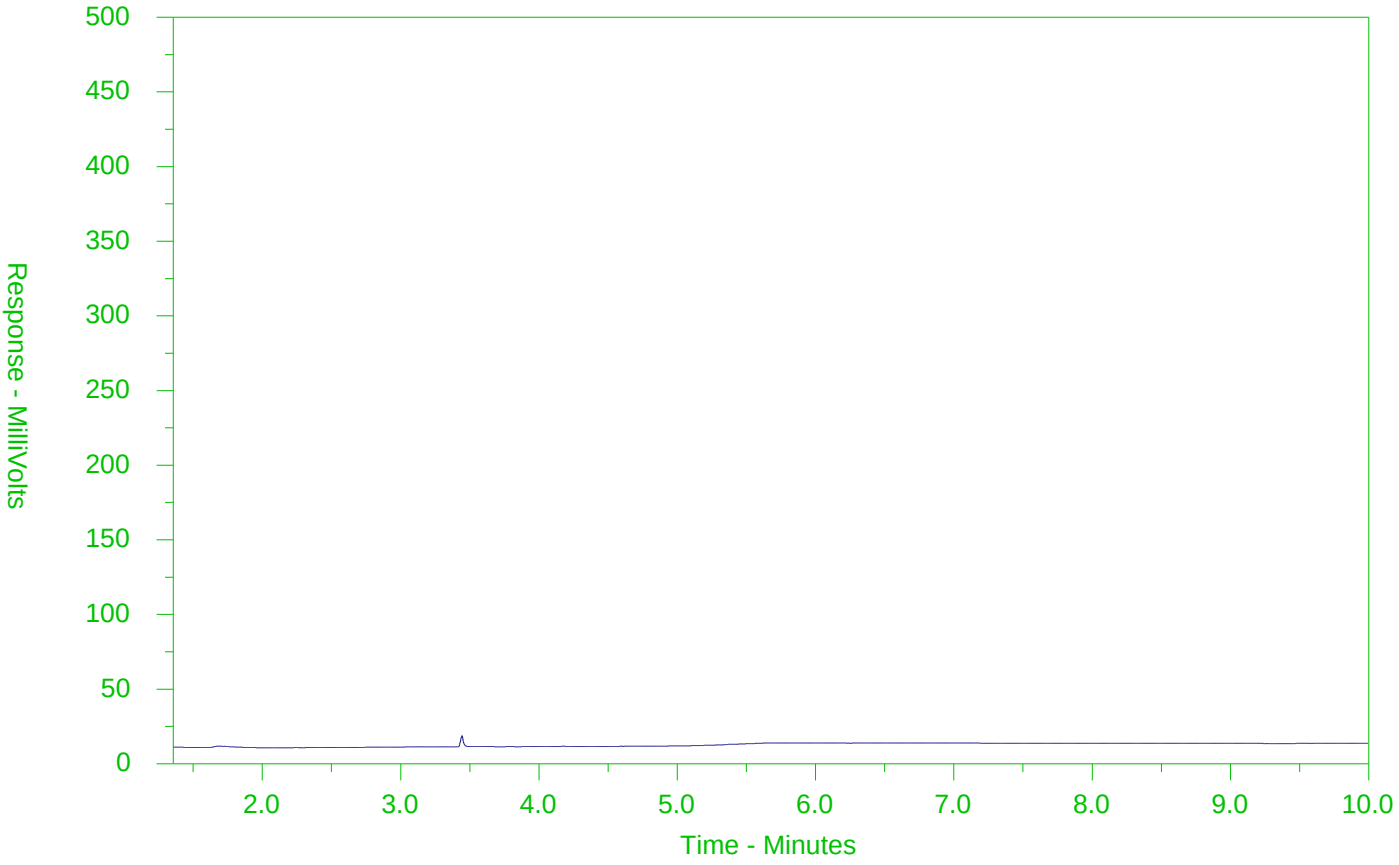
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-1
Client Sample ID: TP1-S6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

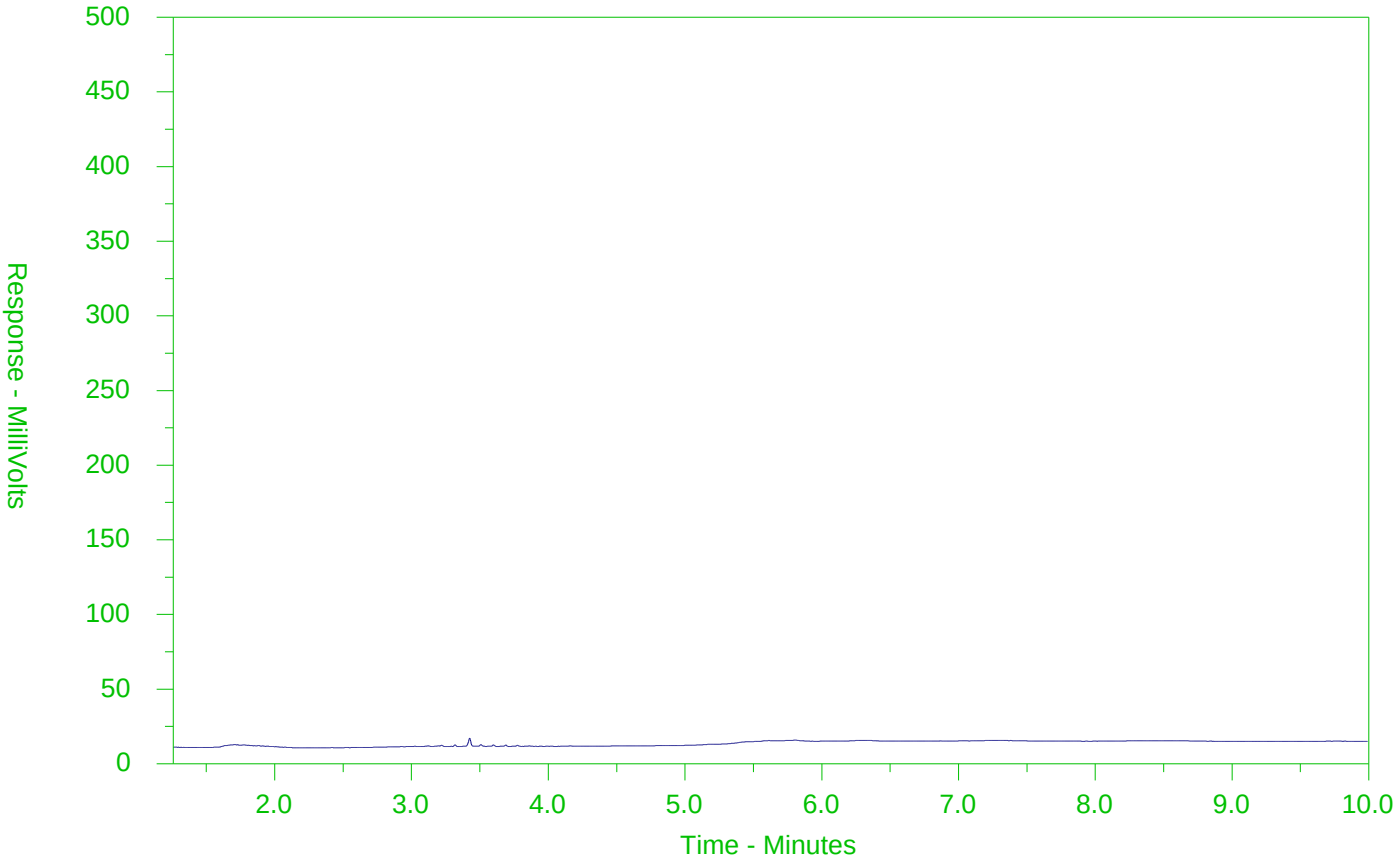
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-2
Client Sample ID: TP2-S7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

