



**PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
RIVERFRONT COMMUNITY DEVELOPMENT,
EAST & NORTH OF DORCHESTER ROAD &
WEST OF PROGRESS STREET,
NIAGARA FALLS, ONTARIO**

Submitted to:

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- Wood Environment & Infrastructure Solutions - 1 copy.

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1.0 EXECUTIVE SUMMARY

Wood was retained by GR (CAN) Investments Co., Ltd. to conduct a Phase Two Environmental Site Assessment (ESA) of the property known as the Riverfront Community Development, in Niagara Falls, Ontario (the Phase Two Property). The Phase Two Property does not have a current municipal address. The Client is considering developing the Phase Two Property for proposed mixed land use. A Record of Site Condition (RSC), acknowledged by the Ministry of the Environment, Conservation and Parks (MECP), is required as a condition of the planned redevelopment from vacant to mixed land use for the Client to receive a Brownfields grant from the City of Niagara Falls.

A Phase Two ESA in support of an RSC is legislated under Ontario Regulation 153/04 as amended (*O. Reg. 153/04* as amended). The regulation outlines the procedure to follow to complete Phase One and Two ESAs including the requirement to complete a Phase One ESA prior to completing a Phase Two ESA.

Wood previously completed a Phase I ESA, the findings of which were documented in the report entitled "*Phase I Environmental Site Assessment Thundering Waters Development, East & North of Dorchester Road & West of Progress Street, Niagara Falls, Ontario*" dated January 25, 2016, (Phase I ESA). It is noted that the name of the development has changed from Thundering Waters to Riverfront Community. The Phase I ESA was updated in September 2018 to meet the requirements of Ontario Regulation 153/04 as amended (*O. Reg. 153/04* as amended). The updated Phase One ESA is entitled, "*Phase One Environmental Site Assessment, Riverfront Community, Niagara Falls, Ontario*" dated September 10, 2018. It is noted that Wood's Phase One ESA included a larger property which included the Phase Two Property. The Phase One ESA is greater than 18 months old and will need to be updated prior to the filing of the RSC.

This Phase Two ESA was carried out in accordance with Wood's proposal dated October 16, 2015 and authorization to proceed, signed by the Client on November 15, 2015. A delineation testpitting and ground water sampling program was carried out in accordance with Wood's proposal dated December 2, 2016 and authorization to proceed, signed by the Client on December 3, 2016. A supplemental delineation investigation was carried out in accordance with Wood's proposal dated June 15, 2018 and authorization to proceed, and email authorization to proceed, by the Client on June 15, 2018. An additional delineation investigation was carried out in accordance with Wood's proposal dated November 3, 2020 and authorization of Change Work Order #10 by the Client to proceed.

The primary findings of this Phase Two ESA are as follows:

- Wood drilled seventy-one boreholes, including the installation and monitoring of monitoring wells in fifteen boreholes, excavated 50 testpits, completed hydrogeological testing and an elevation survey between December 2, 2015 and March 19, 2021. The locations of the boreholes, monitoring wells and testpits were selected to address Areas of Potential Concern (APECs) resulting from Potentially Contaminating Activities (PCAs) identified during the Phase One ESA.
- The subsurface conditions encountered in the boreholes and testpits consisted of either a topsoil, or granular surface layer, underlain by fill material consisting of silty clay/clayey silt fill to depths ranging from 0.2 to 7.2 metres below ground surface (mbgs) overlying a native silty clay/clayey to depth. The fill material is believed to be associated with the infilling of the former Welland River channel and spoil from the Queenston-Chippawa Power Canal that transferred the Phase Two Property. The fill layer extends outside the former river boundaries but is still inferred to be associated with the infilling of the former river channel. A peat/organic layer was encountered in BH/MW101 at a depth of 4.4 mbgs. Trace slag was noted in TP221 (0.5 mbgs). Black and/or white seams were noted in the fill material in TP221, TP226, TP227 and TP228. The stratigraphy in the delineation testpits and boreholes was consistent with the boreholes and testpits completed in 2015.
- Bedrock was not encountered at the maximum drilled depth of the boreholes (26.4 mbgs). The bedrock is anticipated to be of the Middle and Lower Silurian Age, consisting of sandstone, shale, dolostone and siltstone of the Lockport Formation. Bedrock is anticipated to be encountered at depths ranging from 20 to 25 mbgs.
- Visual or olfactory evidence of petroleum hydrocarbon impacts was not observed by Wood during the drilling or testpitting programs.
- It is Wood's opinion that the results of the Combustible Organic Vapours (COV) and Total Organic Vapours (TOV) head space screening program suggest a low potential for the presence of significant combustible soil headspace vapour levels in the boreholes and testpits.
- The depth to ground water measured from ground surface in the monitoring wells ranged from approximately 2.05 to 5.79 mbgs, which corresponds to geodetic elevations ranging from 172.93 to 179.76 metres above sea level (mASL). Across the Phase Two Property, the hydraulic gradient varies by an order of magnitude generally between 0.02 and 0.002 m/m.

