

APPENDIX 7

ENVIRONMENTAL SOILS INVESTIGATION REPORT





September 24, 2019

Project SCT196342

Kerry T. Howe Engineering Limited

98 Church Street, P.O. Box 460
St. Catharines, Ontario
L2R 6V9

Attention: Mr. Scott Kozub, P.Eng.

**Re: Environmental Soils Investigation
King Street, Between Greenlane Avenue and Lincoln Avenue
Beamsville, Ontario**

Dear Mr. Kozub:

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood), was retained by Kerry T. Howe Engineering Limited (the Client) to provide an Environmental Soils Investigation (ESI) along King Street between Greenlane Avenue and Lincoln Avenue in Beamsville, Ontario (the Site; **Figure 1**). Environmental testing was completed as part of a Geotechnical Investigation completed at the Site in 2016. The current services included environmental soil quality testing to confirm the initial environmental sampling results from 2016 in order to provide updated disposal options to the Client for the excess soil to be generated during the construction project along King Street.

The initial environmental sampling was summarized in the report entitled, "*Geotechnical Investigation, Regional Road #81 Road and Drainage Improvements, King Street (RR#81) Between Greenlane Avenue and Lincoln Avenue, Town of Lincoln, Ontario*" dated September 2016 (Wood's GI). As part of Wood's GI, nineteen boreholes (BH1 to BH3, BH6 to BH21 and BH23) were drilled in July 2016 and representative soil samples analyzed for metals including hydrides, pH, Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR). The majority of the soil samples met the Table 1 Site Condition Standards (SCS) contained in the Ministry of the Environment, Conservation and Parks (MECP) document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, dated April 15, 2011 with the exception of EC and/or SAR in all boreholes except BH6, total boron in BH6 and uranium in BH8, BH9, BH12, BH15, BH17,

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BH19 and BH21. BH2, BH3, BH8, BH9, BH11 and BH13 to BH15 exceeded the Table 3 SCS (industrial/commercial/community property use) for EC and/or SAR. Wood was retained by KTH to perform additional analysis for quarry acceptance testing, landfill acceptance testing and to delineate previous Table 1 SCS exceedances to provide updated disposal options. The Client will be preparing the tender documents for the road and drainage improvements and will use Wood's ESI report to provide disposal options to the bidders.

The work was carried out as per the scope of work provided to the Client in Wood's proposal (PSCT196447) dated July 3, 2019. The following report briefly outlines the scope of work and soil sample results in comparison to the applicable standards and requirements and associated disposal options.

METHODOLOGY

Borehole Drilling and Soil Sampling

Based on discussions with KTH, the borehole locates were drilled as follows:

- o One (1) borehole (BH101) to 5.2 metres below ground surface (mbgs) in the area of BH1, BH2 and BH3 to complete supplemental composite and discrete sample analysis [Polycyclic Aromatic Hydrocarbons (PAHs), Petroleum Hydrocarbons (PHCs), Polychlorinated Biphenyls (PCBs) and Volatile Organic Compounds (VOCs)] for quarry acceptance.
- o Four (4) boreholes (BH102 to BH104, BH116) to 4.6 mbgs including two boreholes between the previous BH4 and BH6 to fill the gap left previously by not drilling BH4 and BH5 (omitted due to the unlocatable underground utilities) and one borehole between Thirty Road and BH7 to confirm depth to bedrock, delineate the boron noted in BH6 previously and complete quarry acceptance testing. Note: the boreholes were located in similar areas as BH4 and BH5 to avoid the previously unlocatable area.
- o Three (3) boreholes (BH105 to BH107) to 3.2 mbgs including one borehole between BH7 and BH8, one between BH8 and BH9 and one between BH9 and BH10. Submitted sample for TCLP landfill acceptance testing.
- o Two (2) boreholes (BH108 and BH109) to 4.6 mbgs including one borehole between BH14

and BH15 and one borehole between BH15 and BH16 to delineate uranium noted in BH15.

- o Six (6) boreholes (BH110 to BH115) to 4.6 mbgs between BH16 and BH21 to further delineate and determine if disposal options will change.

An additional borehole (BH116) was drilled in the area of BH4 and BH5 from Wood's GI due to refusal encountered in the GI to ensure coverage in that area of the Site.

The sixteen (16) overburden boreholes were drilled on August 14 and 15, 2019 by Landshark Drilling of Brantford, Ontario (MECP License Number 7464). The boreholes were advanced to a maximum depth of between 2.1 and 7.6 mbgs using a Geoprobe 7822DT rig. Continuous samples were obtained in 1.5 m intervals throughout the borehole advancement. Soil cuttings generated during the investigation were left on-Site. The locations of the boreholes are shown on **Figure 2**. Details of the borehole drilling, as well as soil sampling, are provided in the borehole logs in **Appendix A**. All drilling activities were completed under the supervision of Wood field staff.

All work completed under this project was performed in general accordance with standard engineering practices and the following documents:

-) Ontario Ministry of the Environment and Climate Change (MOECC) document entitled *"Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act"* issued by the Laboratory Services Branch of the MOE and dated March 9, 2004, amended as of July 1, 2011 (Analytical Protocol);
-) *O. Reg. 153/04*, dated October 2004. However, all analytical results would be compared to the appropriate standards identified in the MOECC now known as the MECP document entitled, *"Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act"* dated April 15, 2011; and
-) Canadian Standards Association (CSA) publication entitled *"Phase II Environmental Site Assessment, CSA Standard Z769-00 (reaffirmed 2004)"*.

The soil samples retrieved during the field investigation were examined, classified, and logged according to soil type, moisture content, colour, consistency, and presence of visual and/or olfactory indicators of negative impact.

All soil samples were collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. The soil samples collected were split into duplicate fractions. The primary sample fractions were placed into laboratory supplied sample containers, including an unpreserved 250 millilitre (mL) glass jar with a Teflon-lined lid and 40 mL vial (field preserved, specifically for analysis of volatile parameters) and were subsequently stored in coolers on ice for future potential laboratory analysis. The duplicate sample fractions were placed in resealable plastic sample bags and stored at ambient temperature for subsequent field vapour screening. All soil sampling equipment was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination. Each sample was labelled using a unique identifier except for blind duplicate samples that were assigned aliases. All samples were delivered to the laboratory under continuous Chain of Custody documentation.

All field sampling activities followed Wood's standard field protocols for environmental soil and ground water investigations, which reflect the requirements of the previously referenced MECP documents.

Soil samples were placed into appropriate laboratory-supplied glass sample jars and subsequently stored in coolers on ice for future potential laboratory analysis. Each sample was labeled using a unique identifier. All samples were delivered to the laboratory under continuous Chain of Custody documentation.

Field Screening

All soil samples collected during the drilling were screened in the field for gross evidence of negative environmental impact including staining and odours.

Soil sample headspace screening was also performed to facilitate sample selections for laboratory analysis and to provide an assessment of the vertical contaminant distributions at each location. The duplicate soil sample fractions were screened for Combustible Organic Vapour (COV) and Total Organic Vapour (TOV) concentrations using the sample headspace method. COV and TOV concentrations were measured using an EAGLE 2™ combustible vapour analyzer calibrated to known hexane and isobutylene standards and operated in methane elimination mode. The TOV/COV screening measures the cumulative organic/combustible vapour present within sample headspace. TOV/COV results are semi-quantitative at best and are generally only used for relative

sample comparison purposes when selecting samples for laboratory analysis.

Analytical Testing

Representative samples collected during the drilling program were submitted for laboratory analysis as follows:

-) BH101 – SAR, EC, metals, PAHs, PCBs, PHCs and VOCs
-) BH102 – SAR, EC, metals
-) BH103 – SAR, EC, metals, BTEX, PHCs
-) BH104 – SAR, EC, metals, PAHs, PCB, PHCs and VOCs
-) BH105 – SAR, EC, metals
-) BH106 – SAR, EC, metals
-) BH107 – SAR, EC, metals
-) BH108 – SAR, EC, metals
-) BH109 – SAR, EC, metals
-) BH110 – SAR, EC, metals
-) BH111 – SAR, EC, metals
-) BH112 – SAR, EC, metals
-) BH113 – SAR, EC, metals
-) BH114 – SAR, EC, metals
-) BH115 – SAR, EC, metals
-) BH116 – SAR, EC, metals

A composite sample (TCLP-1) was submitted for Ontario Regulation 347, as amended by Ontario Regulation 558, Toxicity Characteristic Leaching Procedure (TCLP) testing for heavy metals and other inorganics and VOCs as well as for total PCBs. The TCLP analysis is required to classify the soil as hazardous or non-hazardous for disposal at MECP-approved landfill sites.

Laboratory analysis was conducted by Parcel Laboratories Ltd. (Paracel), an ISO 17025-certified laboratory located in Ottawa, Ontario.

REGULATORY FRAMEWORK

Under *O. Reg. 153/04* as amended, the MECP has outlined Site Condition Standards (SCS) in the document *"Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the*

Environmental Protection Act dated 15 April 2011. For the purposes of the sampling program, all laboratory analytical results were compared to Table 1: Full Depth Background Site Condition Standards (SCS) for residential/parkland/institutional/industrial/commercial/community property use (Table 1 SCS) and Table 3: Full Depth Generic SCS for industrial/commercial/community property use for medium to fine textured soils.

RESULTS

Geology

The geology of the soils noted was similar to the Wood's GI which included between 230 to 300 millimetres (mm) of asphalt underlain by 200 mm to 510 mm of granular. This pavement structure was underlain by fill consisting of silty sand and clayey silt fills to depths of 0.8 to 2.7 mbgs underlain by a clayey silt till which was terminated by shale bedrock in a majority of the boreholes.

Field Screening

No gross evidence of negative environmental impact including staining and odours was observed during the drilling program. Petroleum-like odours were noted in a majority of the boreholes but inferred to be attributed to the shale.

COV and TOV concentration headspace measurements recorded in the soil samples collected from the boreholes ranged from non-detectable to 155 parts per million (ppm). It is Wood's opinion that the results of the screening program for the samples suggest a low potential for the presence of combustible soil headspace vapour levels in the soil/fill samples collected. Laboratory analysis was performed to confirm and quantify these results.

Soil Quality

The results of the soil sample analyses are summarized in the analytical **Tables 1 to 3** in the tables appendix of this report. The laboratory Certificates of Analyses are included in **Appendix B**. The analytical results are summarized in **Table 4** for disposal options.

CONCLUSIONS

Wood was on-site August 14 and 15, 2019 to complete a drilling program consisting of sixteen

boreholes (i.e., BH101 to BH116). The borehole locations were determined in consultation with the Client and drilled to a depth representative of the depth of excess soil which is anticipated to be disposed off-site.

Wood collected soil samples at varying depths and submitted the soil samples for laboratory analysis. The laboratory analysis determined that several of the soil samples exceeded the Table 1 SCS for metals, EC, SAR, PHCs and/or PAHs. The majority of the soil samples exceeded the Table 3 SCS for EC and/or SAR and samples from BH102 exceeded the Table 3 SCS for PAH parameters.

Based on the results of the analytical testing, the summary **Table 4** provides options for removal/disposal of excess soil/fill material if required during the development project.

The sample submitted for TCLP analysis indicated that the material is non-hazardous.

If any additional soil/fill materials that appear to be impacted are encountered during excavation activities, Wood recommends that the material be sampled prior to shipment to ensure it meets the receiver's requirements and/or to determine if they should be removed for landfill disposal and replaced with clean fill materials.

CLOSURE

This report was prepared for the exclusive use of Kerry T. Howe Engineering Limited and is intended to provide an environmental soils investigation report for the road and drainage improvements along King Street between Greenlane Avenue and Lincoln Avenue in Beamsville, Ontario. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Wood will be required. With respect to third parties, Wood has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The investigation undertaken by Wood with respect to this report and any conclusions or recommendations made in this report reflect Wood's judgment based on the Site conditions observed at the time of the Site inspection on the dates set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this Site and it is based, in part, upon visual observation of the Site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future Site conditions, portions of the Site, which were unavailable for direct investigation, subsurface locations, which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Wood has used its professional judgment in analyzing this information and formulating these conclusions.

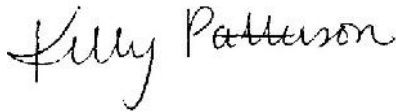
Wood makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

This Report is also subject to the further Standard Limitations contained in **Appendix C**.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact this office.

**Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited.**

Prepared by:



Kelly Patterson, P.Geo. (Limited)
Senior Environmental Geoscientist

Reviewed by:



Patrick Shriner, P.Geo.
Associate, Environmental Geoscientist

Attachments:

Figures

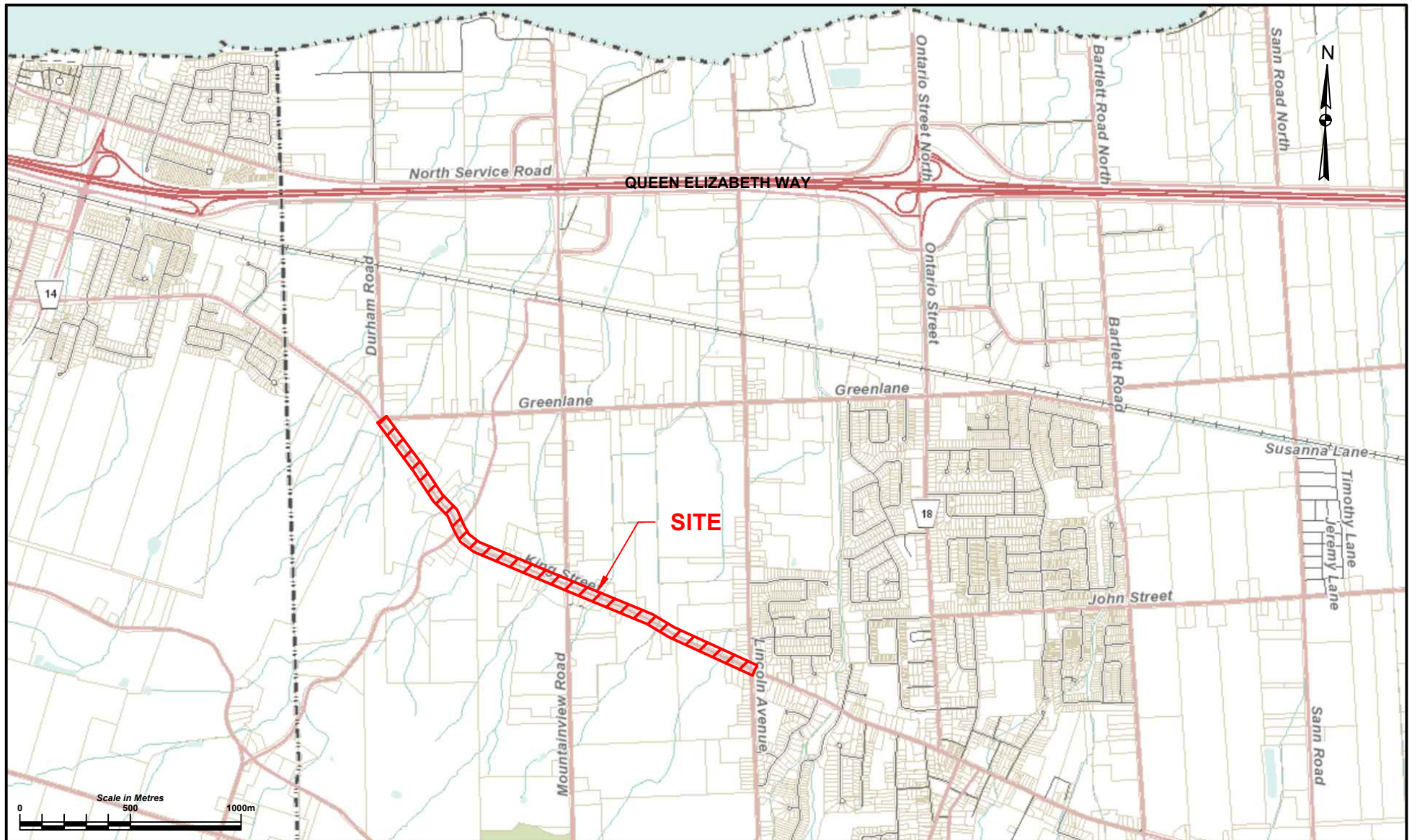
Tables

Appendix A: Borehole Logs

Appendix B: Laboratory Certificates of Analysis

Appendix C: Limitations

FIGURES



REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd. Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.	LEGEND:  Site Location	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO TITLE: SITE LOCATION PLAN	REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342 NO.: FIGURE 1
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REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd.	LEGEND: ◆ BH-1 Borehole Location ◆ BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO	REV. NO.: A
Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.			TITLE: BOREHOLE LOCATION PLAN	DATE: SEPT 2019
				PROJECT NO.: SCT196342
				NO.: FIGURE 2a



REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd. Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.		LEGEND: + BH-1 Borehole Location (2016) + BH-4 Omitted Borehole (2016) due to unlocatable utilities + BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO TITLE: BOREHOLE LOCATION PLAN		REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342 NO.: FIGURE 2b
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REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd. Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.	LEGEND: ◆ BH-1 Borehole Location (2016) ◆ BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO TITLE: BOREHOLE LOCATION PLAN	REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342 NO.: FIGURE 2c



REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd. Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.	LEGEND: ◆ BH-1 Borehole Location (2016) ◆ BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO TITLE: BOREHOLE LOCATION PLAN	REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342 NO.: FIGURE 2d



REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd.	LEGEND: ◆ BH-1 Borehole Location (2016) ◆ BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO	REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342
Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.			TITLE: BOREHOLE LOCATION PLAN	NO.: FIGURE 2e



REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd. Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.	LEGEND: ◆ BH-1 Borehole Location (2016) ◆ BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO TITLE: BOREHOLE LOCATION PLAN	REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342 NO.: FIGURE 2f



REFERENCE: Base plan provided by NIAGARA NAVIGATOR, <https://maps-beta.niagararegion.ca/Navigator/>

FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

CLIENT: Kerry T. Howe Engineering Ltd. Wood Environment & Infrastructure Solutions 3300 Merrittville Hwy, Unit 5 Thorold, Ontario wood.	LEGEND:  BH-1 Borehole Location (2016)  BH-1 Borehole Location (2019)	DWN BY: KH CHK'D BY: MP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: As Shown	PROJECT: ENVIRONMENTAL SOILS INVESTIGATION REGIONAL ROAD 81 (KING STREET) ROAD & DRAINAGE IMPROVEMENTS BETWEEN GREENLANE and LINCOLN AVENUE TOWN OF LINCOLN, ONTARIO	REV. NO.: A DATE: SEPT 2019 PROJECT NO.: SCT196342 NO.: FIGURE 2g
			TITLE: BOREHOLE LOCATION PLAN	

TABLES

Table 1: Summary of Soil Analyses for General Inorganics and Metals

Client: Kerry T. Howe Engineering Limited
Site: King St, Beamsville
Project: SCT196342

Sample ID					Composite BH101	Composite BH 102	Composite BH103	Composite BH104	BH105-2-D	Dup AC	Duplicate Average	RPD	BH106-2-C	BH107-2-C	Composite BH114	Composite BH115	Composite BH116	Composite BH108	Composite BH109	Composite BH110	Composite BH111	Composite BH112	Composite BH113
Sample Depth (m)										Field Duplicate of BH105-2D	BH105-2D and Dup AC	BH105-2D and Dup AC											
Date Collected					14-Aug-19	14-Aug-19	14-Aug-19	14-Aug-19	14-Aug-19	14-Aug-19			14-Aug-19	14-Aug-19	14-Aug-19	14-Aug-19	14-Aug-19	16-Aug-19	16-Aug-19	16-Aug-19	16-Aug-19	15-Aug-19	15-Aug-19
Laboratory ID					1933472-01	1933472-05	1933472-06	1933472-09	1933472-11	1933472-12			1933472-13	1933472-14	1933472-15	1933472-16	1933472-17	1933560-01	1933560-02	1933560-03	1933560-04	1933560-05	1933560-06
Parameter	Units	MDL	Table 1 SCS ^a	Table 3 SCS ^b																			
General Inorganics																							
SAR	N/A	0.01	2.4	12	9.89	13.9	5.93	16.1	4.48	14.8	9.6	107%	20.4	5.18	2.07	17.7	7.81	17.2	13.2	12.3	10.8	8.98	8.52
Conductivity	uS/cm	5	570 uS/cm	1400 uS/cm	1650	2880	630	1740	428	1360	894	104%	1610	1600	746	2560	1700	4450	1220	1270	1180	1680	1990
pH	pH units	0.05	+	+	-	-	-	-	-	-	-	-	-	-	7.2	7.4	7.2	-	-	-	-	-	-
Metals																							
Antimony	µg/g	1.0	1.3	50	<	2.3	1.7	1.2	3.4	1.9	2.7	NC	1.3	<	<	<	<	<	<	<	2.7	1.4	1.0
Arsenic	µg/g	1.0	18.0	18	5.0	6.1	7.2	6.3	8.2	5.3	6.8	43%	8.9	5.3	6.7	6.5	4.7	4.7	4.5	4.2	6.0	5.0	6.3
Barium	µg/g	1.0	220	670	67.1	124	89.8	108	109	79.2	94.1	32%	127	250	125	113	80.5	93.0	66.0	78.2	111	78.5	105
Beryllium	µg/g	0.5	3	10	<	0.8	1.0	0.9	1.0	0.9	1.0	NC	1.0	0.8	1.0	0.8	<	0.9	0.7	0.7	0.6	0.7	0.8
Boron	µg/g	5.0	36	120	11.5	17.4	35.1	30.9	35.5	30.0	32.8	17%	32.6	31.5	31.6	27.3	9.4	24.5	17.8	20.6	22.4	20.5	23.0
Cadmium	µg/g	0.5	1	1.9	<	<	<	<	<	<	<	NC	<	<	<	<	0.6	<	<	<	<	<	<
Chromium	µg/g	5.0	70	160	15.1	24.0	26.1	27.9	28.7	28.0	28.4	2%	28.4	25.7	26.8	24.0	14.1	27.2	21.6	21.8	20.5	21.0	26.5
Cobalt	µg/g	1.0	21	100	8.8	12.2	15.3	15.0	15.1	14.5	14.8	4%	14.4	13.4	15.7	13.0	7.7	13.7	11.4	10.5	10.4	11.1	14.8
Copper	µg/g	5.0	92	300	24.5	27.5	6.9	7.0	7.2	8.4	7.8	15%	18.3	6.1	10.1	18.4	29.9	9.3	11.7	7.5	7.9	8.5	8.6
Lead	µg/g	1.0	120	120	9.5	16.9	9.0	10.7	9.2	8.1	8.7	13%	8.8	7.3	12.7	11.9	42.0	9.9	9.1	6.1	7.8	6.8	9.0
Molybdenum	µg/g	1.0	2	40	<	<	1.2	1.0	1.6	1.0	1.3	NC	1.3	<	<	1.2	<	<	<	<	<	<	1.0
Nickel	µg/g	5.0	82	340	19.4	27.7	34.3	35.6	36.6	34.4	35.5	6%	34.4	31.6	33.8	29.1	15.6	29.1	25.1	23.0	23.7	24.6	33.4
Selenium	µg/g	1.0	2	5.5	<	<	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<
Silver	µg/g	0.3	1	50	<	<	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<
Thallium	µg/g	1.0	1	3.3	<	<	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<
Uranium	µg/g	1.0	3	33	<	1.1	<	<	<	<	<	NC	<	<	<	<	<	1.7	<	<	<	<	<
Vanadium	µg/g	10.0	86	86	21.5	33.9	29.6	32.4	32.8	33.0	32.9	NC	34.8	30.0	35.9	32.8	22.0	54.8	28.6	27.1	25.9	25.0	29.1
Zinc	µg/g	20.0	290	340	50.8	70.9	60.5	82.3	110	75.0	92.5	NC	65.8	56.4	77.5	126	202	61.6	50.3	52.5	47.7	48.3	60.5

Notes:
"a" - Table 1: Full Depth Background Site Condition Standards for residential/parkland/institutional/industrial/commercial/community property use; established in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Ontario Ministry of the Environment, Conservation and Parks, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.
"b" - Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for industrial/commercial/community property use; established in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Ontario Ministry of the Environment, Conservation and Parks, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

Bolded values exceed the Table 1 SCS.

Bolded and **Shaded** values exceed the Table 1 and 3 SCS.

"µg/g" - micrograms per gram, parts per million.

"µS/cm" - microSiemens per centimetre

"MDL" - method detection limit.

"<" - sample results less than the MDL.

"-" - not applicable or parameter not analyzed.

"Duplicate Average" - average of results of sample and it's field duplicate; where parameter <MDL, MDL used to calculate average. Note: the duplicate average must exceed the SCS for there to be an exceedance.

"RPD" - relative percent difference.

"NC" - RPD not calculable as both values are not greater than 5x the MDL.

Bold - means RPD outside of the sample duplicate value as outlined in the 2011 Analytical Protocol (Metals 30%, pH 0.3 pH units).

"+" means as per O. Reg. 153/04 as amended, in order to apply the generic Site Condition Standards, pH for surface soil (<1.5 mbgs) should be between 5 and 9 and pH for subsurface soil (>1.5 mbgs) should be between 5 and 11.

Table 2: Summary of Soil Analyses for PHCs and BTEX



Client: Kerry T. Howe Engineering Limited
Site: King St, Beamsville
Project: SCT196342

Sample ID					BH101-5-D	BH103-1-D	BH104-1-D
Sample Depth (m)					14-Aug-19	14-Aug-19	14-Aug-19
Date Collected					1933472-03	1933472-07	1933472-08
Laboratory ID							
Parameter	Units	MDL	Table 1 SCS ^a	Table 3 SCS ^c			
Petroleum Hydrocarbons (PHCs)							
F1 PHCs (C6-C10)	µg/g	7	25	65	<	<	<
F2 PHCs (C10-C16)	µg/g	4	10	250	<	5	<
F3 PHCs (C16-C34)	µg/g	8	240	2500	<	263	<
F4 PHCs (C34-C50)	µg/g	6	120	6600	<	72	<
Volatiles							
Acetone	µg/g	0.50	0.5	28	<	-	<
Benzene	µg/g	0.02	0.02	0.4	<	-	<
Bromodichloromethane	µg/g	0.05	0.05	18	<	-	<
Bromoform	µg/g	0.05	0.05	1.7	<	-	<
Bromomethane	µg/g	0.05	0.05	0.05	<	-	<
Carbon Tetrachloride	µg/g	0.05	0.05	1.5	<	-	<
Chlorobenzene	µg/g	0.05	0.05	2.7	<	-	<
Chloroform	µg/g	0.05	0.05	0.18	<	-	<
Dibromochloromethane	µg/g	0.05	0.05	13	<	-	<
Dichlorodifluoromethane	µg/g	0.05	0.05	25	<	-	<
1,2-Dichlorobenzene	µg/g	0.05	0.05	8.5	<	-	<
1,3-Dichlorobenzene	µg/g	0.05	0.05	12	<	-	<
1,4-Dichlorobenzene	µg/g	0.05	0.05	0.84	<	-	<
1,1-Dichloroethane	µg/g	0.05	0.05	21	<	-	<
1,2-Dichloroethane	µg/g	0.05	0.05	0.05	<	-	<
1,1-Dichloroethylene	µg/g	0.05	0.05	0.48	<	-	<
cis-1,2-Dichloroethylene	µg/g	0.05	0.05	37	<	-	<
trans-1,2-Dichloroethylene	µg/g	0.05	0.05	9.3	<	-	<
1,2-Dichloropropane	µg/g	0.05	0.05	0.68	<	-	<
cis-1,3-Dichloropropylene	µg/g	0.05	-	-	<	-	<
trans-1,3-Dichloropropylene	µg/g	0.05	-	-	<	-	<
1,3-Dichloropropene, total	µg/g	0.05	0.05	0.21	<	-	<
Ethylbenzene	µg/g	0.05	0.05	19	<	-	<
Ethylene dibromide (dibromoetha	µg/g	0.05	0.05	0.05	<	-	<
Hexane	µg/g	0.05	0.05	88	<	-	<
Methyl Ethyl Ketone (2-Butanone)	µg/g	0.50	0.5	88	<	-	<
Methyl Isobutyl Ketone	µg/g	0.50	0.5	210	<	-	<
Methyl tert-butyl ether	µg/g	0.05	0.05	3.2	<	-	<
Methylene Chloride	µg/g	0.05	0.05	2	<	-	<
Styrene	µg/g	0.05	0.05	43	<	-	<
1,1,1,2-Tetrachloroethane	µg/g	0.05	0.05	0.11	<	-	<
1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	0.094	<	-	<
Tetrachloroethylene	µg/g	0.05	0.05	21	<	-	<
Toluene	µg/g	0.05	0.2	78	<	-	<
1,1,1-Trichloroethane	µg/g	0.05	0.05	12	<	-	<
1,1,2-Trichloroethane	µg/g	0.05	0.05	0.11	<	-	<
Trichloroethylene	µg/g	0.05	0.05	0.61	<	-	<
Trichlorofluoromethane	µg/g	0.05	0.25	5.8	<	-	<
Vinyl Chloride	µg/g	0.02	0.02	0.25	<	-	<
m/p-Xylene	µg/g	0.05	-	-	<	-	<
o-Xylene	µg/g	0.05	-	-	<	-	<
Xylenes, total	µg/g	0.05	0.05	30	<	-	<
Benzene	µg/g	0.02	0.02	0.4	-	<	-
Ethylbenzene	µg/g	0.05	0.05	19	-	<	-
Toluene	µg/g	0.05	0.20	78	-	<	-
m/p-Xylene	µg/g	0.05	-	-	-	<	-
o-Xylene	µg/g	0.05	-	-	-	<	-
Xylenes, total	µg/g	0.05	0.05	30	-	<	-
PCBs							
PCBs, total	µg/g	0.05	0.30	1.1	-	-	<

Notes:

"a" - Table 1: Full Depth Background Site Condition Standards for residential/parkland/institutional/industrial/commercial/community property use; established in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Ontario Ministry of the Environment, Conservation and Parks, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

"b" - Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for industrial/commercial/community property use; established in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Ontario Ministry of the Environment, Conservation and Parks, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

Bolded values exceed the Table 1 SCS.