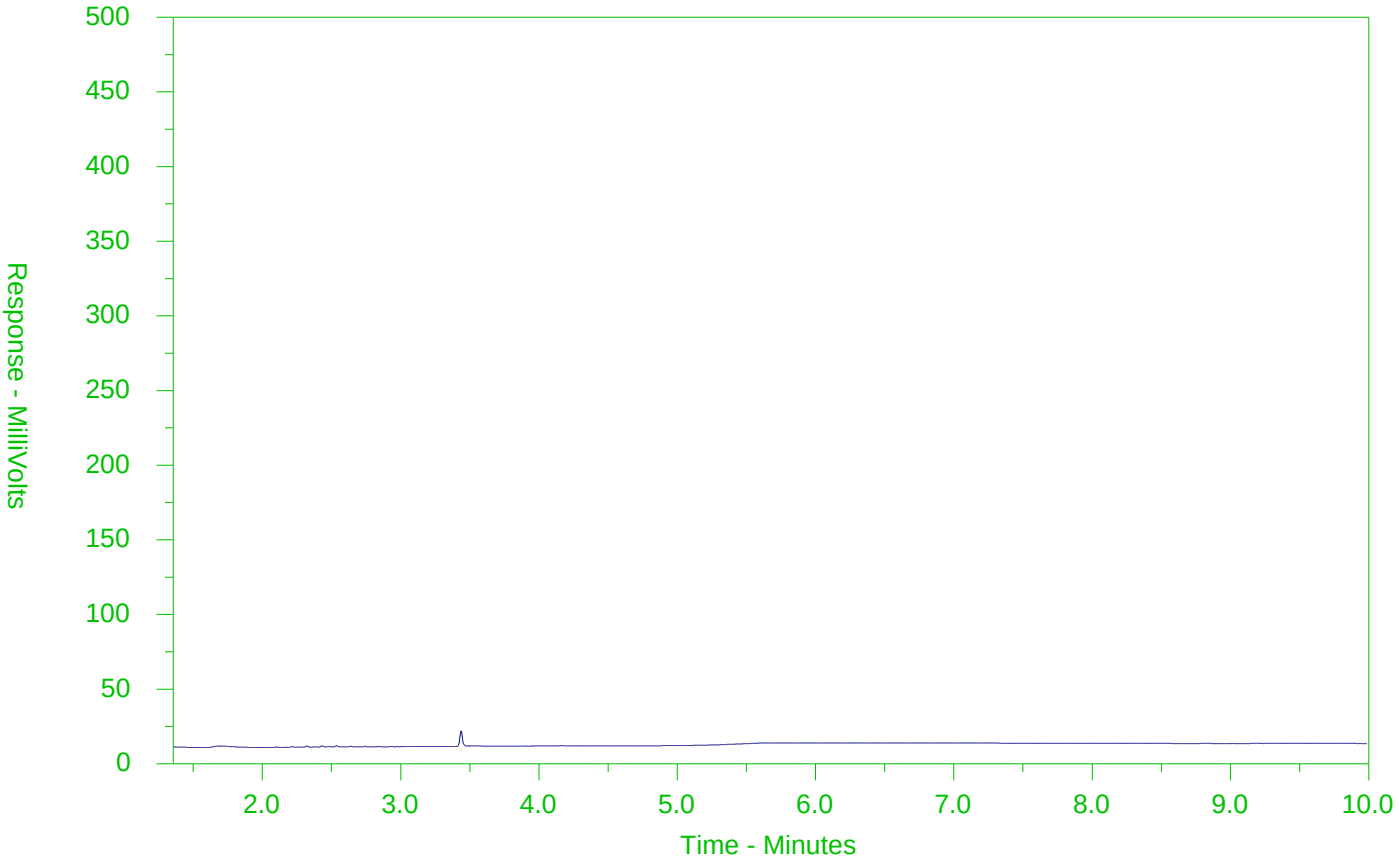
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-3
Client Sample ID: TP3-S9



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

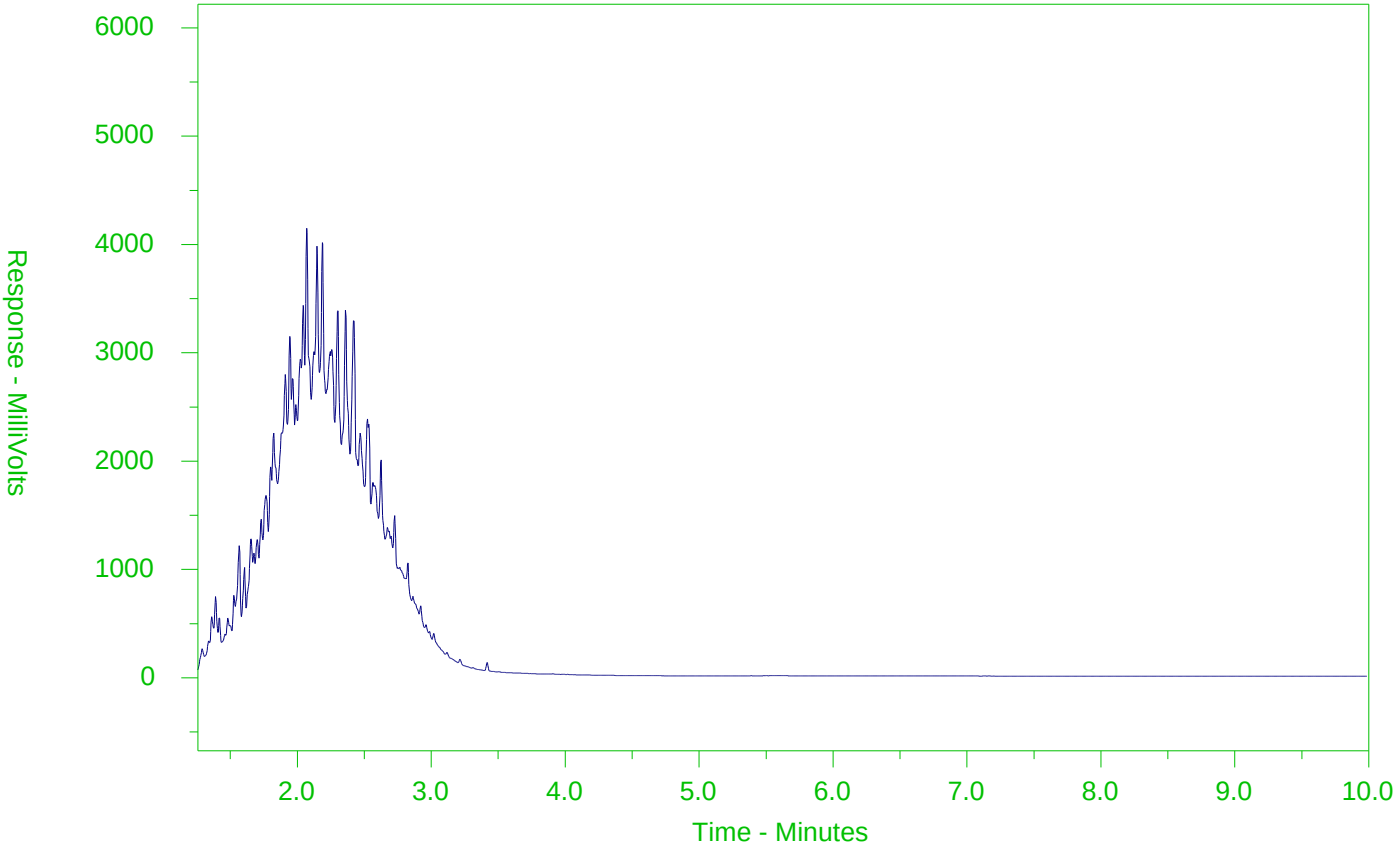
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-4
Client Sample ID: TP4-S2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

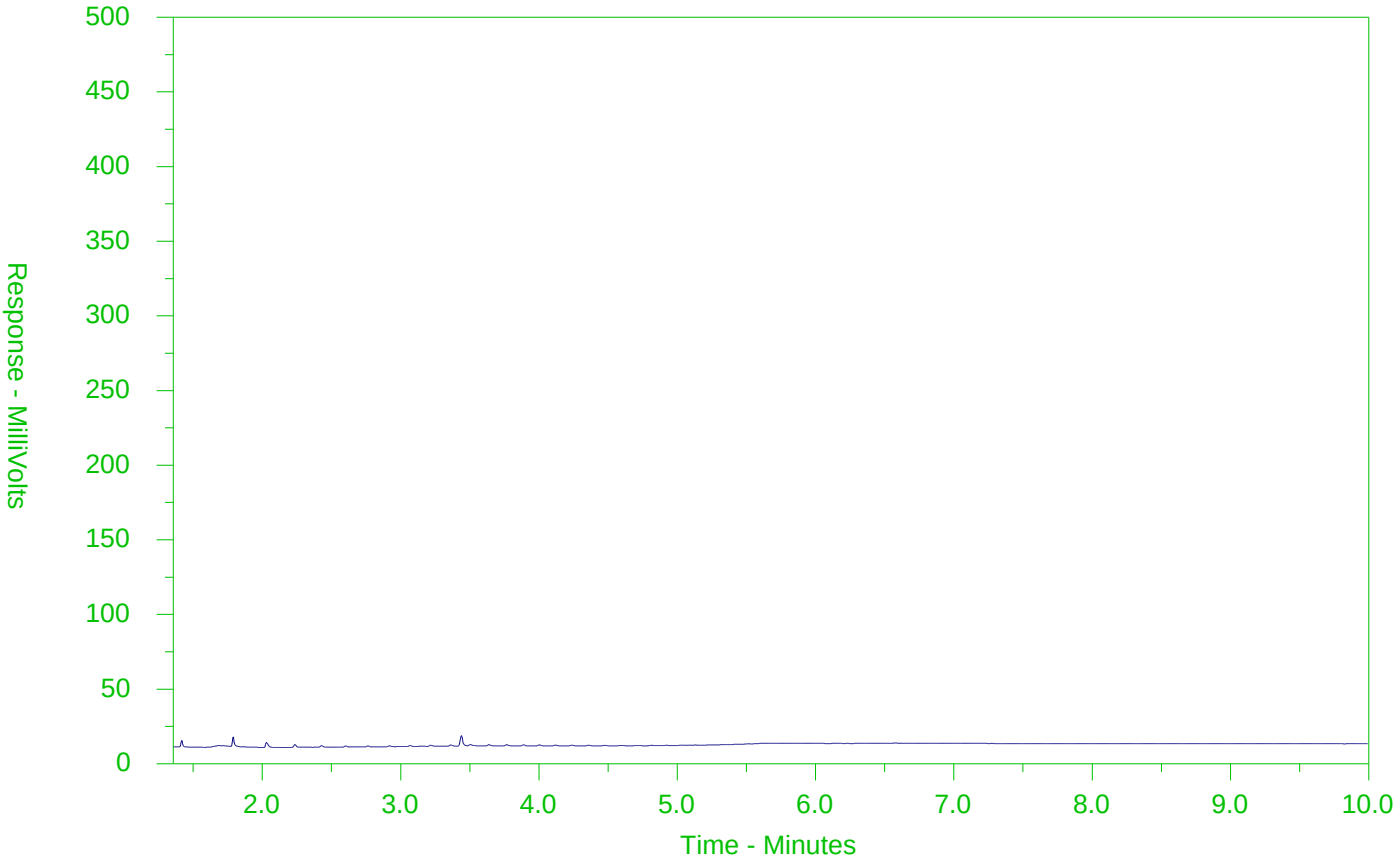
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-5
Client Sample ID: TP5-S10