- The water levels in these monitoring wells have been used to infer horizontal ground water flow directions across the Phase Two Property. Using Surfer® to interpolate the on-site data, lines of equivalent ground water level were determined across the Phase Two Property. Ground water flow is perpendicular to these lines moving from higher head to lower head. Ground water flow in the southwestern portion of the Phase Two Property generally moves radially away from BH/MW412, which is a topographic high on the Phase Two Property. From BH/MW412, water moves west towards the Queenston-Chippawa Power Canal, south towards the Welland River, north towards the railway tracks adjacent to the Phase Two Property, or east through the Phase Two Property. The ground water moving east through the eastern portion of the Phase Two Property is met by a ground water divide that generally creates ground water flow north to northwest towards the railway tracks and south towards the Welland River. Ground water from the east portion of the Phase Two Property flows west towards the ground water divide described above.
- The assessment criteria applicable to the Phase Two Property, if an RSC was to be filed for the Phase Two Property, are the Table 3 Full Depth Generic Site Condition Standards (SCS) for residential/parkland/institutional property use and medium and fine textured soils (Table 3 SCS).
- The results of the soil testing indicated exceedances of the Table 3 SCS, as follows:
 - One or more metals parameters including: Antimony in fill materials in BH429-3 and Thallium in fill materials at BH/MW101 and BH/MW103;
 - Electrical Conductivity in fill materials at TP117, TP224 to TP229, BH439, BH440, BH442, BH518, BH519 and BH520;
 - Various Polycyclic Aromatic Hydrocarbons (PAH) and metals parameters in BH448;
- The results of the ground water testing indicated no exceedances of the Table 3 SCS.

As there are impacts above the Ministry's standards in the soil at the Phase Two Property, an RSC could not be filed at this time. The contaminants would need to be addressed using one of or a combination of the following techniques before an RSC could be filed:

- Soil Remediation – the impacted materials would be removed for off-site disposal at a licensed landfill; or
- Site Specific Risk Assessment – impacted materials can remain in place if they are below site specific criteria that would be generated for the Phase Two Property.

Once the ground water monitoring wells are no longer required, they must be maintained or abandoned in accordance with the requirements of Section 21(3) of Ontario Regulation 903 – Wells which states *“the well owner shall immediately abandon the well if it is not being used or maintained for future use as a well”*.

2.0 INTRODUCTION

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood) was retained by GR (CAN) Investments Co., Ltd. (the Client), to conduct a Phase Two Environmental Site Assessment (ESA) of a property known as the Riverfront Community Development, in Niagara Falls, Ontario (the Phase Two Property; **Figure 1**). The Phase Two Property does not have a current municipal address and the current Phase Two ESA includes a portion of the Riverfront Community Development south of the railway tracks. The Client is considering developing the Phase Two Property for proposed mixed land use. A Record of Site Condition (RSC), acknowledged by the Ministry of the Environment, Conservation and Parks (MECP), is required as a condition of the planned redevelopment from vacant to mixed land use for the Client to receive a Brownfields grant from the City of Niagara Falls.

A Phase Two ESA in support of an RSC is legislated under Ontario Regulation 153/04 as amended (*O. Reg. 153/04* as amended). The regulation outlines the procedure to follow to complete Phase One and Two ESAs including the requirement to complete a Phase One ESA prior to completing a Phase Two ESA.