Bolded and Shaded values exceed the Table 1 and 3 SCS.

"µg/g" - micrograms per gram, parts per million.

"MDL" - method detection limit.

"<" - sample results less than the MDL.

"-" - not applicable or parameter not analyzed.

Table 3: Summary of Soil Analyses for PAHs

Client: Kerry T. Howe Engineering Limited
Site: King St, Beamsville
Project: SCT196342

Sample ID					BH101-2-D	Dup AF	Duplicate Average	RPD	BH104-1-D
Sample Depth (m)									
Date Collected					14-Aug-19	14-Aug-19	BH101-5D and Dup AF	BH101-5D and Dup AF	14-Aug-19
Laboratory ID					1933472-02	1933472-04			1933472-08
Parameter	Units	MDL	Table 1 SCS ^a	Table 3 SCS ^b					
PAHs - Semi-Volatiles									
Acenaphthene	µg/g	0.02	0.072	96	0.54	0.30	0.4	57%	<
Acenaphthylene	µg/g	0.02	0.093	0.17	0.18	0.06	0.1	NC	<
Anthracene	µg/g	0.02	0.16	0.74	0.93	0.47	0.7	66%	0.06
Benzo[a]anthracene	µg/g	0.02	0.36	0.96	1.08	0.55	0.8	65%	0.06
Benzo[a]pyrene	µg/g	0.02	0.3	0.3	0.93	0.46	0.7	68%	0.04
Benzo[b]fluoranthene	µg/g	0.02	0.47	0.96	0.76	0.36	0.6	71%	0.04
Benzo[g,h,i]perylene	µg/g	0.02	0.68	9.6	0.51	0.30	0.4	52%	0.02
Benzo[k]fluoranthene	µg/g	0.02	0.48	0.96	0.46	0.21	0.3	75%	0.02
Chrysene	µg/g	0.02	2.8	9.6	1.02	0.54	0.8	62%	0.04
Dibenzo[a,h]anthracene	µg/g	0.02	0.1	0.1	0.20	0.08	0.1	NC	<
Fluoranthene	µg/g	0.02	0.56	9.6	2.78	1.37	2.1	68%	0.15
Fluorene	µg/g	0.02	0.12	69	0.56	0.32	0.4	55%	0.03
Indeno[1,2,3-cd]pyrene	µg/g	0.02	0.23	0.95	0.51	0.30	0.4	52%	0.02
1-Methylnaphthalene	µg/g	0.02	0.59	85	0.33	0.09	0.2	NC	<
2-Methylnaphthalene	µg/g	0.02	0.59	85	0.49	0.12	0.3	121%	<
Methylnaphthalene (1&2)	µg/g	0.04	0.59	85	0.51	0.21	0.4	83%	<
Naphthalene	µg/g	0.01	0.09	28	0.79	0.26	0.5	101%	0.02
Phenanthrene	µg/g	0.02	0.69	16	3.18	1.50	2.3	72%	0.17
Pyrene	µg/g	0.02	1	96	1.70	0.82	1.3	70%	0.08

Notes:

"a" - Table 1: Full Depth Background Site Condition Standards for residential/parkland/institutional/industrial/commercial/community property use; established in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Ontario Ministry of the Environment, Conservation and Parks, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

"b" - Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for industrial/commercial/community property use; established in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", Ontario Ministry of the Environment, Conservation and Parks, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

Bolded values exceed the Table 1 SCS.

Bolded and Shaded values exceed the Table 1 and 3 SCS.

"µg/g" - micrograms per gram, parts per million.

"MDL" - method detection limit.

"<" - sample results less than the MDL.

"-" - not applicable or parameter not analyzed.

"Duplicate Average" - average of results of sample and it's field duplicate; where parameter <MDL, MDL used to calculate average. Note: the duplicate average must exceed the SCS for there to be an exceedance.

"RPD" - relative percent difference.

"NC" - RPD not calculable as both values are not greater than 5x the MDL.

Bold - means RPD outside of the sample duplicate value as outlined in the 2011 Analytical Protocol (PAHs 40%).

	Table 1 Exceedances							Table 3 Exceedances							Summary and Disposal Option
BH	EC	SAR	Metals	PHC's/BTEX	VOCs	PCBs	PAH's	EC	SAR	Metals	PHC's/BTEX	VOCs	PCBs	PAH's	
1	X	X	X					X	X	X					
2	X	X	X					X	X	X					
101	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3	X	X	X					X	X	X					
116	X	X	X					X	X	X					
4	no analysis														
5	no analysis														
102	X	X	Sb					X	X	X					
103	X	X	Sb	PHC F3				X	X	X	X				
6			B							X					
104	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7	X	X	X					X	X	X					
105	X	X	Sb					X	X	X					
8	X	X	U					X	X	X					
106	X	X	X					X	X	X					
9	X	X	U					X	X	X					
107	X	X	Ba					X	X	X					
10			X												
11	X	X	X					X	X						
12	X	X	U						X	X					
13	X	X	X					X	X						
14	X	X	X					X	X						
108	X	X	X					X	X	X					
15	X	X	U					X	X	X					
109	X	X	X					X	X	X					
16	X	X	X					X	X						
110	X	X	X					X	X	X					
17	X	X	U					X	X	X					
111	X	X	Sb					X	X	X					
18	X	X	X					X	X	X					
112	X	X	Sb					X	X	X					
19	X	X	U					X	X	X					
113	X	X	X					X	X	X					
20	X	X	X					X	X	X					
114	X	X	X					X	X	X					
115	X	X	X					X	X	X					
21	X	X	U					X	X	X					

Notes: Sb = Antimony, B = Boron, Ba = Barium, U = Uranium,, PHCs = Petroleum Hydrocarbons, VOCs = Volatile Organic Compounds, PAHs = Polycyclic Aromatic Hydrocarbons, PCBs = Polychlorinated Biphenyls, X= sample submitted for laboratory analysis

- sample exceeds Site Condition Standard (SCS)
- EC/SAR exceeds Table 1 and/or Table 3 SCS.
- EC /SAR exceeds Table 1 and/or Table 3 SCS. Metals and/or PHCs exceeds Table 1 but meets Table 3 SCS.
- EC /SAR exceeds Table 1 and/or Table 3 SCS. PAHs exceed Table 1 and 3 SCS.

APPENDIX A
BOREHOLE LOGS

RECORD OF BOREHOLE No. **BH101**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781613N; 621481E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT		
	Local Ground Surface Elevation:							20 40 60 80	100 200 300 400	
	Grey, Sandy Gravel dry 0.4	DT	1	50		1			2 * △ 25.0	Composite soil sample BH101 submitted for laboratory analysis of PAHs, PCBS, Metals, EC and SAR.
	Brown, Sandy Clay Fill , With traces of gravel and cobbles, Moist					2			1 * △ 15.0	
	Brown SILTY CLAY/CLAYEY SILT with traces of Gravel WTPL 3.0	DT	2	38		3			0 * △ 15.0	
	Brown, Clay Fill , Some gravel 4.6	DT	3	63		4				
	Brown, Clay Fill , Some gravel	DT	4	13		5				
	Brown, Silty Clay/Clayey Silt , With traces of gravel, WTPL 6.1	DT	5	84		6			2 * △ 155.0	Soil sample BH101-5-D submitted for laboratory analysis of PHCs (F1-F4) and VOCs.
	Borehole Terminated 7.6					7				
										Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH102**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781457N; 621591E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm) 100 200 300 400		
	Asphalt Grey, Sandy Gravel					0.1				
	Brown, Fill, Silty Clay/Clayey Silt, With traces of sand and gravel, Moist	DT	1	70		1		10 20.0		
	Brown/Reddish Brown, SILTY CLAY/CLAYEY SILT with traces of Gravel and sand, WTPL/APL	DT	2	67		2		2 0.0		
	Borehole Terminated	DT	3	80		4		2 20.0		
										Composite soil sample BH102 submitted for laboratory analysis of Metals, EC and SAR.
										Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH103**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781417N; 621629E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm) 100 200 300 400		
	Asphalt Grey, Sandy Gravel dry	DT	1	80		0.1				Soil sample BH103-1-D submitted for laboratory analysis of PHCs (F1-F4) and BTEX. Composite soil sample BH103 submitted for laboratory analysis of PHCs (F1-F4), BTEX, Metals, EC and SAR.
	Brown, Fill, Silty Clay/Clayey Silt, Petroleum Odour, Moist					0.5				
	Brown, Silty Clay/Clayey Silt, Petroleum Odour, Moist					0.7				
	Brown, Silty Clay/Clayey Silt, Petroleum Odour, Moist					0.9				
	Reddish Brown, Fractured Shale	DT	2	249		1				Upon Completion: Borehole remained open and dry.
	Borehole Terminated					2.1				

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

Page: 1 of 1

RECORD OF BOREHOLE No. **BH104**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781308N; 621696E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:									
	Grey, Fill, Sandy gravel, Moist									
	Reddish Brown, Silty Clay/Clayey Silt, DTPL	DT	1	84		1		2 5.0		Soil sample BH104-1-D submitted for laboratory analysis of VOCs, PHCs (F1-F4), PAHs, PCBs. Composite soil sample BH104 submitted for laboratory analysis of Metals, EC and SAR.
	Reddish Brown, Fractured Shale,	DT	2	100		2		1 10.0		
	Borehole Terminated					2.7				
										Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH105**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781265N; 621747E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:									
	Asphalt Grey, Sandy Gravel, Moist									
	Reddish Brown, Silty Clay/Clayey Silt, With traces of gravel, DTPL	DT	1	68		1		10 10.0		Soil sample BH105-2-D and Dup AC submitted for laboratory analysis of Metals, EC and SAR.
	Red, Fractured Shale	DT	2	100		2		4 15.0		
	Borehole Terminated					2.4				Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

Page: 1 of 1

RECORD OF BOREHOLE No. **BH106**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781237N; 621831E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) Δ Total Organic Vapour (ppm) 100 200 300 400		
	Asphalt Grey, Sandy Gravel, Moist Brown, Silty Clay/Clayey Silt, With traces of gravel, APL/WTPL	DT	1	65		1		2 *Δ 25.0		Soil sample BH106-2-C submitted for laboratory analysis of Metals, EC and SAR.
	Reddish Brown, Fractured Shale	DT	2	100		2		4 *Δ 20.0		
	Borehole Terminated					2.7				Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH107**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781203N; 621917E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm) 100 200 300 400		
	Asphalt Grey, Sandy Gravel, With buried asphalt, Moist					0.1				
	Brown, Fill Silty Clay/Clayey Silt, With traces of gravel, APL	DT	1	74		0.6				
	Reddish Brown, Fractured Shale	DT	2	100		1.7				
	Borehole Terminated					2.7				

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☐ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH108**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781022N; 622366E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80 * Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) Δ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation:									
	Grey, Sandy Gravel,									
	0.4									
	Reddish Brown, Silty Clay/Clayey Silt, With traces of gravel, Slight petroleum odour, APL	DT	1	82		1		0 * 5.0		Composite soil sample BH108 submitted for laboratory analysis of Metals, EC and SAR.
	1.9									
	Reddish Brown, Fractured Shale	DT	2	100		2		0 * 0.0		
	Borehole Terminated									Upon Completion: Borehole remained open and dry.

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∇ No freestanding groundwater measured in open borehole on completion of drilling.

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RECORD OF BOREHOLE No. **BH109**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780984N; 622449E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:									
	Grey, Fill, Sandy Gravel,									
	Brown, Fill, Silty Clay/Clayey Silt, Some sand, Petroleum odour, Moist	DT	1	57		1		9 * 10.0		Composite soil sample BH109 submitted for laboratory analysis of Metals, EC and SAR.
	Reddish Brown, Fractured Shale	DT	2	100		2		0 * 30.0		
	Borehole Terminated					2.7				Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH110**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780947N; 622530E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) Δ Total Organic Vapour (ppm)		
	Grey, Fill, Sandy Gravel, Buried crushed asphalt, Moist 0.5									
	Brown, Fill, Silty Sand, Petroleum odour, With traces of gravel, Moist to wet 1	DT	1	68		1		9 * Δ 25.0		Composite soil sample BH110 submitted for laboratory analysis of Metals, EC and SAR.
	Brown, Silty Sand, With traces of gravel, Wet 1.5 1.7 Reddish Brown, Fractured Shale 2	DT	2	100		2		0 * Δ 45.0		
	Borehole Terminated 2.4									Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

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RECORD OF BOREHOLE No. **BH111**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780897N; 622609E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:									
	Grey, Fill, Sandy Gravel, Moist									
	Brown, Fill, Clay with gravel, Petroleum odour, With traces of gravel, Moist	DT	1	63		1			1 15.0	Composite soil sample BH111 submitted for laboratory analysis of Metals, EC and SAR.
	Reddish Brown, Fractured Shale	DT	2	100		2			0 0.0	
	Borehole Terminated					2.7				Upon Completion: Borehole remained open and dry.

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☞ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH112**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780847N; 622706E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) Δ Total Organic Vapour (ppm) 100 200 300 400		
	Grey, Fill, Sandy Gravel, Buried crushed asphalt, Moist 0.5	DT	1	78		1		0 * 0.0		
	Brown, Fill, Sand with Clay, Moist 1.0									
	Brown, Silty Clay/Clayey Silt, With traces of gravel, slight petroleum odour, APL 1.5	DT	2	100		2		0 * 0.0		Composite soil sample BH112 submitted for laboratory analysis of Metals, EC and SAR.
	Reddish Brown, Fractured Shale 2.4									
	Borehole Terminated									Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned.

Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH113**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780806N; 622802E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
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LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT * Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation:							20 40 60 80 100 200 300 400		
	Grey, Fill, Sandy Gravel, Buried crushed asphalt, 0.5									
	Grey, Fill, Clay, Slight odour, Moist, 0.7	DT	1	65		1		1 *△ 10.0		Composite soil sample BH113 submitted for laboratory analysis of Metals, EC and SAR.
	Reddish Brown, Silty Clay/Clayey Silt, APL									
	Reddish Brown, Fractured Shale, 1.5	DT	2	100		2		1 *△ 80.0		
	Borehole Terminated, 2.1									Upon Completion: Borehole remained open and dry.

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☐ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH114**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780764N; 622901E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT * Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) Δ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation:							20 40 60 80 100 200 300 400		
	Grey, Fill, Sandy Gravel, Moist									
	Dark Grey, Fill, Silty Clay/Clayey Silt, Moist	DT	1	75		1		2 *Δ 15.0		Composite soil sample BH114 submitted for laboratory analysis of Metals, EC, SAR and pH.
	Reddish Brown, Silty Clay/Clayey Silt									
	Reddish Brown, Fractured Shale	DT	2	100		2		1 *Δ 25.0		Upon Completion: Borehole remained open and dry.
	Borehole Terminated									

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH115**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4780745N; 622934E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80 * Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation:									
	Grey, Fill, Sandy Gravel, Moist									
	Brown, Fill, Silty Clay/Clayey Silt, Slight petroleum odour, some gravel, Moist	DT	1	75		1		6 25.0		Composite soil sample BH115 submitted for laboratory analysis of Metals, EC, SAR and pH.
	Reddish Brown, Fractured Shale	DT	2	100		2		1 20.0		
	Borehole Terminated					3				Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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RECORD OF BOREHOLE No. **BH116**

Project Number: **SCT196342**
 Project Client: **Kerry T. Howe Engineering Limited**
 Project Name: **Environmental Soils Investigation**
 Project Location: **King Street, Beamsville**
 Drilling Location: **4781494N; 621564E**

Drilling Method: **50 mm Direct Push**
 Drilling Machine: **Geoprobe 7822DT**
 Date Started: **Aug 14, 19** Date Completed: **Aug 14, 19**
 Logged by: **CM** Compiled by: **CM**
 Reviewed by: **KH** Revision No.: **0, 9/24/19**



LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT 20 40 60 80		
	Local Ground Surface Elevation:							* Combustible Organic Vapour (ppm) ♦ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Asphalt Grey, Fill, Sandy Gravel, Buried crushed asphalt, petroleum odour, Moist to dry	DT	1	41		1		46 45.0		Composite soil sample BH116 submitted for laboratory analysis of Metals, EC, SAR and pH.
	Brown, Fill, Clayey Silt, With traces of gravel, Moist to wet	DT	2	49		2		5 45.0		
	Brown, Silty Clay/Clayey Silt, APL to WTPL	DT	3	84		3		1 20.0		
	Borehole Terminated					4				Upon Completion: Borehole remained open and dry.

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∞ No freestanding groundwater measured in open borehole on completion of drilling.

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Scale: 1 : 50

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APPENDIX B

**LABORATORY CERTIFICATES OF
ANALYSIS**

PARACEL REPORT #

1933472

1933569

1934007

Certificate of Analysis

Wood Environment & Infrastructure (Thorold)

3300 Merrittville Hwy, Unit 5
Thorold, ON L2V 4Y6
Attn: Kelly Patterson

Client PO:
Project: SCT196342
Custody: 48377/378/379/380/381/382/383/384/385/386

Report Date: 23-Aug-2019
Order Date: 15-Aug-2019

Order #: 1933472

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1933472-01	Composite BH101
1933472-02	BH101-2-D
1933472-03	BH101-5-D
1933472-04	Dup AF
1933472-05	Composite BH 102
1933472-06	Composite BH103
1933472-07	BH103-1-D
1933472-08	BH104-1-D
1933472-09	Composite BH104
1933472-11	BH105-2-D
1933472-12	Dup AC
1933472-13	BH106-2-C
1933472-14	BH107-2-C
1933472-15	Composite BH114
1933472-16	Composite BH115
1933472-17	Composite BH116

Approved By:



Milan Ralitsch, PhD
Senior Technical Manager

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 15-Aug-2019

Project Description: SCT196342

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	22-Aug-19	23-Aug-19
Conductivity	MOE E3138 - probe @25 °C, water ext	20-Aug-19	20-Aug-19
PCBs, total	SW846 8082A - GC-ECD	20-Aug-19	21-Aug-19
PHC F1	CWS Tier 1 - P&T GC-FID	22-Aug-19	23-Aug-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	16-Aug-19	23-Aug-19
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	21-Aug-19	21-Aug-19
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	19-Aug-19	21-Aug-19
REG 153: pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	20-Aug-19	20-Aug-19
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	22-Aug-19	23-Aug-19
SAR	Calculated	20-Aug-19	20-Aug-19
Solids, %	Gravimetric, calculation	20-Aug-19	20-Aug-19

Certificate of Analysis
Client: Wood Environment & Infrastructure (Thorold)
Client PO:

Report Date: 23-Aug-2019
Order Date: 15-Aug-2019
Project Description: SCT196342

	Client ID:	Composite BH101	BH101-2-D	BH101-5-D	Dup AF
	Sample Date:	14-Aug-19 13:25	14-Aug-19 13:30	14-Aug-19 14:05	14-Aug-19 00:00
	Sample ID:	1933472-01	1933472-02	1933472-03	1933472-04
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	85.6	92.5	79.5	92.0
----------	--------------	------	------	------	------

General Inorganics

SAR	0.01 N/A	9.89	-	-	-
Conductivity	5 uS/cm	1650	-	-	-

Metals

Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	5.0	-	-	-
Barium	1.0 ug/g dry	67.1	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	11.5	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	15.1	-	-	-
Cobalt	1.0 ug/g dry	8.8	-	-	-
Copper	5.0 ug/g dry	24.5	-	-	-
Lead	1.0 ug/g dry	9.5	-	-	-
Molybdenum	1.0 ug/g dry	<1.0	-	-	-
Nickel	5.0 ug/g dry	19.4	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	21.5	-	-	-
Zinc	20.0 ug/g dry	50.8	-	-	-

Volatiles

Acetone	0.50 ug/g dry	-	-	<0.50	-
Benzene	0.02 ug/g dry	-	-	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	-	<0.05	-
Bromoform	0.05 ug/g dry	-	-	<0.05	-
Bromomethane	0.05 ug/g dry	-	-	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	-	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	-	<0.05	-
Chloroform	0.05 ug/g dry	-	-	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	-	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 15-Aug-2019

Project Description: SCT196342

	Client ID: Sample Date: Sample ID:	Composite BH101 14-Aug-19 13:25 1933472-01 Soil	BH101-2-D 14-Aug-19 13:30 1933472-02 Soil	BH101-5-D 14-Aug-19 14:05 1933472-03 Soil	Dup AF 14-Aug-19 00:00 1933472-04 Soil
	MDL/Units				
1,3-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	-	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	-	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	-	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	-	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Ethylene dibromide (dibromoethane)	0.05 ug/g dry	-	-	<0.05	-
Hexane	0.05 ug/g dry	-	-	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	-	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	-	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	-	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	-	<0.05	-
Styrene	0.05 ug/g dry	-	-	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	-	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	-	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	-	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	-	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	-	<0.02	-
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	-
o-Xylene	0.05 ug/g dry	-	-	<0.05	-
Xylenes, total	0.05 ug/g dry	-	-	<0.05	-
4-Bromofluorobenzene	Surrogate	-	-	87.6%	-
Dibromofluoromethane	Surrogate	-	-	73.3%	-
Toluene-d8	Surrogate	-	-	103%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	-	<7	-

Certificate of Analysis
Client: Wood Environment & Infrastructure (Thorold)
Client PO:
Report Date: 23-Aug-2019
Order Date: 15-Aug-2019
Project Description: SCT196342

	Client ID:	Composite BH101	BH101-2-D	BH101-5-D	Dup AF
	Sample Date:	14-Aug-19 13:25	14-Aug-19 13:30	14-Aug-19 14:05	14-Aug-19 00:00
	Sample ID:	1933472-01	1933472-02	1933472-03	1933472-04
	MDL/Units	Soil	Soil	Soil	Soil
F2 PHCs (C10-C16)	4 ug/g dry	-	-	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	-	-	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	-	-	<6	-

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	0.54	-	0.30
Acenaphthylene	0.02 ug/g dry	-	0.18	-	0.06
Anthracene	0.02 ug/g dry	-	0.93	-	0.47
Benzo [a] anthracene	0.02 ug/g dry	-	1.08	-	0.55
Benzo [a] pyrene	0.02 ug/g dry	-	0.93	-	0.46
Benzo [b] fluoranthene	0.02 ug/g dry	-	0.76	-	0.36
Benzo [g,h,i] perylene	0.02 ug/g dry	-	0.51	-	0.30
Benzo [k] fluoranthene	0.02 ug/g dry	-	0.46	-	0.21
Chrysene	0.02 ug/g dry	-	1.02	-	0.54
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	0.20	-	0.08
Fluoranthene	0.02 ug/g dry	-	2.78	-	1.37
Fluorene	0.02 ug/g dry	-	0.56	-	0.32
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	0.51	-	0.30
1-Methylnaphthalene	0.02 ug/g dry	-	0.33	-	0.09
2-Methylnaphthalene	0.02 ug/g dry	-	0.49	-	0.12
Methylnaphthalene (1&2)	0.04 ug/g dry	-	0.51	-	0.21
Naphthalene	0.01 ug/g dry	-	0.79	-	0.26
Phenanthrene	0.02 ug/g dry	-	3.18	-	1.50
Pyrene	0.02 ug/g dry	-	1.70	-	0.82
2-Fluorobiphenyl	Surrogate	-	38.2%	-	29.2% [4]
Nitrobenzene-d5	Surrogate	-	60.6%	-	40.6%
Terphenyl-d14	Surrogate	-	53.8%	-	43.1%

PCBs

PCBs, total	0.05 ug/g dry	-	<0.05	-	<0.05
Decachlorobiphenyl	Surrogate	-	107%	-	119%

Certificate of Analysis
Client: Wood Environment & Infrastructure (Thorold)
Client PO:

Report Date: 23-Aug-2019
Order Date: 15-Aug-2019
Project Description: SCT196342

	Client ID:	Composite BH 102	Composite BH103	BH103-1-D	BH104-1-D
	Sample Date:	14-Aug-19 09:50	14-Aug-19 12:55	14-Aug-19 12:50	14-Aug-19 12:20
	Sample ID:	1933472-05	1933472-06	1933472-07	1933472-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.6	93.1	90.8	89.2
General Inorganics					
SAR	0.01 N/A	13.9	5.93	-	-
Conductivity	5 uS/cm	2880	630	-	-
Metals					
Antimony	1.0 ug/g dry	2.3	1.7	-	-
Arsenic	1.0 ug/g dry	6.1	7.2	-	-
Barium	1.0 ug/g dry	124	89.8	-	-
Beryllium	0.5 ug/g dry	0.8	1.0	-	-
Boron	5.0 ug/g dry	17.4	35.1	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	24.0	26.1	-	-
Cobalt	1.0 ug/g dry	12.2	15.3	-	-
Copper	5.0 ug/g dry	27.5	6.9	-	-
Lead	1.0 ug/g dry	16.9	9.0	-	-
Molybdenum	1.0 ug/g dry	<1.0	1.2	-	-
Nickel	5.0 ug/g dry	27.7	34.3	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	1.1	<1.0	-	-
Vanadium	10.0 ug/g dry	33.9	29.6	-	-
Zinc	20.0 ug/g dry	70.9	60.5	-	-
Volatiles					
Acetone	0.50 ug/g dry	-	-	-	<0.50
Benzene	0.02 ug/g dry	-	-	-	<0.02
Bromodichloromethane	0.05 ug/g dry	-	-	-	<0.05
Bromoform	0.05 ug/g dry	-	-	-	<0.05
Bromomethane	0.05 ug/g dry	-	-	-	<0.05
Carbon Tetrachloride	0.05 ug/g dry	-	-	-	<0.05
Chlorobenzene	0.05 ug/g dry	-	-	-	<0.05
Chloroform	0.05 ug/g dry	-	-	-	<0.05
Dibromochloromethane	0.05 ug/g dry	-	-	-	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	-	-	-	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	-	-	-	<0.05

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 15-Aug-2019

Project Description: SCT196342

	Client ID:	Composite BH 102	Composite BH103	BH103-1-D	BH104-1-D
	Sample Date:	14-Aug-19 09:50	14-Aug-19 12:55	14-Aug-19 12:50	14-Aug-19 12:20
	Sample ID:	1933472-05	1933472-06	1933472-07	1933472-08
	MDL/Units	Soil	Soil	Soil	Soil
1,3-Dichlorobenzene	0.05 ug/g dry	-	-	-	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	-	-	-	<0.05
1,1-Dichloroethane	0.05 ug/g dry	-	-	-	<0.05
1,2-Dichloroethane	0.05 ug/g dry	-	-	-	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	-	-	-	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	-	-	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	-	-	<0.05
1,2-Dichloropropane	0.05 ug/g dry	-	-	-	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	-	-	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	-	-	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	-	-	-	<0.05
Ethylbenzene	0.05 ug/g dry	-	-	-	<0.05
Ethylene dibromide (dibromoethane)	0.05 ug/g dry	-	-	-	<0.05
Hexane	0.05 ug/g dry	-	-	-	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	-	-	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	-	-	-	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	-	-	-	<0.05
Methylene Chloride	0.05 ug/g dry	-	-	-	<0.05
Styrene	0.05 ug/g dry	-	-	-	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	-	-	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	-	-	<0.05
Tetrachloroethylene	0.05 ug/g dry	-	-	-	<0.05
Toluene	0.05 ug/g dry	-	-	-	<0.05
1,1,1-Trichloroethane	0.05 ug/g dry	-	-	-	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	-	-	-	<0.05
Trichloroethylene	0.05 ug/g dry	-	-	-	<0.05
Trichlorofluoromethane	0.05 ug/g dry	-	-	-	<0.05
Vinyl chloride	0.02 ug/g dry	-	-	-	<0.02
m,p-Xylenes	0.05 ug/g dry	-	-	-	<0.05
o-Xylene	0.05 ug/g dry	-	-	-	<0.05
Xylenes, total	0.05 ug/g dry	-	-	-	<0.05
4-Bromofluorobenzene	Surrogate	-	-	-	83.3%
Dibromofluoromethane	Surrogate	-	-	-	75.0%
Toluene-d8	Surrogate	-	-	-	98.3%
Benzene	0.02 ug/g dry	-	-	<0.02	-