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

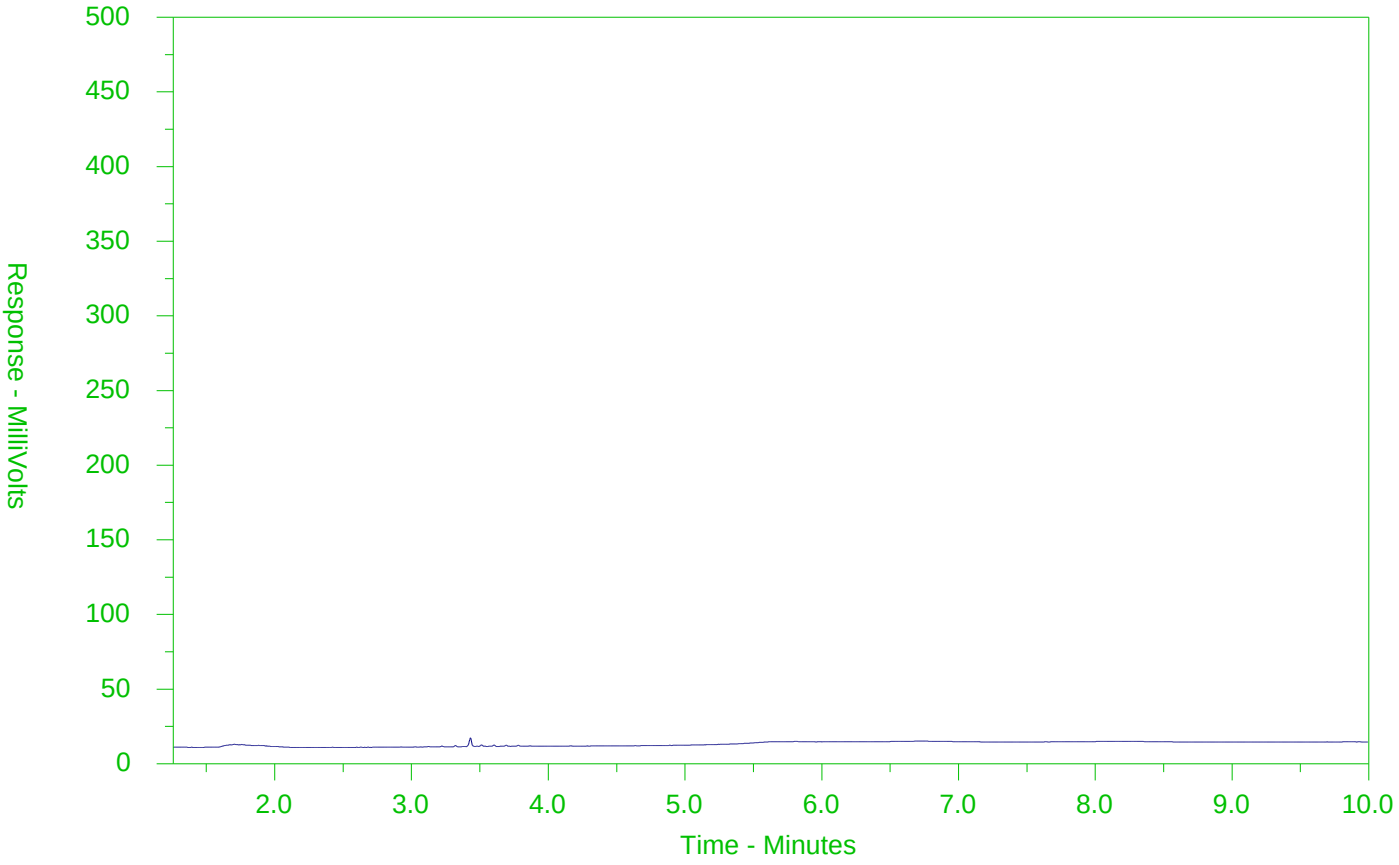
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-6
Client Sample ID: TP6-S7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

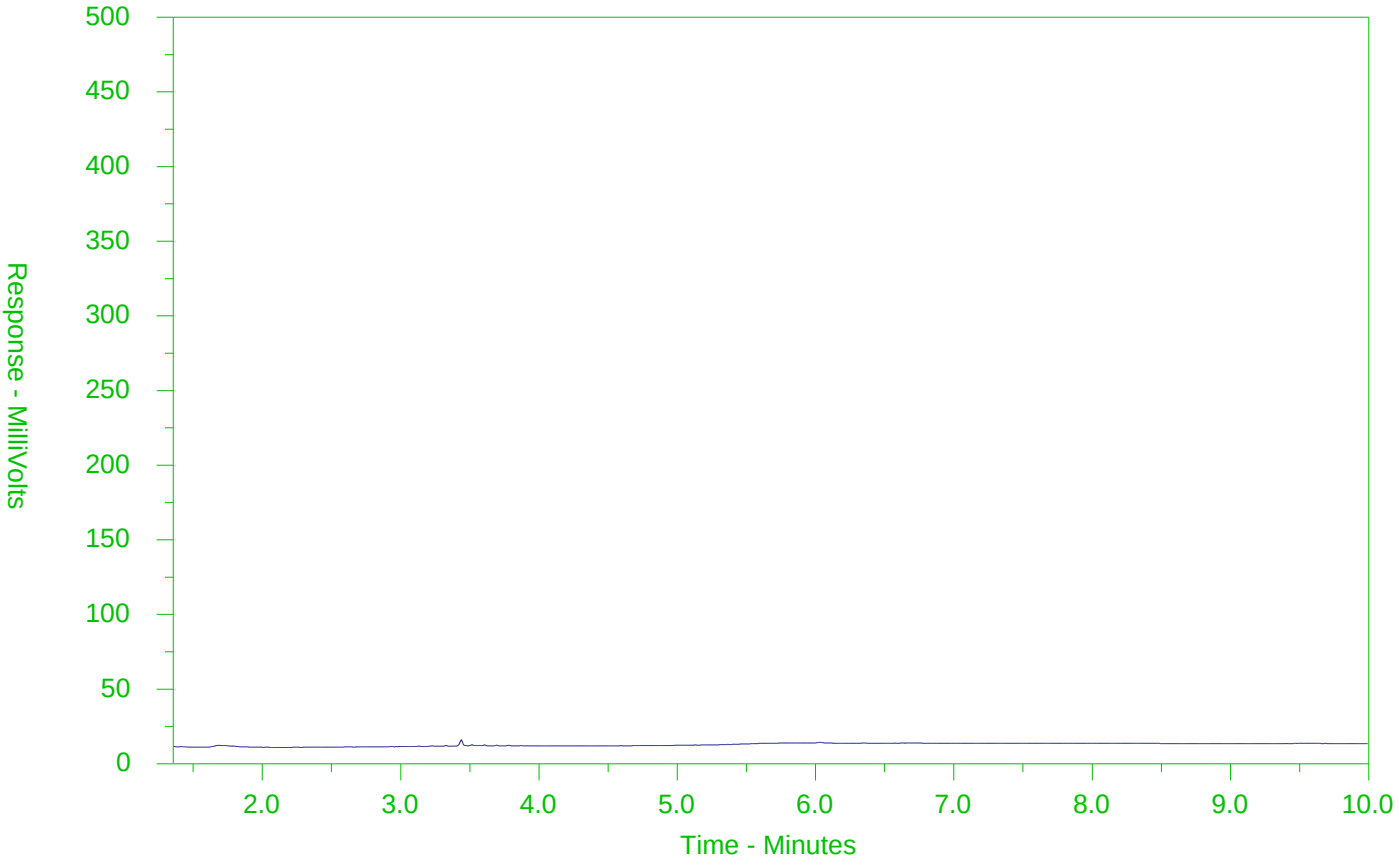
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-7
Client Sample ID: TP7-S8