Wood previously completed a Phase I ESA, the findings of which were documented in the report entitled "*Phase I Environmental Site Assessment Thundering Waters Development, East & North of Dorchester Road & West of Progress Street, Niagara Falls, Ontario*" dated January 25, 2016, (Phase I ESA). It is noted that the name of the development has changed from Thundering Waters to Riverfront Community. The Phase I ESA was updated in September 2018 to meet the requirements of Ontario Regulation 153/04 as amended (*O. Reg. 153/04* as amended). The update Phase One ESA is entitled, "*Phase One Environmental Site Assessment, Riverfront Community, Niagara Falls, Ontario*" dated September 10, 2018 (Phase One ESA). It is noted that Wood's Phase One ESA included a larger property which included the Phase Two Property. The Phase One ESA is greater than 18 months old and will need to be updated prior to the filing of the RSC.

This Phase Two ESA was carried out in accordance with Wood's proposal dated October 16, 2015 and authorization to proceed, signed by the Client on November 15, 2015. A delineation testpitting and ground water sampling program was carried out in accordance with Wood's proposal dated December 2, 2016 and authorization to proceed, signed by the Client on December 3, 2016. A supplemental delineation investigation was carried out in accordance with Wood's proposal dated June 15, 2018 and authorization to proceed via email from the Client on June 15, 2018. An additional delineation investigation was carried out in accordance with Wood's proposal dated November 3, 2020 and authorization of Change Work Order #10 by the Client to proceed.

2.1 Site Description

The Phase Two Property is located east and north of Dorchester Road and west of Progress Street in Niagara Falls, Ontario (**Figure 1**). The Phase Two Property is currently owned by the Client and is bisected by a railway running northeast to southwest. The Phase Two Property is vacant, undeveloped land and lies in a municipal urban setting in an area of mixed vacant, industrial and commercial land uses. **Figures 2 and 3** illustrate the property boundaries of the Phase Two Property. The Former Welland River that transversed the Phase Two Property is referenced from aerial photographs. The properties for the future RSC filing are indicated on **Figures 2 and 3**.

2.2 Property Ownership

The property ownership and Client names and contact information is as follows:

Owner	GR (CAN) Investment Co., Ltd.	4342 Queen Street, Suite 203 Niagara Falls, Ontario L2E 7J7 P: 1 (905) 233-4427 Contact: Mr. Feng Shi fengshi@gr-gp.com
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2.3 Current and Proposed Future Uses

The Phase Two Property is vacant, undeveloped land covered with dense vegetation and wetlands. Railway tracks are located to the north of the Phase Two Property. The proposed future use is residential, commercial and parkland. Section 168.3.1 of the Environmental Protection Act (EPA) may prohibit the residential, commercial and parkland property use unless an RSC is filed. As mentioned previously, the Client has confirmed that an RSC will be completed.

2.4 Applicable Site Condition Standard

Under *O. Reg. 153/04* as amended, the MECP has outlined SCS in the document "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*" dated April 15, 2011. The SCS applicable to the Phase Two Property have been evaluated on the basis of the following rationale:

- The proposed property use is residential, commercial and parkland and therefore the more sensitive SCS for residential/parkland/institutional property use would apply;