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

	Client ID: Sample Date: Sample ID:	Composite BH 102 14-Aug-19 09:50 1933472-05 Soil	Composite BH103 14-Aug-19 12:55 1933472-06 Soil	BH103-1-D 14-Aug-19 12:50 1933472-07 Soil	BH104-1-D 14-Aug-19 12:20 1933472-08 Soil
	MDL/Units				
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	-
o-Xylene	0.05 ug/g dry	-	-	<0.05	-
Xylenes, total	0.05 ug/g dry	-	-	<0.05	-
Toluene-d8	Surrogate	-	-	97.5%	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	-	-	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	-	-	5	<4
F3 PHCs (C16-C34)	8 ug/g dry	-	-	263	<8
F4 PHCs (C34-C50)	6 ug/g dry	-	-	72	<6

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	-	-	<0.02
Acenaphthylene	0.02 ug/g dry	-	-	-	<0.02
Anthracene	0.02 ug/g dry	-	-	-	0.06
Benzo [a] anthracene	0.02 ug/g dry	-	-	-	0.06
Benzo [a] pyrene	0.02 ug/g dry	-	-	-	0.04
Benzo [b] fluoranthene	0.02 ug/g dry	-	-	-	0.04
Benzo [g,h,i] perylene	0.02 ug/g dry	-	-	-	0.02
Benzo [k] fluoranthene	0.02 ug/g dry	-	-	-	0.02
Chrysene	0.02 ug/g dry	-	-	-	0.04
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	-	-	<0.02
Fluoranthene	0.02 ug/g dry	-	-	-	0.15
Fluorene	0.02 ug/g dry	-	-	-	0.03
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	-	-	0.02
1-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	-	-	-	<0.04
Naphthalene	0.01 ug/g dry	-	-	-	0.02
Phenanthrene	0.02 ug/g dry	-	-	-	0.17
Pyrene	0.02 ug/g dry	-	-	-	0.08
2-Fluorobiphenyl	Surrogate	-	-	-	20.8% [4]
Nitrobenzene-d5	Surrogate	-	-	-	31.4%
Terphenyl-d14	Surrogate	-	-	-	32.2%

PCBs

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

	Client ID:	Composite BH 102	Composite BH103	BH103-1-D	BH104-1-D
	Sample Date:	14-Aug-19 09:50	14-Aug-19 12:55	14-Aug-19 12:50	14-Aug-19 12:20
	Sample ID:	1933472-05	1933472-06	1933472-07	1933472-08
	MDL/Units	Soil	Soil	Soil	Soil
PCBs, total	0.05 ug/g dry	-	-	-	<0.05
Decachlorobiphenyl	Surrogate	-	-	-	122%
	Client ID:	Composite BH104	BH105-2-D	Dup AC	BH106-2-C
	Sample Date:	14-Aug-19 12:25	14-Aug-19 10:30	14-Aug-19 00:00	14-Aug-19 11:50
	Sample ID:	1933472-09	1933472-11	1933472-12	1933472-13
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	90.2	92.2	88.3	90.2
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General Inorganics

SAR	0.01 N/A	16.1	4.48	14.8	20.4
Conductivity	5 uS/cm	1740	428	1360	1610

Metals

Antimony	1.0 ug/g dry	1.2	3.4	1.9	1.3
Arsenic	1.0 ug/g dry	6.3	8.2	5.3	8.9
Barium	1.0 ug/g dry	108	109	79.2	127
Beryllium	0.5 ug/g dry	0.9	1.0	0.9	1.0
Boron	5.0 ug/g dry	30.9	35.5	30.0	32.6
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	27.9	28.7	28.0	28.4
Cobalt	1.0 ug/g dry	15.0	15.1	14.5	14.4
Copper	5.0 ug/g dry	7.0	7.2	8.4	18.3
Lead	1.0 ug/g dry	10.7	9.2	8.1	8.8
Molybdenum	1.0 ug/g dry	1.0	1.6	1.0	1.3
Nickel	5.0 ug/g dry	35.6	36.6	34.4	34.4
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	32.4	32.8	33.0	34.8
Zinc	20.0 ug/g dry	82.3	110	75.0	65.8

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

Client ID:	BH107-2-C	Composite BH114	Composite BH115	Composite BH116
Sample Date:	14-Aug-19 11:20	14-Aug-19 15:30	14-Aug-19 15:05	14-Aug-19 09:35
Sample ID:	1933472-14	1933472-15	1933472-16	1933472-17
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	92.1	91.6	90.7	85.8
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General Inorganics

SAR	0.01 N/A	5.18	2.07	17.7	7.81
Conductivity	5 uS/cm	1600	746	2560	1700
pH	0.05 pH Units	-	7.20	7.41	7.16

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	5.3	6.7	6.5	4.7
Barium	1.0 ug/g dry	250	125	113	80.5
Beryllium	0.5 ug/g dry	0.8	1.0	0.8	<0.5
Boron	5.0 ug/g dry	31.5	31.6	27.3	9.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	0.6
Chromium	5.0 ug/g dry	25.7	26.8	24.0	14.1
Cobalt	1.0 ug/g dry	13.4	15.7	13.0	7.7
Copper	5.0 ug/g dry	6.1	10.1	18.4	29.9
Lead	1.0 ug/g dry	7.3	12.7	11.9	42.0
Molybdenum	1.0 ug/g dry	<1.0	<1.0	1.2	<1.0
Nickel	5.0 ug/g dry	31.6	33.8	29.1	15.6
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	30.0	35.9	32.8	22.0
Zinc	20.0 ug/g dry	56.4	77.5	126	202

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	0.0973		ug/g		97.3	60-140			
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	0.0388		ug/g		38.9	35-137			
Surrogate: Nitrobenzene-d5	0.0386		ug/g		38.6	22-136			
Surrogate: Terphenyl-d14	0.0608		ug/g		60.9	30-166			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 15-Aug-2019

Project Description: SCT196342

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane)	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	2.98		ug/g		93.2	50-140			
Surrogate: Dibromofluoromethane	3.80		ug/g		119	50-140			
Surrogate: Toluene-d8	2.46		ug/g		76.8	50-140			
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	2.46		ug/g		76.8	50-140			

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	10.3	0.01	N/A	9.89			4.5	200	
Conductivity	1660	5	uS/cm	1650			0.7	5	
pH	7.70	0.05	pH Units	7.71			0.1	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	38	8	ug/g dry	40			5.7	30	
F4 PHCs (C34-C50)	35	6	ug/g dry	54			42.0	30	QR-01
Metals									
Antimony	ND	1.0	ug/g dry	2.3			0.0	30	
Arsenic	4.9	1.0	ug/g dry	6.1			21.6	30	
Barium	97.3	1.0	ug/g dry	124			24.3	30	
Beryllium	0.7	0.5	ug/g dry	0.8			24.8	30	
Boron	13.1	5.0	ug/g dry	17.4			28.7	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	18.3	5.0	ug/g dry	24.0			26.8	30	
Cobalt	9.3	1.0	ug/g dry	12.2			26.6	30	
Copper	21.5	5.0	ug/g dry	27.5			24.3	30	
Lead	13.4	1.0	ug/g dry	16.9			23.2	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	21.3	5.0	ug/g dry	27.7			26.2	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	1.1			0.0	30	
Vanadium	25.6	10.0	ug/g dry	33.9			27.7	30	
Zinc	53.8	20.0	ug/g dry	70.9			27.5	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	0.111		ug/g dry		106	60-140			
Physical Characteristics									
% Solids	91.8	0.1	% by Wt.	91.5			0.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND				40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND				40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND				40	
Chrysene	ND	0.02	ug/g dry	ND				40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND				40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND				40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND				40	
Pyrene	ND	0.02	ug/g dry	ND				40	
Surrogate: 2-Fluorobiphenyl	0.0492		ug/g dry		42.2	35-137			
Surrogate: Nitrobenzene-d5	0.0537		ug/g dry		46.1	22-136			
Surrogate: Terphenyl-d14	0.0810		ug/g dry		69.5	30-166			

Volatiles

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 15-Aug-2019

Project Description: SCT196342

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Ethylene dibromide (dibromoethane)	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	3.60		ug/g dry		95.3	50-140			
Surrogate: Dibromofluoromethane	3.88		ug/g dry		103	50-140			
Surrogate: Toluene-d8	3.57		ug/g dry		94.4	50-140			
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	3.57		ug/g dry		94.4	50-140			

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	201	7	ug/g		101	80-120			
F2 PHCs (C10-C16)	84	4	ug/g	ND	90.0	60-140			
F3 PHCs (C16-C34)	273	8	ug/g	40	75.0	60-140			
F4 PHCs (C34-C50)	90	6	ug/g	54	96.7	60-140			
Metals									
Antimony	105	1.0	ug/g	2.3	82.0	70-130			
Arsenic	129	1.0	ug/g	6.1	98.2	70-130			
Barium	231	1.0	ug/g	124	85.7	70-130			
Beryllium	117	0.5	ug/g	0.8	93.1	70-130			
Boron	128	5.0	ug/g	17.4	88.7	70-130			
Cadmium	120	0.5	ug/g	ND	95.8	70-130			
Chromium	139	5.0	ug/g	24.0	92.2	70-130			
Cobalt	126	1.0	ug/g	12.2	91.2	70-130			
Copper	143	5.0	ug/g	27.5	92.0	70-130			
Lead	133	1.0	ug/g	16.9	92.7	70-130			
Molybdenum	120	1.0	ug/g	ND	96.0	70-130			
Nickel	142	5.0	ug/g	27.7	91.7	70-130			
Selenium	124	1.0	ug/g	ND	99.0	70-130			
Silver	110	0.3	ug/g	ND	88.1	70-130			
Thallium	119	1.0	ug/g	ND	95.4	70-130			
Uranium	120	1.0	ug/g	1.1	95.5	70-130			
Vanadium	149	10.0	ug/g	33.9	92.0	70-130			
Zinc	181	20.0	ug/g	70.9	88.4	70-130			
PCBs									
PCBs, total	0.504	0.05	ug/g	ND	120	60-140			
Surrogate: Decachlorobiphenyl	0.122		ug/g		116	60-140			
Semi-Volatiles									
Acenaphthene	0.030	0.02	ug/g	ND	25.8	16-166			
Acenaphthylene	0.033	0.02	ug/g	ND	28.5	21-146			
Anthracene	0.041	0.02	ug/g	ND	35.7	10-187			
Benzo [a] anthracene	0.049	0.02	ug/g	ND	42.2	16-193			
Benzo [a] pyrene	0.052	0.02	ug/g	ND	44.4	10-173			
Benzo [b] fluoranthene	0.051	0.02	ug/g	ND	44.2	28-201			
Benzo [g,h,i] perylene	0.050	0.02	ug/g	ND	42.8	3-158			
Benzo [k] fluoranthene	0.052	0.02	ug/g	ND	44.6	7-202			
Chrysene	0.046	0.02	ug/g	ND	39.5	10-215			
Dibenzo [a,h] anthracene	0.048	0.02	ug/g	ND	41.4	21-138			
Fluoranthene	0.056	0.02	ug/g	ND	48.6	31-144			
Fluorene	0.028	0.02	ug/g	ND	24.0	31-144			QM-07
Indeno [1,2,3-cd] pyrene	0.050	0.02	ug/g	ND	42.8	5-155			
1-Methylnaphthalene	0.033	0.02	ug/g	ND	28.3	20-152			
2-Methylnaphthalene	0.032	0.02	ug/g	ND	27.8	10-195			
Naphthalene	0.029	0.01	ug/g	ND	25.1	26-160			QM-07
Phenanthrene	0.039	0.02	ug/g	ND	33.3	10-187			
Pyrene	0.040	0.02	ug/g	ND	34.4	10-187			
Volatiles									
Acetone	11.3	0.50	ug/g		113	50-140			
Benzene	3.94	0.02	ug/g		98.6	60-130			
Bromodichloromethane	2.52	0.05	ug/g		62.9	60-130			
Bromoform	2.79	0.05	ug/g		69.8	60-130			

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 15-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	4.25	0.05	ug/g		106	50-140			
Carbon Tetrachloride	2.60	0.05	ug/g		64.9	60-130			
Chlorobenzene	3.71	0.05	ug/g		92.8	60-130			
Chloroform	3.74	0.05	ug/g		93.4	60-130			
Dibromochloromethane	2.42	0.05	ug/g		60.5	60-130			
Dichlorodifluoromethane	2.83	0.05	ug/g		70.8	50-140			
1,2-Dichlorobenzene	3.45	0.05	ug/g		86.2	60-130			
1,3-Dichlorobenzene	3.48	0.05	ug/g		86.9	60-130			
1,4-Dichlorobenzene	3.60	0.05	ug/g		89.9	60-130			
1,1-Dichloroethane	4.08	0.05	ug/g		102	60-130			
1,2-Dichloroethane	3.72	0.05	ug/g		93.1	60-130			
1,1-Dichloroethylene	4.09	0.05	ug/g		102	60-130			
cis-1,2-Dichloroethylene	3.99	0.05	ug/g		99.8	60-130			
trans-1,2-Dichloroethylene	3.99	0.05	ug/g		99.6	60-130			
1,2-Dichloropropane	3.95	0.05	ug/g		98.8	60-130			
cis-1,3-Dichloropropylene	2.76	0.05	ug/g		69.0	60-130			
trans-1,3-Dichloropropylene	2.56	0.05	ug/g		64.1	60-130			
Ethylbenzene	3.57	0.05	ug/g		89.2	60-130			
Ethylene dibromide (dibromoethane)	3.70	0.05	ug/g		92.5	60-130			
Hexane	3.75	0.05	ug/g		93.8	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.5	0.50	ug/g		105	50-140			
Methyl Isobutyl Ketone	11.0	0.50	ug/g		110	50-140			
Methyl tert-butyl ether	11.1	0.05	ug/g		111	50-140			
Methylene Chloride	3.82	0.05	ug/g		95.6	60-130			
Styrene	3.74	0.05	ug/g		93.4	60-130			
1,1,1,2-Tetrachloroethane	3.03	0.05	ug/g		75.7	60-130			
1,1,2,2-Tetrachloroethane	3.23	0.05	ug/g		80.8	60-130			
Tetrachloroethylene	3.58	0.05	ug/g		89.6	60-130			
Toluene	3.61	0.05	ug/g		90.3	60-130			
1,1,1-Trichloroethane	3.13	0.05	ug/g		78.2	60-130			
1,1,2-Trichloroethane	3.84	0.05	ug/g		96.0	60-130			
Trichloroethylene	3.99	0.05	ug/g		99.7	60-130			
Trichlorofluoromethane	4.31	0.05	ug/g		108	50-140			
Vinyl chloride	3.63	0.02	ug/g		90.6	50-140			
m,p-Xylenes	6.99	0.05	ug/g		87.4	60-130			
o-Xylene	3.76	0.05	ug/g		93.9	60-130			
Benzene	3.94	0.02	ug/g		98.6	60-130			
Ethylbenzene	3.57	0.05	ug/g		89.2	60-130			
Toluene	3.61	0.05	ug/g		90.3	60-130			
m,p-Xylenes	6.99	0.05	ug/g		87.4	60-130			
o-Xylene	3.76	0.05	ug/g		93.9	60-130			