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

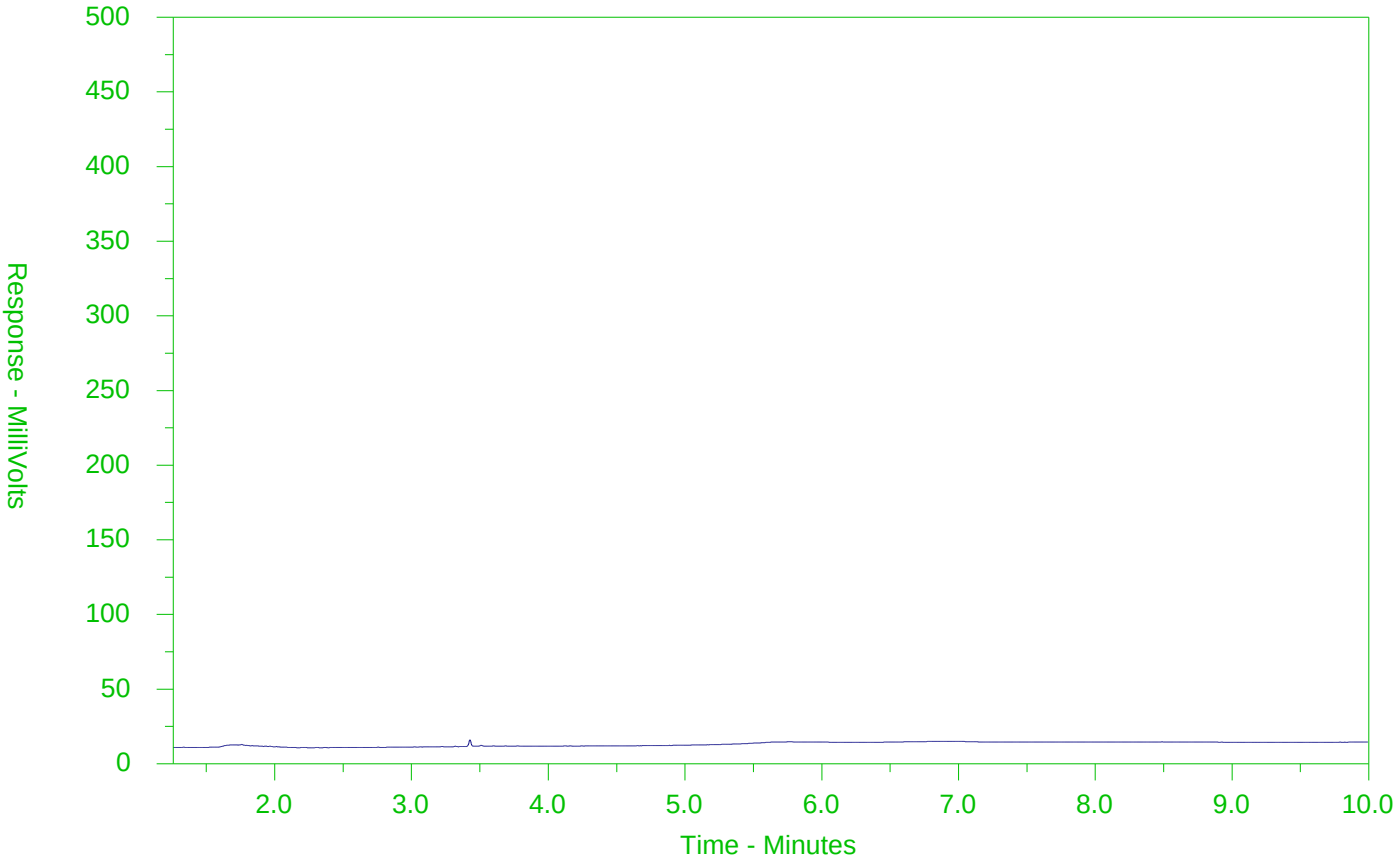
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-8
Client Sample ID: TP7-S10



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

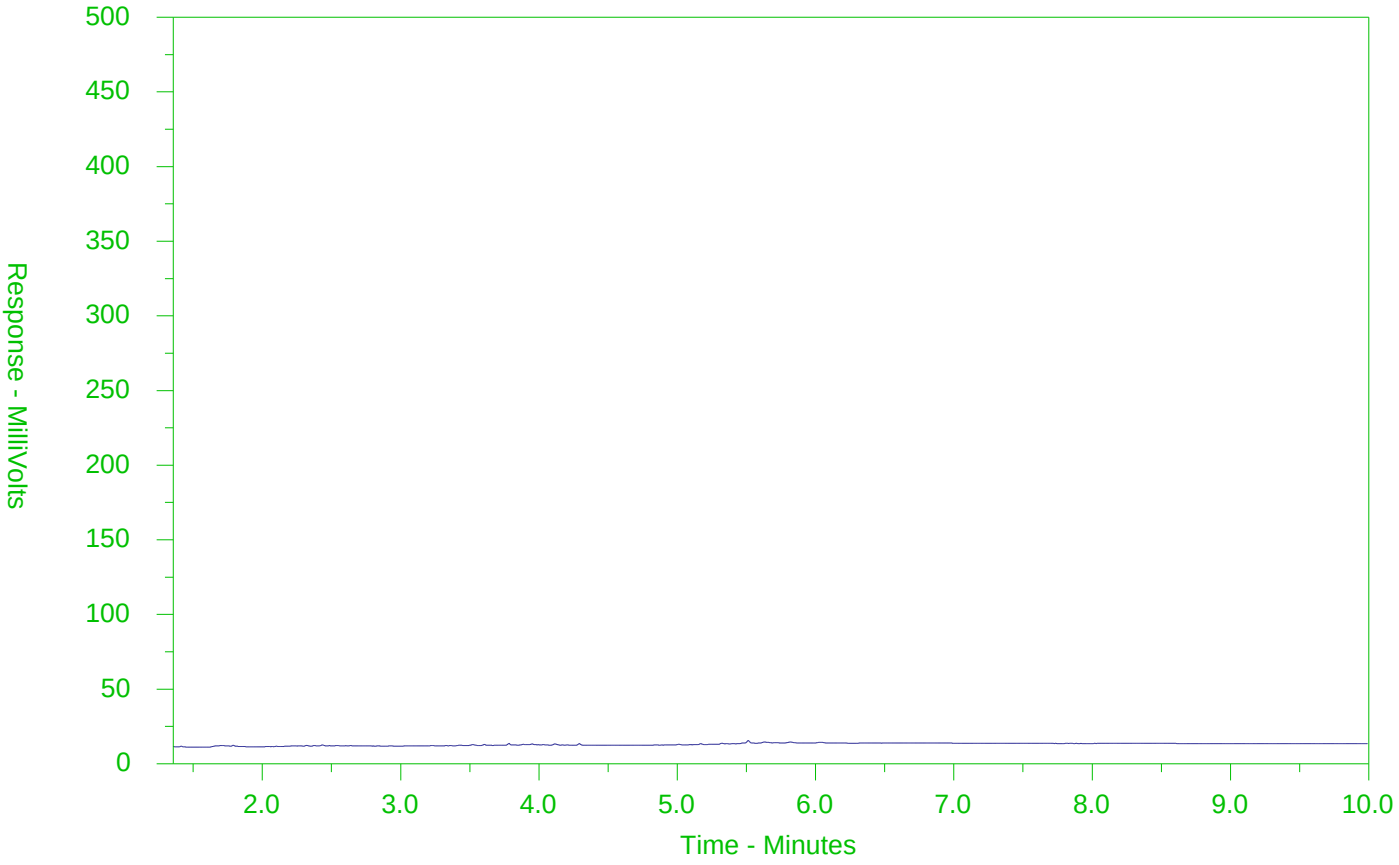
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-9
Client Sample ID: HA8-S4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

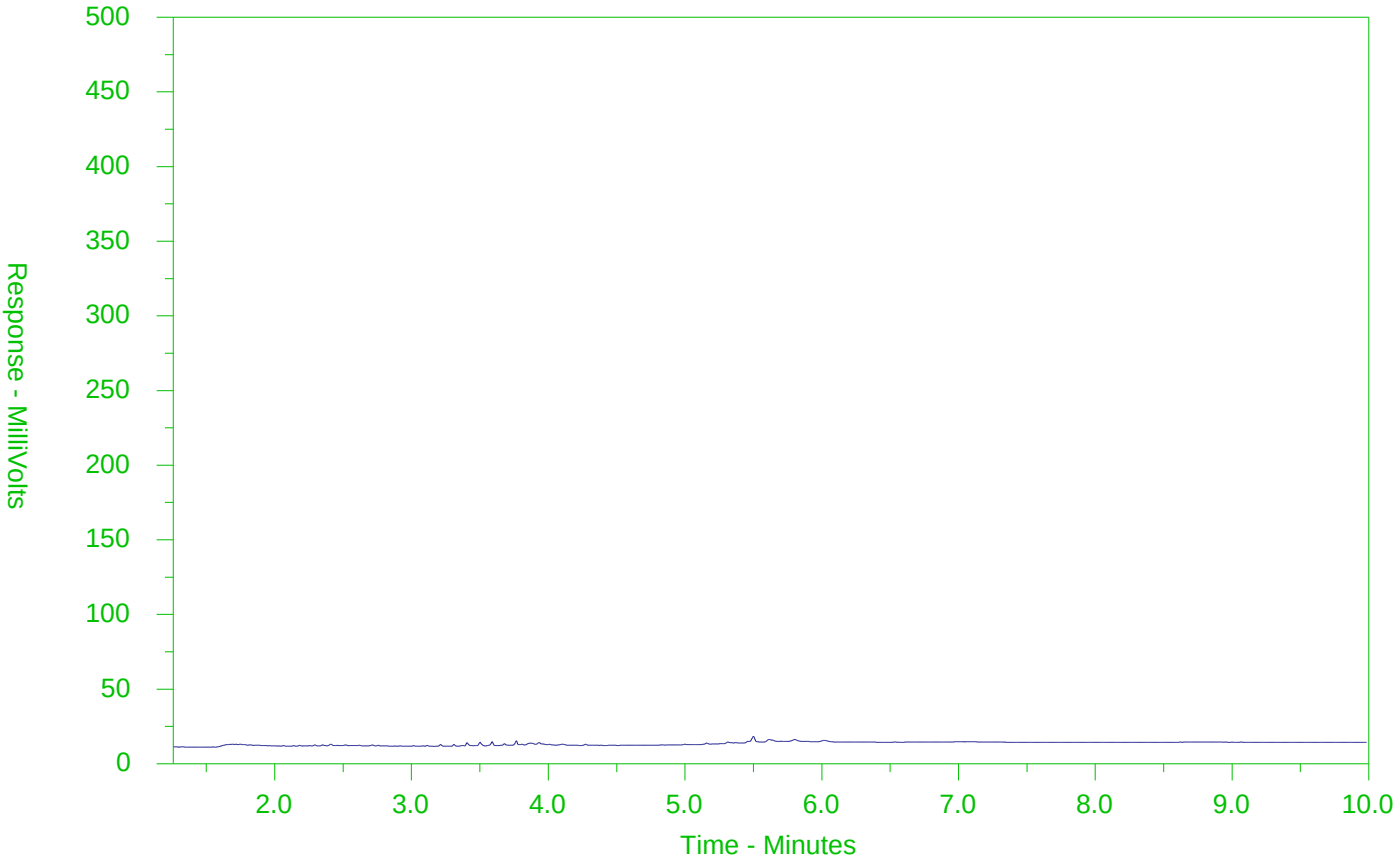
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141367-10
Client Sample ID: HA9-S4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2141367-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	North Rock Environmental
Contact:	Jason Garatti
Phone:	807-633-7866
	Company address below will appear on the final report
Street:	123 Vimy Street
City/Province:	Thunder Bay, ON
Postal Code:	P7G 1N3
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☒ YES ☐ NO

☒ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: jgaratti@nrock.ca

Email 2: emcgonigal@nrock.ca

Email 3: rsmith@nrock.ca

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: jgaratti@nrock.ca

Email 2: pgaratti@tbaytel.net

Project Information

ALS Account # / Quote #:

Job #: 18-059-01

PO / AFE:

LSD: Northern Hardwoods, O.P.

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only): L2141367

ALS Contact: CP

Sampler: EM/RS

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTX, F1-F4	Number of Containers
	TP1-S6	03-Aug-18	pm	Soil	X	3
	TP2-S7				X	
	TP3-S9				X	
	TP4-S2				X	
	TP5-S10				X	
	TP6-S7				X	
	TP7-S8				X	
	TP7-S10				X	
	HA8-S4				X	
	HA9-S4				X	

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human drinking water use? ☐ YES ☒ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

MOE TABLE 2.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
22.2					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	3-Aug-18		LM	Aug 3/18	4:35			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

LS

L2141367-COFC

Client: Northrock environmental

Verified By	Date	Time
Sample Layout Verification: CLM	Aug 3/18	4:51
Labels Verification: LS		

Sample Integrity Issues
Enter information on back page

Do any samples require prep?

NO P F/P

		Sample #:	1-10															
1L	Plastic																	
500mL	Plastic																	
250mL	Plastic																	
145mL	Plastic																	
60mL	Plastic																	
Micro																		
Toxicity Pail																		
1L	Glass																	
500mL	Glass																	
250mL	Glass																	
120mL	Glass																	
60mL	Glass																	
40mL	Vial (Glass)																	
40mL	Methanol Vials	2																
Soil Jar (120, 250 or 500mL)		1																
Other:																		
Other:																		
Total Number of Bottles																		

Trip/Travel/Field Blank Information

Solids Batch#:	Metals Batch#:	T:	D:
Routine Batch#:	Mercury Batch#:	T:	D:
BOD Batch#:	Cyanide Batch#:	T:	D:
Nutrients Batch#:	OGG Batch#:		
DOC/Carbon Batch#:	Phenols Batch#:		
VOC Batch#:			
Other:			

COOLER TRACKING

EPP		Coleman	
Small		Micro (5QT)	
Med		Sm(9QT)	
Lrg		Med(16QT)	1
Micro Box		Lrg(28QT)	
		Lrg(48QT)	

NORTH ROCK ENVIRONMENTAL
ATTN: Jason Garatti
North Rock Environmental
123 Vimy Street
Thunder Bay ON P7G 1N3

Date Received: 15-AUG-18
Report Date: 20-AUG-18 13:42 (MT)
Version: FINAL

Client Phone: 807-633-7866

Certificate of Analysis

Lab Work Order #: L2147555

Project P.O. #: NOT SUBMITTED
Job Reference: 18-059-01
C of C Numbers:
Legal Site Desc: Buchanan Hardwood

Christine Paradis
Project Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2147555-1 FS2 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Physical Tests							
% Moisture	7.04		0.10	%	17-AUG-18	18-AUG-18	R4175850
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	17-AUG-18	20-AUG-18	R4176608
Ethylbenzene	<0.018		0.018	ug/g	17-AUG-18	20-AUG-18	R4176608
Toluene	<0.080		0.080	ug/g	17-AUG-18	20-AUG-18	R4176608
o-Xylene	<0.020		0.020	ug/g	17-AUG-18	20-AUG-18	R4176608
m+p-Xylenes	<0.030		0.030	ug/g	17-AUG-18	20-AUG-18	R4176608
Xylenes (Total)	<0.050		0.050	ug/g		20-AUG-18	
Surrogate: 4-Bromofluorobenzene	108.1		50-140	%	17-AUG-18	20-AUG-18	R4176608
Surrogate: 1,4-Difluorobenzene	107.2		50-140	%	17-AUG-18	20-AUG-18	R4176608
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	17-AUG-18	20-AUG-18	R4176608
F1-BTEX	<5.0		5.0	ug/g		20-AUG-18	
F2 (C10-C16)	<10		10	ug/g	17-AUG-18	20-AUG-18	R4178149
F3 (C16-C34)	141		50	ug/g	17-AUG-18	20-AUG-18	R4178149
F4 (C34-C50)	57		50	ug/g	17-AUG-18	20-AUG-18	R4178149
Total Hydrocarbons (C6-C50)	199		72	ug/g		20-AUG-18	
Chrom. to baseline at nC50	YES				17-AUG-18	20-AUG-18	R4178149
Surrogate: 2-Bromobenzotrifluoride	90.9		60-140	%	17-AUG-18	20-AUG-18	R4178149
Surrogate: 3,4-Dichlorotoluene	113.0		60-140	%	17-AUG-18	20-AUG-18	R4176608
L2147555-2 FS4 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Physical Tests							
% Moisture	5.80		0.10	%	17-AUG-18	18-AUG-18	R4175850
pH	7.16		0.10	pH units		18-AUG-18	R4176197
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	17-AUG-18	20-AUG-18	R4176608
Ethylbenzene	<0.018		0.018	ug/g	17-AUG-18	20-AUG-18	R4176608
Toluene	<0.080		0.080	ug/g	17-AUG-18	20-AUG-18	R4176608
o-Xylene	<0.020		0.020	ug/g	17-AUG-18	20-AUG-18	R4176608
m+p-Xylenes	<0.030		0.030	ug/g	17-AUG-18	20-AUG-18	R4176608
Xylenes (Total)	<0.050		0.050	ug/g		20-AUG-18	
Surrogate: 4-Bromofluorobenzene	108.1		50-140	%	17-AUG-18	20-AUG-18	R4176608
Surrogate: 1,4-Difluorobenzene	109.5		50-140	%	17-AUG-18	20-AUG-18	R4176608
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	17-AUG-18	20-AUG-18	R4176608
F1-BTEX	<5.0		5.0	ug/g		20-AUG-18	
F2 (C10-C16)	<10		10	ug/g	17-AUG-18	20-AUG-18	R4178149
F3 (C16-C34)	59		50	ug/g	17-AUG-18	20-AUG-18	R4178149
F4 (C34-C50)	<50		50	ug/g	17-AUG-18	20-AUG-18	R4178149
Total Hydrocarbons (C6-C50)	<72		72	ug/g		20-AUG-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2147555-2 FS4 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Hydrocarbons							
Chrom. to baseline at nC50	YES				17-AUG-18	20-AUG-18	R4178149
Surrogate: 2-Bromobenzotrifluoride	85.4		60-140	%	17-AUG-18	20-AUG-18	R4178149
Surrogate: 3,4-Dichlorotoluene	118.3		60-140	%	17-AUG-18	20-AUG-18	R4176608
L2147555-3 SS1 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Physical Tests							
% Moisture	5.54		0.10	%	17-AUG-18	18-AUG-18	R4175856
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	17-AUG-18	20-AUG-18	R4176608
Ethylbenzene	<0.018		0.018	ug/g	17-AUG-18	20-AUG-18	R4176608
Toluene	<0.080		0.080	ug/g	17-AUG-18	20-AUG-18	R4176608
o-Xylene	<0.020		0.020	ug/g	17-AUG-18	20-AUG-18	R4176608
m+p-Xylenes	<0.030		0.030	ug/g	17-AUG-18	20-AUG-18	R4176608
Xylenes (Total)	<0.050		0.050	ug/g		20-AUG-18	
Surrogate: 4-Bromofluorobenzene	104.8		50-140	%	17-AUG-18	20-AUG-18	R4176608
Surrogate: 1,4-Difluorobenzene	104.7		50-140	%	17-AUG-18	20-AUG-18	R4176608
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	17-AUG-18	20-AUG-18	R4176608
F1-BTEX	<5.0		5.0	ug/g		20-AUG-18	
F2 (C10-C16)	<10		10	ug/g	17-AUG-18	20-AUG-18	R4178149
F3 (C16-C34)	131		50	ug/g	17-AUG-18	20-AUG-18	R4178149
F4 (C34-C50)	66		50	ug/g	17-AUG-18	20-AUG-18	R4178149
Total Hydrocarbons (C6-C50)	197		72	ug/g		20-AUG-18	
Chrom. to baseline at nC50	YES				17-AUG-18	20-AUG-18	R4178149
Surrogate: 2-Bromobenzotrifluoride	90.5		60-140	%	17-AUG-18	20-AUG-18	R4178149
Surrogate: 3,4-Dichlorotoluene	114.9		60-140	%	17-AUG-18	20-AUG-18	R4176608
L2147555-4 SS5 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Physical Tests							
% Moisture	8.77		0.10	%	17-AUG-18	18-AUG-18	R4175856
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	17-AUG-18	20-AUG-18	R4176608
Ethylbenzene	<0.018		0.018	ug/g	17-AUG-18	20-AUG-18	R4176608
Toluene	<0.080		0.080	ug/g	17-AUG-18	20-AUG-18	R4176608
o-Xylene	<0.020		0.020	ug/g	17-AUG-18	20-AUG-18	R4176608
m+p-Xylenes	<0.030		0.030	ug/g	17-AUG-18	20-AUG-18	R4176608
Xylenes (Total)	<0.050		0.050	ug/g		20-AUG-18	
Surrogate: 4-Bromofluorobenzene	99.4		50-140	%	17-AUG-18	20-AUG-18	R4176608
Surrogate: 1,4-Difluorobenzene	95.3		50-140	%	17-AUG-18	20-AUG-18	R4176608
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	17-AUG-18	20-AUG-18	R4176608