Certificate of Analysis
Client: Wood Environment & Infrastructure (Thorold)
Client PO:

Report Date: 23-Aug-2019
Order Date: 15-Aug-2019
Project Description: SCT196342

Qualifier Notes:

Sample Qualifiers :

- 4 : Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

QC Qualifiers :

- QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.
- S-GC : Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SC196342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrittville Hwy, Unit 5</u> <u>Thornhill, ON L2V 4Y6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>Kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:

1933472

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		PHC (F1-F4)	VOCs ↓	PAHs	PCBS ↓	ICP/MS Metals	EC	SAR					
				Date	Time												
1 BH101-1-D	S		2	Aug 14/19	13:25												
2 BH101-1-C	S		1		13:25												
3 BH101-2-D	S		2		13:30			X	X	X	X	X					
4 BH101-3-D	S		2		13:40												
5 BH101-3-C	S		1		13:40												
6 BH101-4-D	S		2		13:45												
7 BH101-5-D	S		2		14:05	X	X										
8 BH101-5-C	S		1		14:05												
9 Dup AF	S		2					X	X								
10																	

Comments: governed by the TLC of SNA07-003 - Composite BN101-1-C and BN101-3-C into
hold all remaining samples for future analysis - Sample for analysis called Composite BN101-metals EC, SAR
BN101-2-D - analysis of PHC, PCBs

Relinquished By (Sign): <u>C. McCann</u>	Received by Driver/Depot: <u>B. Barton (Niagara)</u>	Received at Lab: <u>My</u>	Verified By: <u>B. Homenick</u>
Relinquished By (Print): <u>Cameron McCann</u>	Date/Time: <u>Aug 15/19 2:45 PM</u>	Date/Time: <u>Aug 16/19 11:15</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 15/19 - 9am</u>	Temperature: <u>16°C</u>	Temperature: <u>14.0°C</u>	pH Verified [] By: <u>NA</u>



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SCT96342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrittville Hwy, Unit 5</u> <u>Theriot, ON L2V 4Y6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>Kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR										
Sample ID/Location Name					Date	Time													
1	BH102-1-D	S		2	Aug 14/19	9:50													
2	BH102-1-C			1	↓	9:50													
3	BH102-2-D			2		9:55													
4	BH102-2-C			1		9:55	X	X	X										
5	BH102-3-D			2		10:00													
6	BH102-3-C			1		10:00													
7	Dup AB	S		1															
8																			
9																			
10																			

Comments: Please see Page #1 Composite BH102-1-C, BH102-2-C and BH102-3-C into 1 sample for analysis called Composite BH102 Method of Delivery: P/U

Relinquished By (Sign): <u>C. McLean</u>	Received by Driver/Depot: <u>B. Barta (Weyburn)</u>	Received at Lab: <u>NYC</u>	Verified By: <u>B. Homenick</u>
Relinquished By (Print): <u>Cameron McLean</u>	Date/Time: <u>Aug 15/19 2:45p</u>	Date/Time: <u>Aug 16/19 11:15</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 15/19 - 9am</u>	Temperature: <u>15°C</u>	Temperature: <u>14.8°C</u>	pH Verified By: <u>NA</u>



Client Name: Wood E&I Solutions	Project Reference: SCT196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required:
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merriville Hwy, Unit 5 Thorold, ON L2V4Y6	PO #	
Telephone: 905-687-6616	Email Address: Kelly.patterson@woodplc.com	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR	PHC's	BTEX								
Sample ID/Location Name					Date	Time													
1	BH103-1-D *	S		2	Aug 14/19	12:50				X	X								
2	BH103-1-C	S		1		12:50													
3	BH103-2-D	S		2		12:55	X	X	X										
4	BH103-2-C	S		1		12:55													
5																			
6																			
7																			
8																			
9																			
10																			

Comments: please see Page #1 Composite BH103-1-C and BH103-2-C for one analysis called Composite BH103

Method of Delivery: P/U.

Relinquished By (Sign): C. McNamee	Received by Driver/Drop: B. Barto (W. J. J. J.)	Received at Lab: M.C.	Verified By: B. McNamee
Relinquished By (Print): Cameron McNamee	Date/Time: Aug 15/19 2:45 pm	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 17°C	Temperature: 14.8°C	pH Verified [] By: NA

BH103-1-D Kelly update 14 Aug 19 for PHC's + BTEX ✓



Client Name: Wood E&I Solutions	Project Reference: SCT 196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merriville Hwy, Unit 5 Therold ON L2V 4Y6	PO #	
Telephone: 905-687-6616	Email Address: kelly.patterson@woodplc.com	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR	VOCs	PHC (F1-F4)	PAHs	PCBs				
Sample ID/Location Name					Date	Time											
1	BH104-1-D	S		2	Aug 14/19	12:20				X	X	X	X				
2	BH104-1-C	S		1	↓	12:20											
3	BH104-2-D	S		2		12:25	X	X	X								
4	BH104-2-C	S		1		12:25											
5	Dup AE	S		2													
6																	
7																	
8																	
9																	
10																	

Comments: please see Page #1 Composite BH104-1-C and BH104-2-C for 1 analysis & called Composite BH104. Discrete sample BH104-1-D for VOC, PHC, PAH, PCBs Method of Delivery: P/U

Relinquished By (Sign): C. McCorm	Received by Driver/Depot: B. Barba (Nayan)	Received at Lab: M.C.	Verified By: B. Comenier
Relinquished By (Print): Cameron McCorm	Date/Time: Aug 15/19 2:48 PM	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 16.2 °C	Temperature: 14.0 °C	pH Verified By: NA



Client Name: Wood E&I Solutions	Project Reference: SCT96342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required:
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merrittville Hwy, Unit 5 Thornburg, ON L2V 4Y6	PO #	
Telephone: 905-687-6616	Email Address: kelly.patterson@woodplc.com	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number: 1933472		Matrix	Air Volume	# of Containers	Sample Taken		TCLP Inorganics	TCLP Metals	TCLP VOCs	PCBs	ICP/MS Metals	EC	SAR						
					Date	Time													
1	BH105-1-D	S		2	Aug 14/19	10:25													
2	BH105-1-C x'	S		1		10:25	X	X	X	X									
3	BH105-2-D	S		2		10:30					X	X	X						
4	BH105-2-C	S		1		10:30					X	X	X						
5	Dp AC	S		2							X	X	X						
6																			
7																			
8																			
9																			
10																			

Comments: please see Page #1 *Composite BH105-1-C, BH106-1-C and BH107-1-C into 1 sample called TCLP-1 for 1 TCLP analysis total - TCLP to meet Walker's requirements Method of Delivery: P/U

Relinquished By (Sign): <i>CMC</i>	Received by Driver/Depot: <i>B. Banta (Niagara)</i>	Received at Lab: <i>NYC</i>	Verified By: <i>BHornemier</i>
Relinquished By (Print): <i>Cameron McCann</i>	Date/Time: <i>Aug 15/19 2:45pm</i>	Date/Time: <i>Aug 16/19 11:15</i>	Date/Time: <i>16 Aug 19</i>
Date/Time: <i>Aug 15/19 - 9am</i>	Temperature: <i>15.2 °C</i>	Temperature: <i>14.0 °C</i>	pH Verified [] By: <i>BTA</i>



Client Name: Wood E&I Solutions	Project Reference: SCT196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☐ Regular Date Required: _____
Contact Name: Kelly Patterson	Quote #	
Address: 3300 Merrittville Hwy, Unit 5 Thornhill, ON L2V 4Y6	PO #	
Telephone: 905-687-6616	Email Address: kelly.patterson@woodplc.com	

Criteria: ☐ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		* TCLP	ICP/MS Metals	EC	SAR										
Sample ID/Location Name					Date	Time														
1	BH106-1-D	S		2	Aug 14/19	11:45														
2	BH106-1-C *	S		1		11:45	*													
3	BH106-2-D	S		2		11:50														
4	BH106-2-C	S		1		11:50		X	X	X										
5																				
6																				
7																				
8																				
9																				
10																				

Comments: please see Page #1 * See note pg 5

Method of Delivery: P/U.

Relinquished By (Sign): C. McCann	Received By Driver/Depot: D. Burtin (V. J. Jans)	Received at Lab: NYC	Verified By: B. Homenick
Relinquished By (Print): Cameron McCann	Date/Time: Aug 15/19 2:45 PM	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 16.2 °C	Temperature: 14.0 °C	pH Verified By: NA



Client Name: Wood E&I Solutions	Project Reference: SCT 196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☐ Regular Date Required:
Contact Name: Kelly Patterson	Quote #	
Address: 3300 Merrithill Hwy, Unit 5 Thornhill, ON L2V 4Y6	PO #	
Telephone: 905-687-6616	Email Address: kelly.patterson@woodplc.com	

Criteria: ☐ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		*TCLP	ICP/MS Metals	EC	SAR										
Sample ID/Location Name					Date	Time														
1	BH107-1-D	S		2	Aug 14/19	11:15														
2	BH107-1-C *	S		1	↓	11:15	*													
3	BH107-2-D	S		2	↓	11:20														
4	BH107-2-C	S		1	↓	11:20		X	X	X										
5	Dup AD	S		1																
6																				
7																				
8																				
9																				
10																				

Comments: please see Page #1 * see note pg 5 Method of Delivery: P/U.

Relinquished By (Sign): C. McCann	Received By Driver/Depot: B. Datta (Wagon)	Received at Lab: M.C.	Verified By: B. Homenick
Relinquished By (Print): Cameron McCann	Date/Time: Aug 15/19 2:45 pm	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 16°C	Temperature: 14.0°C	pH Verified By: NA



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SC1 196342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrithill Hwy, Unit 5</u> <u>Thorold, ON L2V 4Y6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>Kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR	pH										
Sample ID/Location Name					Date	Time														
1	BH114-1-D	S		2	Aug 14/19	15:30														
2	BH114-1-C	S		1		15:30														
3	BH114-2-D	S		2		15:35	X	X	X	X										
4	BH114-2-C	S		1		15:35														
5																				
6																				
7																				
8																				
9																				
10																				

Comments: Composite BH114-1-C and BH114-2-C into 1 sample for analysis called Composite BH114.

Method of Delivery: P/U.

Relinquished By (Sign): <u>C. McCann</u>	Received by Driver/Depot: <u>B. Benth (N. Agara)</u>	Received at Lab: <u>MJC</u>	Verified By: <u>B. Homenick</u>
Relinquished By (Print): <u>Cameron McCann</u>	Date/Time: <u>Aug 15/19 2:45pm</u>	Date/Time: <u>Aug 16/19 11:15</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 15/19 - 9am</u>	Temperature: <u>17°C</u>	Temperature: <u>14.0°C</u>	pH Verified [] By: <u>NA</u>



Client Name: Wood E&I Solutions	Project Reference: SCT196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required:
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merrittville Hwy, Unit 5 Theriot, ON L2V 4Y6	PO #	
Telephone: 905-687-6616	Email Address: Kelly.patterson@woodplc.com	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1933472			Sample Taken		ICP/H5 Metals	EC	SAR	PH										
Sample ID/Location Name			Matrix	Air Volume	# of Containers	Date	Time											
1	BH115-1-D		S		2	Aug 14/19	15:05											
2	BH115-1-C		S		1		15:05											
3	BH115-2-D	Composite BH115	S		2		15:15	X	X	X	X							
4	BH115-2-C		S		1		15:15											
5	Dup AG		S		1													
6																		
7																		
8																		
9																		
10																		

Comments: please see Page #1 Composite BH115-1-C and BH115-2-C into 1 sample for analysis called Composite BH115 Method of Delivery: P/U

Relinquished By (Sign): C. McE...	Received by Driver/Depot: R. Banta (W. Agan)	Received at Lab: WJC	Verified By: B. Homener
Relinquished By (Print): Cameron McE...	Date/Time: Aug 15/19 02:45 PM	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 13°C	Temperature: 14.0°C	pH Verified By: BA



Client Name: Wood EG Solutions	Project Reference: SCT196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required:
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merrithill Hwy, Unit 5 Thornhill, ON L2V 4Y6	PO #	
Telephone: 905-687-6616	Email Address: Kelly.patterson@woodplc.com	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR	pH										
Sample ID/Location Name					Date	Time														
1	BH116-2-D	S		2	Aug 14/19	9:35														
2	BH116-2-C	S		1		9:35														
3	BH116-3-D	S		2		9:40	X	X	X	X										
4	BH116-3-C	S		1		9:40														
5	Dup AA	S		2																
6																				
7																				
8																				
9																				
10																				

Comments: please see Page #1 Composite BH116-2-C and BH116-3-C into 1 sample for analysis called Composite BH116. Method of Delivery: P/U.