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2147555-4 SS5 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Hydrocarbons							
F1-BTEX	<5.0		5.0	ug/g		20-AUG-18	
F2 (C10-C16)	<10		10	ug/g	17-AUG-18	20-AUG-18	R4178149
F3 (C16-C34)	127		50	ug/g	17-AUG-18	20-AUG-18	R4178149
F4 (C34-C50)	<50		50	ug/g	17-AUG-18	20-AUG-18	R4178149
Total Hydrocarbons (C6-C50)	127		72	ug/g		20-AUG-18	
Chrom. to baseline at nC50	YES				17-AUG-18	20-AUG-18	R4178149
Surrogate: 2-Bromobenzotrifluoride	84.8		60-140	%	17-AUG-18	20-AUG-18	R4178149
Surrogate: 3,4-Dichlorotoluene	106.6		60-140	%	17-AUG-18	20-AUG-18	R4176608
L2147555-5 SS8 Sampled By: RS on 15-AUG-18 @ 00:01 Matrix: Soil							
Physical Tests							
% Moisture	10.2		0.10	%	17-AUG-18	18-AUG-18	R4175856
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	17-AUG-18	20-AUG-18	R4176608
Ethylbenzene	<0.018		0.018	ug/g	17-AUG-18	20-AUG-18	R4176608
Toluene	<0.080		0.080	ug/g	17-AUG-18	20-AUG-18	R4176608
o-Xylene	<0.020		0.020	ug/g	17-AUG-18	20-AUG-18	R4176608
m+p-Xylenes	<0.030		0.030	ug/g	17-AUG-18	20-AUG-18	R4176608
Xylenes (Total)	<0.050		0.050	ug/g		20-AUG-18	
Surrogate: 4-Bromofluorobenzene	95.8		50-140	%	17-AUG-18	20-AUG-18	R4176608
Surrogate: 1,4-Difluorobenzene	97.6		50-140	%	17-AUG-18	20-AUG-18	R4176608
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	17-AUG-18	20-AUG-18	R4176608
F1-BTEX	<5.0		5.0	ug/g		20-AUG-18	
F2 (C10-C16)	<10		10	ug/g	17-AUG-18	20-AUG-18	R4178149
F3 (C16-C34)	89		50	ug/g	17-AUG-18	20-AUG-18	R4178149
F4 (C34-C50)	<50		50	ug/g	17-AUG-18	20-AUG-18	R4178149
Total Hydrocarbons (C6-C50)	89		72	ug/g		20-AUG-18	
Chrom. to baseline at nC50	YES				17-AUG-18	20-AUG-18	R4178149
Surrogate: 2-Bromobenzotrifluoride	90.5		60-140	%	17-AUG-18	20-AUG-18	R4178149
Surrogate: 3,4-Dichlorotoluene	83.6		60-140	%	17-AUG-18	20-AUG-18	R4176608

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

Reference Information

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: NORTH ROCK ENVIRONMENTAL
North Rock Environmental 123 Vimy Street
Thunder Bay ON P7G 1N3
Contact: Jason Garatti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R4176608								
WG2852722-4 DUP		**L2147555-1**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	20-AUG-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	20-AUG-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	20-AUG-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	20-AUG-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	20-AUG-18
WG2852722-2 LCS								
Benzene			103.0		%		70-130	20-AUG-18
Ethylbenzene			104.0		%		70-130	20-AUG-18
m+p-Xylenes			103.0		%		70-130	20-AUG-18
o-Xylene			103.1		%		70-130	20-AUG-18
Toluene			103.2		%		70-130	20-AUG-18
WG2852722-1 MB								
Benzene			<0.0068		ug/g		0.0068	20-AUG-18
Ethylbenzene			<0.018		ug/g		0.018	20-AUG-18
m+p-Xylenes			<0.030		ug/g		0.03	20-AUG-18
o-Xylene			<0.020		ug/g		0.02	20-AUG-18
Toluene			<0.080		ug/g		0.08	20-AUG-18
Surrogate: 1,4-Difluorobenzene			85.1		%		50-140	20-AUG-18
Surrogate: 4-Bromofluorobenzene			92.7		%		50-140	20-AUG-18
WG2852722-5 MS		**L2147555-1**						
Benzene			116.2		%		60-140	20-AUG-18
Ethylbenzene			117.8		%		60-140	20-AUG-18
m+p-Xylenes			116.3		%		60-140	20-AUG-18
o-Xylene			116.4		%		60-140	20-AUG-18
Toluene			116.0		%		60-140	20-AUG-18
F1-HS-511-WT	**Soil**							
Batch R4176608								
WG2852722-4 DUP		**L2147555-1**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	20-AUG-18
WG2852722-2 LCS								
F1 (C6-C10)			100.7		%		80-120	20-AUG-18
WG2852722-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	20-AUG-18
Surrogate: 3,4-Dichlorotoluene			92.3		%		60-140	20-AUG-18
WG2852722-6 MS		**L2147555-2**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4176608								
WG2852722-6 MS		**L2147555-2**						
F1 (C6-C10)			113.5		%		60-140	20-AUG-18
F2-F4-511-WT	**Soil**							
Batch R4178149								
WG2852601-2 LCS								
F2 (C10-C16)			101.1		%		80-120	20-AUG-18
F3 (C16-C34)			103.1		%		80-120	20-AUG-18
F4 (C34-C50)			102.3		%		80-120	20-AUG-18
WG2852601-1 MB								
F2 (C10-C16)			<10		ug/g		10	20-AUG-18
F3 (C16-C34)			<50		ug/g		50	20-AUG-18
F4 (C34-C50)			<50		ug/g		50	20-AUG-18
Surrogate: 2-Bromobenzotrifluoride			84.3		%		60-140	20-AUG-18
MOISTURE-WT	**Soil**							
Batch R4175850								
WG2852609-2 LCS								
% Moisture			99.7		%		90-110	18-AUG-18
WG2852609-1 MB								
% Moisture			<0.10		%		0.1	18-AUG-18
Batch R4175856								
WG2852699-3 DUP		**L2147555-3**						
% Moisture		5.54	5.75		%	3.6	20	18-AUG-18
WG2852699-2 LCS								
% Moisture			99.9		%		90-110	18-AUG-18
WG2852699-1 MB								
% Moisture			<0.10		%		0.1	18-AUG-18
PH-WT	**Soil**							
Batch R4176197								
WG2853395-1 LCS								
pH			6.95		pH units		6.9-7.1	18-AUG-18

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

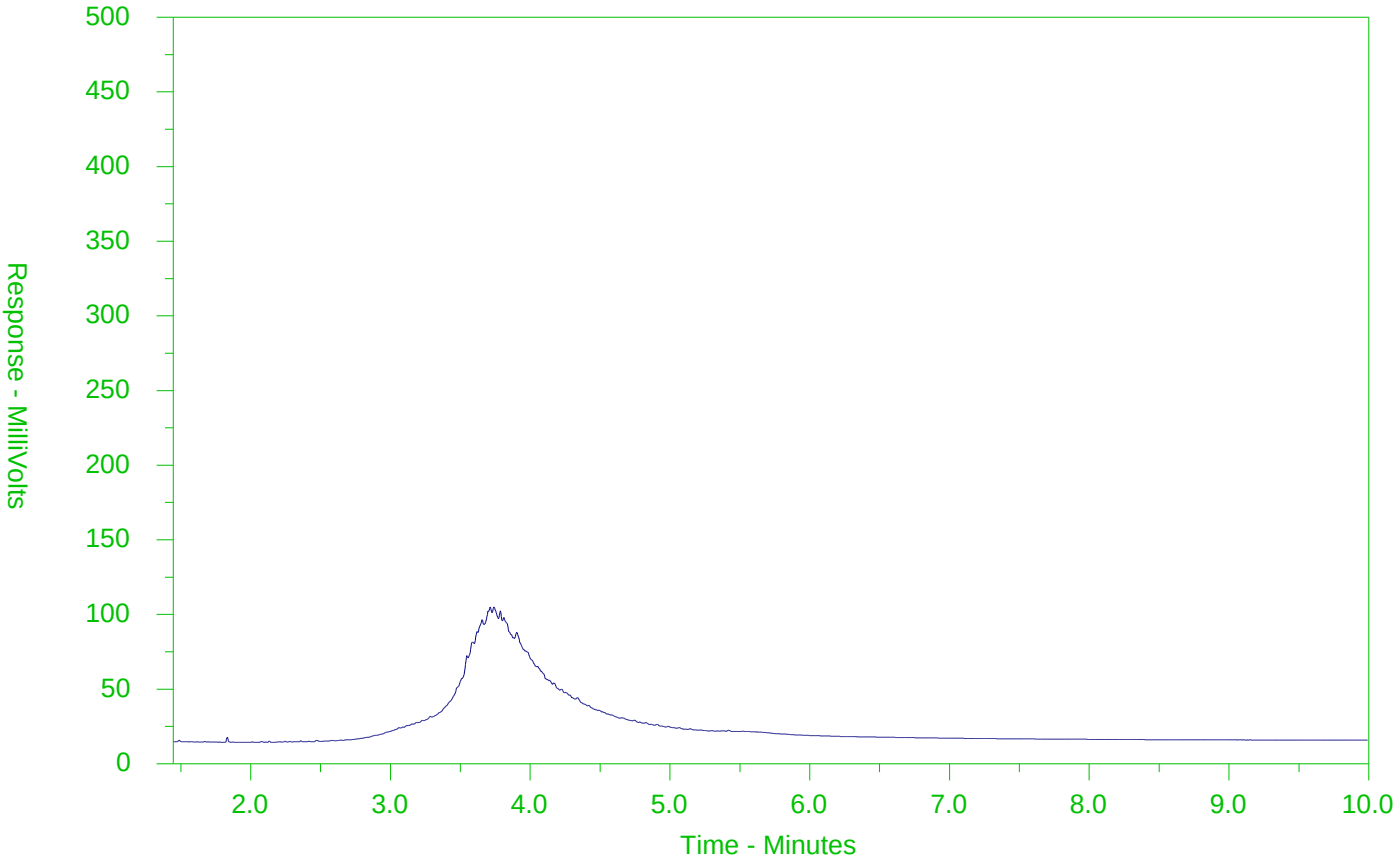
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2147555-1
Client Sample ID: FS2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

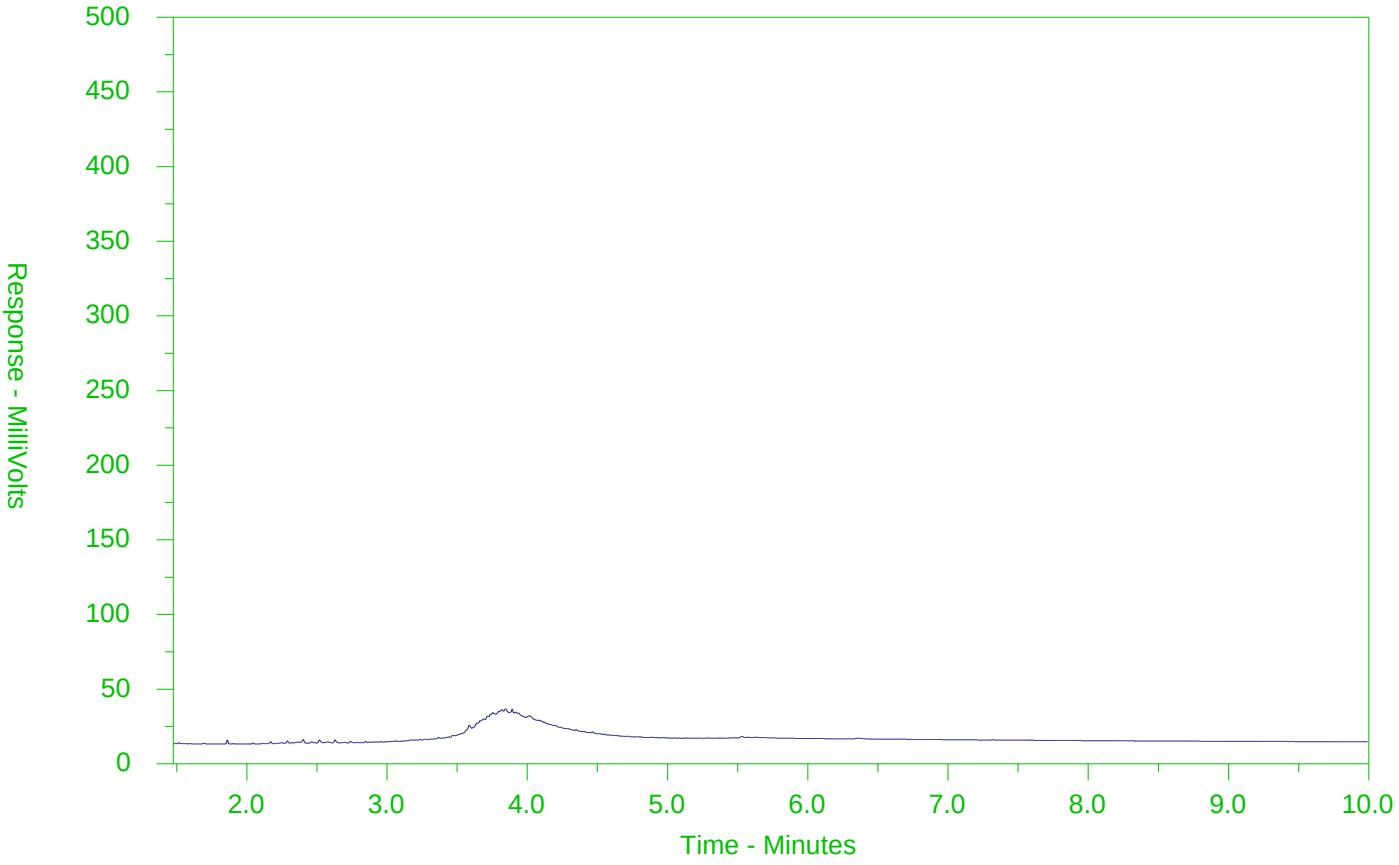
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2147555-2
Client Sample ID: FS4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

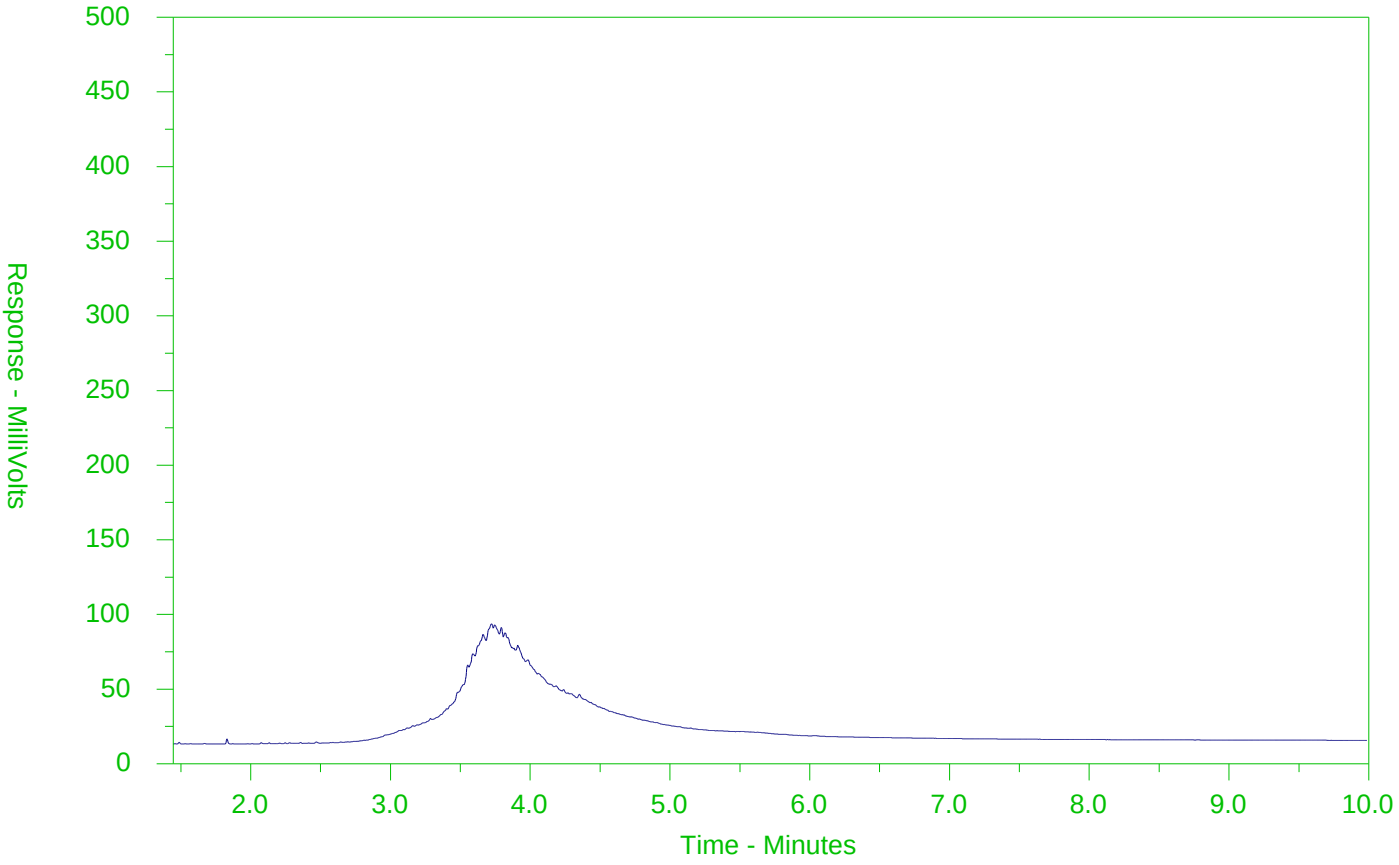
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2147555-3
Client Sample ID: SS1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