Relinquished By (Sign): CMH	Received By Driver/Depot: B. Bahr (Wigam)	Received at Lab: NYC	Verified By: B. Homenier
Relinquished By (Print): Cameron McCann	Date/Time: Aug 15/19 2:45 PM	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 16°C	Temperature: 14.0°C	pH Verified [] By: NA

Certificate of Analysis

Wood Environment & Infrastructure (Thorold)

3300 Merrittville Hwy, Unit 5
Thorold, ON L2V 4Y6
Attn: Kelly Patterson

Client PO:
Project: SCT196342
Custody: 48390/391/392/393/394/395

Report Date: 22-Aug-2019
Order Date: 16-Aug-2019

Order #: 1933560

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1933560-01	Composite BH108
1933560-02	Composite BH109
1933560-03	Composite BH110
1933560-04	Composite BH111
1933560-05	Composite BH112
1933560-06	Composite BH113

Approved By:



Milan Ralitsch, PhD
Senior Technical Manager

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 22-Aug-2019

Order Date: 16-Aug-2019

Project Description: SCT196342

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Conductivity	MOE E3138 - probe @25 °C, water ext	20-Aug-19	20-Aug-19
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	21-Aug-19	21-Aug-19
SAR	Calculated	20-Aug-19	20-Aug-19
Solids, %	Gravimetric, calculation	21-Aug-19	21-Aug-19

Certificate of Analysis

Report Date: 22-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 16-Aug-2019

Client PO:

Project Description: SCT196342

Client ID:	Composite BH108	Composite BH109	Composite BH110	Composite BH111
Sample Date:	16-Aug-19 09:35	16-Aug-19 10:15	16-Aug-19 11:05	16-Aug-19 11:35
Sample ID:	1933560-01	1933560-02	1933560-03	1933560-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	85.8	89.7	89.6	90.1
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General Inorganics

SAR	0.01 N/A	17.2	13.2	12.3	10.8
Conductivity	5 uS/cm	4450	1220	1270	1180

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	2.7
Arsenic	1.0 ug/g dry	4.7	4.5	4.2	6.0
Barium	1.0 ug/g dry	93.0	66.0	78.2	111
Beryllium	0.5 ug/g dry	0.9	0.7	0.7	0.6
Boron	5.0 ug/g dry	24.5	17.8	20.6	22.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	27.2	21.6	21.8	20.5
Cobalt	1.0 ug/g dry	13.7	11.4	10.5	10.4
Copper	5.0 ug/g dry	9.3	11.7	7.5	7.9
Lead	1.0 ug/g dry	9.9	9.1	6.1	7.8
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	29.1	25.1	23.0	23.7
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	1.7	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	54.8	28.6	27.1	25.9
Zinc	20.0 ug/g dry	61.6	50.3	52.5	47.7

Certificate of Analysis

Report Date: 22-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 16-Aug-2019

Client PO:

Project Description: SCT196342

Client ID:	Composite BH112	Composite BH113	-	-
Sample Date:	15-Aug-19 12:15	15-Aug-19 09:00	-	-
Sample ID:	1933560-05	1933560-06	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	89.3	88.9	-	-
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General Inorganics

SAR	0.01 N/A	8.98	8.52	-	-
Conductivity	5 uS/cm	1680	1990	-	-

Metals

Antimony	1.0 ug/g dry	1.4	1.0	-	-
Arsenic	1.0 ug/g dry	5.0	6.3	-	-
Barium	1.0 ug/g dry	78.5	105	-	-
Beryllium	0.5 ug/g dry	0.7	0.8	-	-
Boron	5.0 ug/g dry	20.5	23.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	21.0	26.5	-	-
Cobalt	1.0 ug/g dry	11.1	14.8	-	-
Copper	5.0 ug/g dry	8.5	8.6	-	-
Lead	1.0 ug/g dry	6.8	9.0	-	-
Molybdenum	1.0 ug/g dry	<1.0	1.0	-	-
Nickel	5.0 ug/g dry	24.6	33.4	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	25.0	29.1	-	-
Zinc	20.0 ug/g dry	48.3	60.5	-	-

Certificate of Analysis

Report Date: 22-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 16-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						

Certificate of Analysis
Client: Wood Environment & Infrastructure (Thorold)
Client PO:
Report Date: 22-Aug-2019
Order Date: 16-Aug-2019
Project Description: SCT196342
Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	10.3	0.01	N/A	9.89			4.5	200	
Conductivity	1660	5	uS/cm	1650			0.7	5	
Metals									
Antimony	ND	1.0	ug/g dry	2.3			0.0	30	
Arsenic	4.9	1.0	ug/g dry	6.1			21.6	30	
Barium	97.3	1.0	ug/g dry	124			24.3	30	
Beryllium	0.7	0.5	ug/g dry	0.8			24.8	30	
Boron	13.1	5.0	ug/g dry	17.4			28.7	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	18.3	5.0	ug/g dry	24.0			26.8	30	
Cobalt	9.3	1.0	ug/g dry	12.2			26.6	30	
Copper	21.5	5.0	ug/g dry	27.5			24.3	30	
Lead	13.4	1.0	ug/g dry	16.9			23.2	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	21.3	5.0	ug/g dry	27.7			26.2	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	1.1			0.0	30	
Vanadium	25.6	10.0	ug/g dry	33.9			27.7	30	
Zinc	53.8	20.0	ug/g dry	70.9			27.5	30	
Physical Characteristics									
% Solids	77.1	0.1	% by Wt.	76.8			0.5	25	

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 22-Aug-2019

Order Date: 16-Aug-2019

Project Description: SCT196342

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	105	1.0	ug/g	2.3	82.0	70-130			
Arsenic	129	1.0	ug/g	6.1	98.2	70-130			
Barium	231	1.0	ug/g	124	85.7	70-130			
Beryllium	117	0.5	ug/g	0.8	93.1	70-130			
Boron	128	5.0	ug/g	17.4	88.7	70-130			
Cadmium	120	0.5	ug/g	ND	95.8	70-130			
Chromium	139	5.0	ug/g	24.0	92.2	70-130			
Cobalt	126	1.0	ug/g	12.2	91.2	70-130			
Copper	143	5.0	ug/g	27.5	92.0	70-130			
Lead	133	1.0	ug/g	16.9	92.7	70-130			
Molybdenum	120	1.0	ug/g	ND	96.0	70-130			
Nickel	142	5.0	ug/g	27.7	91.7	70-130			
Selenium	124	1.0	ug/g	ND	99.0	70-130			
Silver	110	0.3	ug/g	ND	88.1	70-130			
Thallium	119	1.0	ug/g	ND	95.4	70-130			
Uranium	120	1.0	ug/g	1.1	95.5	70-130			
Vanadium	149	10.0	ug/g	33.9	92.0	70-130			
Zinc	181	20.0	ug/g	70.9	88.4	70-130			

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 22-Aug-2019

Order Date: 16-Aug-2019

Project Description: SCT196342

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SC196342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrittville Hwy, Unit 5</u> <u>Thorold, ON L2V 4Y6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number: <u>1933560</u>		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR								
Sample ID/Location Name					Date	Time											
1	BH108-1-D	S		2	Aug 15/19	9:35											
2	BH108-1-C	S		1	↓	9:35											
3	BH108-2-D	S		2		9:40	X	X	X								
4	BH108-2-C	S		1		9:40											
5	Dup AH	S		2													
6																	
7																	
8																	
9																	
10																	

Comments: governed by the T/C of SNA07-003 Composite BH108 for analysis - 1-C and BH-2-C for Method of Delivery: D/W/D
hold all remaining samples for future analysis 1 analysis called Composite BH108

Relinquished By (Sign): <u>C. McCann</u>	Received by Driver/Depot: <u>Niagara</u> <u>B. Homenick</u>	Received at Lab: <u>Hy83-CB</u>	Verified By: <u>B. Homenick</u>
Relinquished By (Print): <u>Cameron McCann</u>	Date/Time: <u>16 Aug 19 11:45</u>	Date/Time: <u>08/19/19 11:01</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 16/19 - 9am</u>	Temperature: <u>13</u> °C	Temperature: <u>9.8</u> °C	pH Verified By: <u>NA</u>



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SCT96342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrittville Hwy, Unit 5</u> <u>Thornhill, ON L2V 4Y6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR										
Sample ID/Location Name					Date	Time													
1	BH109-1-D	S		2	Aug 15/19	10:15													
2	BH109-1-C	S		1	↓	10:15													
3	BH109-2-D	S		2		10:20	X	X	X										
4	BH109-2-C	S		1		10:20													
5	Dup AI	S		1															
6																			
7																			
8																			
9																			
10																			

Comments: Composite BH109-1-C and BH109-2-C for 1 sample analysis called
please see Page #1 Composite BH109
 Method of Delivery: PUP

Relinquished By (Sign): <u>C. McCann</u>	Received by Driver/Depot: <u>Niagara</u> <u>BHomenick</u>	Received at Lab: <u>Mississauga</u>	Verified By: <u>BHomenick</u>
Relinquished By (Print): <u>Cameron McCann</u>	Date/Time: <u>16 Aug 19 11:45</u>	Date/Time: <u>08/19/19 11:01</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 16/19 - 9am</u>	Temperature: <u>13</u> °C	Temperature: <u>9.8</u> °C	pH Verified By: <u>WAF</u>



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SCT96342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrittville Hwy, Unit 5</u> <u>Thornburg, ON L2V 4Y6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table _____ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:			Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR															
Sample ID/Location Name						Date	Time																		
1	BH110-1-D		S		2	Aug 15/19	11:05																		
2	BH110-1-C		S		1	↓	11:05																		
3	BH110-2-D		S		2		11:00	X	X	X															
4	BH110-2-C		S		1		11:00																		
5	Dup AJ		S		2																				
6																									
7																									
8																									
9																									
10																									

Comments: Composite BH110-1-C and BH110-2-C for 1 analysis called Composite BH110. Method of Delivery: DUP
please see Page #1

Relinquished By (Sign): <u>C.M.</u>	Received by Driver/Depot: <u>Niagara</u>	Received at Lab: <u>Myssie Gibe</u>	Verified By: <u>B. Homenick</u>
Relinquished By (Print): <u>Cameron McCann</u>	Date/Time: <u>16 Aug 19 11:45</u>	Date/Time: <u>08/19/19</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 16/19 - 9am</u>	Temperature: <u>13</u> °C	Temperature: <u>9.8</u> °C	pH Verified [] By: <u>NB</u>



Client Name: <u>Wood E&I Solutions</u>	Project Reference: <u>SC196342</u>	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: <u>Kelly Patterson</u>	Quote # <u>19-010</u>	
Address: <u>3300 Merrittville Hwy, Unit 5</u> <u>Thornhill, ON L2V 4V6</u>	PO # _____	
Telephone: <u>905-687-6616</u>	Email Address: <u>kelly.patterson@woodplc.com</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR										
					Date	Time													
1	BH112-1-D	S		2	Aug 15/19	12:15													
2	BH112-1-C	S		1	↓	12:15													
3	BH112-2-D	S		2	↓	12:20	X	X	X										
4	BH112-2-C	S		1	↓	12:20													
5																			
6																			
7																			
8																			
9																			
10																			

Comments: Composite BH112-1C and BH112-2C for 1 analysis called Composite BH112. Method of Delivery: DUP

please see Page #1

Relinquished By (Sign): <u>C. McCann</u>	Received by Driver/Depot: <u>W. Homenick</u>	Received at Lab: <u>Allyson Clark</u>	Verified By: <u>B. Homenick</u>
Relinquished By (Print): <u>Cameron McCann</u>	Date/Time: <u>16 Aug 19 11:45</u>	Date/Time: <u>08/19/19 11:01</u>	Date/Time: <u>16 Aug 19</u>
Date/Time: <u>Aug 16/19 - 9am</u>	Temperature: <u>13</u> °C	Temperature: <u>9.9</u> °C	pH Verified [] By: <u>NA</u>



Client Name: Wood E&I Solutions	Project Reference: SCT196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merrittville Hwy, Unit 5 Thorold, ON L2V4Y6	PO #	
Telephone: 905-687-6616	Email Address: kelly.patterson@woodplc.com	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		ICP/MS Metals	EC	SAR										
Sample ID/Location Name					Date	Time													
1	BH113-1-D	S		2	Aug 15/19	9:00													
2	BH113-1-C	S		1	↓	9:00													
3	BH113-2-D	S		2		9:10	X	X	X										
4	BH113-2-C	S		1		9:10													
5																			
6																			
7																			
8																			
9																			
10																			

Comments: please see Page #1 Composite BH113-1C and BH113-2C for analysis called Composite BH113

Method of Delivery: PUP

Relinquished By (Sign): C. McEwen	Received by Driver/Depot: B. McEwen	Received at Lab: M. McEwen	Verified By: B. McEwen
Relinquished By (Print): Cameron McEwen	Date/Time: 16 Aug 19 11:45	Date/Time: 08/19/19	Date/Time: 16 Aug 19
Date/Time: Aug 16/19 - 9am	Temperature: 13 °C	Temperature: 2.8 °C	pH Verified [] By: NA

Certificate of Analysis

Wood Environment & Infrastructure (Thorold)

3300 Merrittville Hwy, Unit 5
Thorold, ON L2V 4Y6
Attn: Kelly Patterson

Client PO:
Project: SCT196342
Custody: 48377/378/379/380/381/382/383/384/385/386

Report Date: 23-Aug-2019
Order Date: 19-Aug-2019

Order #: 1934007

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID
1934007-01

Client ID
TCLP-1

Approved By:



Milan Ralitsch, PhD
Senior Technical Manager

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 19-Aug-2019

Project Description: SCT196342

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PCBs, total	SW846 8082A - GC-ECD	20-Aug-19	21-Aug-19
REG 558 - Cyanide	MOE E3015- Auto Colour	21-Aug-19	21-Aug-19
REG 558 - Fluoride	EPA 340.2 - ISE	21-Aug-19	21-Aug-19
REG 558 - Mercury by CVAA	EPA 7470A - Cold Vapour AA	21-Aug-19	21-Aug-19
REG 558 - Metals, ICP-MS	TCLP EPA 6020 - Digestion - ICP-MS	21-Aug-19	21-Aug-19
REG 558 - NO3/NO2	EPA 300.1 - IC	21-Aug-19	21-Aug-19
REG 558 - VOCs	EPA 624 - P&T GC-MS	21-Aug-19	22-Aug-19
Solids, %	Gravimetric, calculation	22-Aug-19	22-Aug-19

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 19-Aug-2019

Client PO:

Project Description: SCT196342

Client ID: TCLP-1
Sample Date: 14-Aug-19 10:25
Sample ID: 1934007-01
MDL/Units: Soil

-	-	-
-	-	-
-	-	-
-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	87.7	-	-	-
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EPA 1311 - TCLP Leachate Inorganics

Fluoride	0.05 mg/L	0.11	-	-	-
Nitrate as N	1 mg/L	<1	-	-	-
Nitrite as N	1 mg/L	<1	-	-	-
Cyanide, free	0.02 mg/L	<0.02	-	-	-

EPA 1311 - TCLP Leachate Metals

Arsenic	0.05 mg/L	<0.05	-	-	-
Barium	0.05 mg/L	0.53	-	-	-
Boron	0.05 mg/L	<0.05	-	-	-
Cadmium	0.01 mg/L	<0.01	-	-	-
Chromium	0.05 mg/L	<0.05	-	-	-
Lead	0.05 mg/L	<0.05	-	-	-
Mercury	0.005 mg/L	<0.005	-	-	-
Selenium	0.05 mg/L	<0.05	-	-	-
Silver	0.05 mg/L	<0.05	-	-	-
Uranium	0.05 mg/L	<0.05	-	-	-

EPA 1311 - TCLP Leachate Volatiles

Benzene	0.005 mg/L	<0.005	-	-	-
Carbon Tetrachloride	0.005 mg/L	<0.005	-	-	-
Chlorobenzene	0.004 mg/L	<0.004	-	-	-
Chloroform	0.006 mg/L	<0.006	-	-	-
1,2-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-
1,4-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-
1,2-Dichloroethane	0.005 mg/L	<0.005	-	-	-
1,1-Dichloroethylene	0.006 mg/L	<0.006	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.30 mg/L	<0.30	-	-	-
Methylene Chloride	0.04 mg/L	<0.04	-	-	-
Tetrachloroethylene	0.005 mg/L	<0.005	-	-	-
Trichloroethylene	0.004 mg/L	<0.004	-	-	-
Vinyl chloride	0.005 mg/L	<0.005	-	-	-
4-Bromofluorobenzene	Surrogate	98.1%	-	-	-
Dibromofluoromethane	Surrogate	89.0%	-	-	-
Toluene-d8	Surrogate	89.0%	-	-	-

PCBs

PCBs, total	0.05 ug/g dry	<0.05	-	-	-
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Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 19-Aug-2019

Project Description: SCT196342

		Client ID:	TCLP-1	-	-	-
		Sample Date:	14-Aug-19 10:25	-	-	-
		Sample ID:	1934007-01	-	-	-
		MDL/Units	Soil	-	-	-
Decachlorobiphenyl	Surrogate		111%	-	-	-

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 19-Aug-2019

Project Description: SCT196342

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Fluoride	ND	0.05	mg/L						
Nitrate as N	ND	1	mg/L						
Nitrite as N	ND	1	mg/L						
Cyanide, free	ND	0.02	mg/L						
EPA 1311 - TCLP Leachate Metals									
Arsenic	ND	0.05	mg/L						
Barium	ND	0.05	mg/L						
Boron	ND	0.05	mg/L						
Cadmium	ND	0.01	mg/L						
Chromium	ND	0.05	mg/L						
Lead	ND	0.05	mg/L						
Mercury	ND	0.005	mg/L						
Selenium	ND	0.05	mg/L						
Silver	ND	0.05	mg/L						
Uranium	ND	0.05	mg/L						
EPA 1311 - TCLP Leachate Volatiles									
Benzene	ND	0.005	mg/L						
Carbon Tetrachloride	ND	0.005	mg/L						
Chlorobenzene	ND	0.004	mg/L						
Chloroform	ND	0.006	mg/L						
1,2-Dichlorobenzene	ND	0.004	mg/L						
1,4-Dichlorobenzene	ND	0.004	mg/L						
1,2-Dichloroethane	ND	0.005	mg/L						
1,1-Dichloroethylene	ND	0.006	mg/L						
Methyl Ethyl Ketone (2-Butanone)	ND	0.30	mg/L						
Methylene Chloride	ND	0.04	mg/L						
Tetrachloroethylene	ND	0.005	mg/L						
Trichloroethylene	ND	0.004	mg/L						
Vinyl chloride	ND	0.005	mg/L						
Surrogate: 4-Bromofluorobenzene	0.746		mg/L		108	83-134			
Surrogate: Dibromofluoromethane	0.678		mg/L		98.5	78-124			
Surrogate: Toluene-d8	0.616		mg/L		89.6	76-118			
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	0.0973		ug/g		97.3	60-140			

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 19-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Fluoride	0.12	0.05	mg/L	0.12			0.4	20	
Nitrate as N	ND	1	mg/L	ND				20	
Nitrite as N	ND	1	mg/L	ND				20	
Cyanide, free	ND	0.02	mg/L	ND				20	
EPA 1311 - TCLP Leachate Metals									
Arsenic	ND	0.05	mg/L	ND			0.0	29	
Barium	0.514	0.05	mg/L	0.533			3.7	34	
Boron	ND	0.05	mg/L	ND			0.0	33	
Cadmium	ND	0.01	mg/L	ND			0.0	33	
Chromium	ND	0.05	mg/L	ND			0.0	32	
Lead	ND	0.05	mg/L	ND			0.0	32	
Mercury	ND	0.005	mg/L	ND			0.0	30	
Selenium	ND	0.05	mg/L	ND			0.0	28	
Silver	ND	0.05	mg/L	ND			0.0	28	
Uranium	ND	0.05	mg/L	ND			0.0	27	
EPA 1311 - TCLP Leachate Volatiles									
Benzene	ND	0.005	mg/L	ND				25	
Carbon Tetrachloride	ND	0.005	mg/L	ND				25	
Chlorobenzene	ND	0.004	mg/L	ND				25	
Chloroform	ND	0.006	mg/L	ND				25	
1,2-Dichlorobenzene	ND	0.004	mg/L	ND				25	
1,4-Dichlorobenzene	ND	0.004	mg/L	ND				25	
1,2-Dichloroethane	ND	0.005	mg/L	ND				25	
1,1-Dichloroethylene	ND	0.006	mg/L	ND				25	
Methyl Ethyl Ketone (2-Butanone)	ND	0.30	mg/L	ND				25	
Methylene Chloride	ND	0.04	mg/L	ND				25	
Tetrachloroethylene	ND	0.005	mg/L	ND				25	
Trichloroethylene	ND	0.004	mg/L	ND				25	
Vinyl chloride	ND	0.005	mg/L	ND				25	
Surrogate: 4-Bromofluorobenzene	0.710		mg/L		103	83-134			
Surrogate: Dibromofluoromethane	0.612		mg/L		89.0	78-124			
Surrogate: Toluene-d8	0.633		mg/L		92.0	76-118			
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				40	
Surrogate: Decachlorobiphenyl	0.111		ug/g dry		106	60-140			
Physical Characteristics									
% Solids	88.4	0.1	% by Wt.	87.7			0.7	25	

Certificate of Analysis

Report Date: 23-Aug-2019

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 19-Aug-2019

Client PO:

Project Description: SCT196342

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Fluoride	0.64	0.05	mg/L	0.12	105	70-130			
Nitrate as N	11	1	mg/L	ND	108	81-112			
Nitrite as N	11	1	mg/L	ND	105	76-107			
Cyanide, free	0.057	0.02	mg/L	ND	113	60-136			
EPA 1311 - TCLP Leachate Metals									
Arsenic	51.9		ug/L	0.131	103	83-119			
Barium	94.9		ug/L	53.3	83.1	83-116			
Boron	45.1		ug/L	3.25	83.6	71-128			
Cadmium	44.3		ug/L	0.190	88.2	78-119			
Chromium	55.3		ug/L	0.263	110	80-124			
Lead	40.8		ug/L	1.03	79.5	77-126			
Mercury	0.0293	0.005	mg/L	ND	97.8	70-130			
Selenium	42.4		ug/L	0.100	84.7	81-125			
Silver	42.3		ug/L	ND	84.5	70-128			
Uranium	45.3		ug/L	ND	90.6	70-131			
EPA 1311 - TCLP Leachate Volatiles									
Benzene	0.040	0.005	mg/L		101	55-141			
Carbon Tetrachloride	0.042	0.005	mg/L		104	49-149			
Chlorobenzene	0.038	0.004	mg/L		95.0	64-137			
Chloroform	0.038	0.006	mg/L		94.8	58-138			
1,2-Dichlorobenzene	0.036	0.004	mg/L		89.2	60-150			
1,4-Dichlorobenzene	0.035	0.004	mg/L		87.8	63-132			
1,2-Dichloroethane	0.038	0.005	mg/L		94.2	50-140			
1,1-Dichloroethylene	0.034	0.006	mg/L		84.2	43-153			
Methyl Ethyl Ketone (2-Butanone)	0.090	0.30	mg/L		90.2	26-153			
Methylene Chloride	0.033	0.04	mg/L		83.4	58-149			
Tetrachloroethylene	0.036	0.005	mg/L		90.6	51-145			
Trichloroethylene	0.032	0.004	mg/L		79.6	52-135			
Vinyl chloride	0.042	0.005	mg/L		105	31-159			
Surrogate: 4-Bromofluorobenzene	0.0688		mg/L		86.0	83-134			
PCBs									
PCBs, total	0.504	0.05	ug/g	ND	120	60-140			

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 23-Aug-2019

Order Date: 19-Aug-2019

Project Description: SCT196342

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.



Client Name: Wood E&I Solutions	Project Reference: SCT196342	Turnaround Time: ☐ 1 Day ☐ 3 Day ☐ 2 Day ☒ Regular Date Required: _____
Contact Name: Kelly Patterson	Quote # 19-010	
Address: 3300 Merrittville Hwy, Unit 5 Thornhill, ON L2V 4V6	PO #	
Telephone: 905-687-6616	Email Address: kelly.patterson@woodplc.com	

Criteria: ☒ O Reg 153/04 (As Amended) Table ☐ RSC Filing ☐ O Reg 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other _____

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Sample ID/Location Name		Matrix	Air Volume	# of Containers	Sample Taken		TCLP Inorganics	TCLP Metals	TCLP VOCs	PCBs	ICP/MS Metals	EC	SAR				
					Date	Time											
1	BH105-1-D	S		2	Aug 14/19	10:25											
2	BH105-1-C *	S		1		10:25	X	X	X	X							
3	BH105-2-D	S		2		10:30											
4	BH105-2-C	S		1		10:30					X	X	X				
5	Dp AC	S		2	Y						X	X	X				
6											X	X	X				
7																	
8																	
9																	
10																	

Comments: please see Page #1 *Composite BH105-1-C, BH106-1-C and BH107-1-C into 1 sample called TCLP-1 for 1 TCLP analysis total - TCLP to meet Walker's requirements

Relinquished By (Sign): <i>C. McCann</i>	Received by Driver/Dept: <i>B. Banta Niagara</i>	Received at Lab: <i>MJC</i>	Verified By: <i>BH105-1-C</i>
Relinquished By (Print): <i>Cameron McCann</i>	Date/Time: <i>Aug 15/19 2:45 PM</i>	Date/Time: <i>Aug 16/19 11:15</i>	Date/Time: <i>16 Aug 19</i>
Date/Time: <i>Aug 15/19 - 9am</i>	Temperature: <i>15°C</i>	Temperature: <i>14.8°C</i>	pH Verified / By: <i>SKA</i>



Client Name: Wood E&I Solutions
Contact Name: Kelly Patterson
Address: 3300 Merrittville Hwy, Unit 5
Thornhill, ON L2V 4Y6
Telephone: 905-687-6616

Project Reference: SCT196342
Quote #
PO #
Email Address: kelly.patterson@woodplc.com

Criteria: ☐ O, Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O, Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1934007
1933472 TCP

Sample ID/Location Name

Matrix

Air Volume

of Containers

Sample Taken

Date

Time

* TCLP

ICP/MS

Metals

EC

SAR

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Date	Time	* TCLP	ICP/MS Metals	EC	SAR										
1 BH106-1-D	S		2	Aug 14/19	11:45														
2 BH106-1-C *	S		1		11:45	X													
3 BH106-2-D	S		2		11:50														
4 BH106-2-C	S		1		11:50		X	X	X										
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

please see Page #1

* See note pg 5

Method of Delivery:

P/U.

Relinquished By (Sign):

[Signature]

Received by Driver/Depot:

[Signature]

Received at Lab:

[Signature]

Verified By:

[Signature]

Relinquished By (Print):

Camron McCann

Date/Time:

Aug 15/19 2:45pm

Date/Time:

Aug 16/19 11:15

Date/Time:

16 Aug 19

Date/Time:

Aug 15/19 - 9am

Temperature:

16°C

Temperature:

14.0°C

pH Verified |

By: NA



Client Name: Wood E&I Solutions
Contact Name: Kelly Patterson
Address: 3300 Merrithill Hwy, Unit 5
Thornhill, ON L2W 4Y6
Telephone: 905-687-6616
Project Reference: SCT 196342
Quote #
PO #
Email Address: kelly.patterson@woodplc.com

Criteria: ☐ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ OCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1934007
1933472 Twp

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		* TCLP	ICP/MS Metals	EC	SAR										
				Date	Time														
1 BH107-1-D	S		2	Aug 14/19	11:15														
2 BH107-1-C *	S		1		11:15	*													
3 BH107-2-D	S		2		11:20														
4 BH107-2-C	S		1		11:20		X	X	X										
5 Dup AD	S		1																
6																			
7																			
8																			
9																			
10																			

Comments:

please see Page #1 * see note pg 5

Method of Delivery:

P/U.

Relinquished By (Sign): C.M.	Received By Driver/Depot: B. Burtin (Wagon)	Received at Lab: M.C.	Verified By: B. Hemeny
Relinquished By (Print): Cameron McCann	Date/Time: Aug 15/19 2:45 pm	Date/Time: Aug 16/19 11:15	Date/Time: 16 Aug 19
Date/Time: Aug 15/19 - 9am	Temperature: 16°C	Temperature: 14.0°C	pH Verified By: NA

APPENDIX C
LIMITATIONS

Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
 - (a) The Standard Terms and Conditions which form a part of Wood's Project Authorization, dated July 3, 2019 and signed by the Client on July 23, 2019;
 - (b) The Scope of Services;
 - (c) Time and Budgetary limitations as described in our Contract; and,
 - (d) The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the site and attendant structures. Our conclusions cannot and are not extended to include those portions of the site or structures which were not reasonably available, in Wood's opinion, for direct observation.
4. The environmental conditions at the site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the site with any applicable local, provincial or federal by-laws, orders-in-council, legislative enactments and regulations was not performed.
5. The site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on site and may be revealed by different of other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, Wood must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of Wood's services during the implementation of any remedial measures will allow Wood to observe compliance with the conclusions and recommendations contained in the report. Wood's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or in part, or any reliance thereon, or decisions made based on any information of conclusions in the report, is the sole responsibility of such third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Wood.
11. Unless stated otherwise in the Closure Section of this Report, provided that the report is still reliable, and less than 12 months old, Wood may issue a third-party reliance letter to parties client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on Wood's report, by such reliance agree to be bound by our proposal and Wood's standard reliance letter. Wood's standard reliance letter indicates that in no event shall Wood be liable for any damages, howsoever arising, relating to third-party reliance on Wood's report. No reliance by any party is permitted without such agreement.