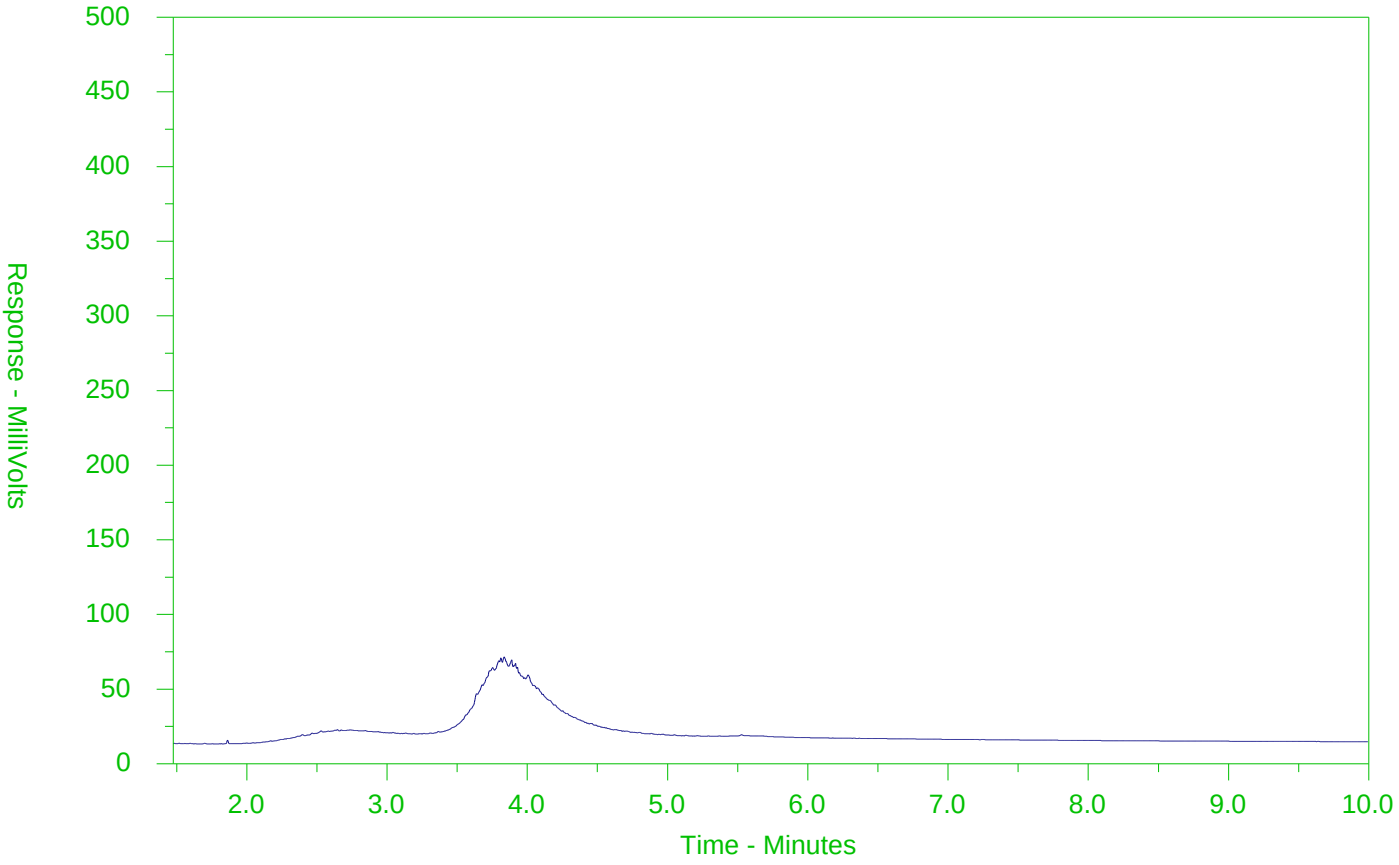
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2147555-4
Client Sample ID: SS5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

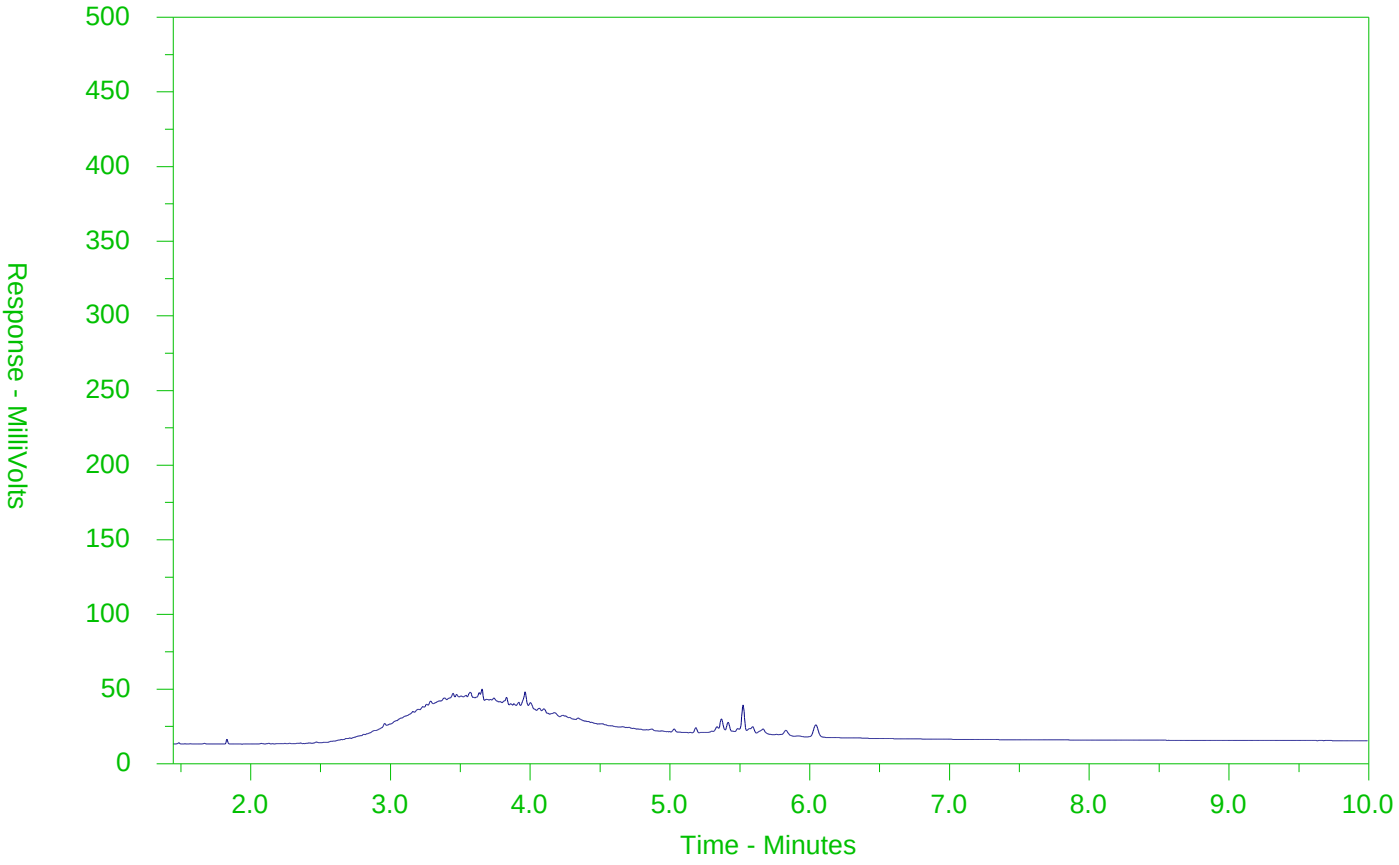
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2147555-5
Client Sample ID: SS8



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2147555-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	North Rock Environmental	Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Jason Garatti	Quality Control (QC) Report with Report ☒ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	807-633-7666	☒ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
Street:	123 Vimy Street	Email 1 or Fax jgaratti@nrock.ca	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Thunder Bay, ON	Email 2 emcgonigal@nrock.ca	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	P7G 1N3	Email 3 rsmith@nrock.ca	
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☒ NO	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☑ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax jgaratti@nrock.ca	
Contact:		Email 2 pgaratti@tbaytel.net	
Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #: 18-059-01		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD: Buchanan Hardwood		Location:	
ALS Lab Work Order # (lab use only): L2147557		ALS Contact: CP	Sampler: RS

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTX, F1-F4	pH	Number of Containers
	FS2	15-Aug-18	am	Soil	X		3
	FS4	"	"	"	X	X	"
	SS1	"	"	"	X		"
	SS5	"	"	"	X		"
	SS8	"	"	"	X		"

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	MOECC Table 3 - Industrial
Are samples for human drinking water use? ☐ YES ☒ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☒ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☒

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
17.4			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: RS	Date: 15-Aug-18	Time: 11:00	Received by: MM	Date: 15 Aug 18	Time: 1311	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

L2147555-COFC

Client: North Rock Enviro.

	Verified By	Date	Time	
Sample Layout Verification:	VA	2018 Aug 15	254	Sample Integrity Issues Enter information on back page
Labels Verification:	Verified By			Do any samples require prep? NO P F/P

		Sample #:	1-5														
1L	Plastic																
500mL	Plastic																
250mL	Plastic																
145mL	Plastic																
60mL	Plastic																
Micro																	
Toxicity Pail																	
1L	Glass																
500mL	Glass																
250mL	Glass																
120mL	Glass																
60mL	Glass																
40mL	Vial (Glass)																
40mL	Methanol Vials	2															
Soil Jar (120, 250 or 500mL)		1															
Other:																	
Other:																	
Total Number of Bottles																	

Trip/Travel/Field Blank Information

Solids Batch#:	Metals Batch#:	T:	D:
Routine Batch#:	Mercury Batch#:	T:	D:
BOD Batch#:	Cyanide Batch#:	T:	D:
Nutrients Batch#:	OGG Batch#:		
DOC/Carbon Batch#:	Phenols Batch#:		
VOC Batch#:			
Other:			

COOLER TRACKING

EPP		Coleman	
Small		Micro (5QT)	
Med		Sm(9QT)	
Lrg		Med(16QT)	1
Micro Box		Lrg(28QT)	
		Lrg(48QT)	