- Six samples (TP112-6 & TP108-4, TP119-4 & TP121-4, BH406-SS6, BH422-SS4, BH439-SS5 and BH439-SS10) were submitted for grain size distribution tests (**Appendix A**). Grain size distribution results for sample TP119-4 and TP121-4 consisted of 37% of particles less than 75 micrometres (μm) in diameter. This silty sand is classified as a coarse textured soil (i.e., contains more than 50% by mass of particles that are 75 μm or larger in mean diameter (*O. Reg. 153/04, s.42 (2)*). The remaining five samples consisted of 85 to 99% of particles less than 75 μm in diameter and this silty clay is classified as a medium and fine textured soil (i.e., contains 50% or more by mass of particles that are smaller than 75 μm in mean diameter (*O. Reg. 153/04, s.42 (2)*). As more than 1/3 of the soil at the property consists of medium and fine textured soils, the soil materials at the Phase Two Property have been classified as medium and fine textured (*O. Reg. 153/04, s.42 (1)*);
- Municipal services are located throughout the Phase Two Study Area. There are no domestic wells located within 250 metres (m) of the Phase Two Property (based on a search of the MECP interactive well record mapping tool completed by Wood on September 13, 2019 and updated decommissioning records provided by the Client);
- In accordance with *O. Reg. 153/04*, the Phase Two Property does include land that is within 30 m of a "water body" as the Welland River is located within 30 m of the Phase Two Property;
- The depth to bedrock is greater than 2 m; and
- The Phase Two Property is classified as an environmentally sensitive area under *O. Reg. 153/04* as amended, as:
 - The Phase Two Property includes land (provincially significant wetlands) that would be classified as an area of natural significance as defined by *O. Reg. 153/04* as amended. The wetland boundaries have been assessed and included in Savanta's 2018 Residential Block Plan (another consultant retained by the Client) and have been indicated on **Figure 2**; and
 - Soil pH values were reported between 7.3 and 7.8 in the 10 surface soil samples (including two field duplicate samples) and between 7.2 and 7.8 in the 7 subsurface soil samples submitted for pH determination from the borehole and testpit samples. The reported soil pH for all soil samples was within 5.0 to 9.0 units for surface soil (surface to 1.5 metres below ground surface [mbgs]) and 5.0 to 11.0 units for subsurface soil (below 1.5 mbgs).

Based on the above site characteristics, the SCS currently applicable to the entire Phase Two Property, for the purposes of filing an RSC, are the Table 1 Full Depth Generic SCS for a non-potable ground water condition, residential/parkland/institutional/industrial/commercial/community property use and fine and medium textured soils (the Table 1 SCS). However, there will be two RSCs filed for the areas outside the 30 m buffer of the wetland boundaries. Based on this change, the full depth Table 3 SCS for a non-potable ground water condition and residential/parkland/institutional property use and medium to fine textured soils (Table 3 SCS) can be utilized. The data tables have been updated to compare the results to the Table 3 SCS.

3.0 BACKGROUND INFORMATION

3.1 Physical Setting

The Phase Two Property lies at an approximate elevation of 189 metres above sea level (mASL) (**Niagara Topographic Series, 1984**). The UTM coordinates (NAD 83) are Zone 17, 4768046 Northing and 654085 Easting. The topography across the Phase Two Property is relatively flat and graded evenly with the surrounding properties to the east and north. The east end of the Phase Two Property includes an elevated area inferred to be a soil/fill pile. The Welland River and Queenston-Chippawa Power Canal are located approximately 25 to 130 m south and west of the Phase Two Property, respectively. Therefore, the Phase Two Property includes land within 30 m of a “waterbody” as outlined in *O. Reg. 153/04* as amended.

According to the **2010 Surficial Geology of Southern Ontario Miscellaneous Release – Data 128 REV**, published by the **Ontario Geological Survey (OGS)**, the geology of the northern portion of the Phase One Property is interpreted to consist of fine-textured glaciolacustrine deposits of silt and clay with minor sands, which are massive to well laminated; while the southern portion of the Phase One Property is interpreted to consist of man made deposits of fill, sewage lagoons, landfill, and urban development.

The **2007 Paleozoic Geology of Southern Ontario Miscellaneous Release – Data 219**, published by **Armstrong, D.K. and Dodge, J.E.P. of the OGS**, describes the bedrock for the northern portion of the Phase One Property to consist of dolostone of the Guelph Formation; while the southern portion of the Phase One Property consists of dolostone, shale, and evaporites of the Salina Formation.

The regional ground water flow direction, based on topographic features and knowledge gained from other sites in the area, is expected to be to the southwest towards the Welland River. Locally, however, the shallow ground water flow may be influenced by underground utility trenches, conduits, and structures, variations in soil type, and minor fluctuations in topography. Further sections in this report discuss the ground water flow direction.

3.2 Past Investigations

Background materials relevant to the discussion provided herein are documented in more detail in Wood’s Phase One ESA.

Based on Wood’s Phase One ESA, Areas of Potential Environmental Concern (APECs) associated with current or former Potentially Contaminating Activities (PCAs) associated with the Phase One Property and the surrounding properties are as follows:

Area of Potential Environmental Concern (APEC)	Location of APEC on Site	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC-1: Historic Infilling	Southern Portion of the Phase One Property	PCA #30 – Importation of Fill Material of Unknown Quality	On-Site	Metals, Sb, As, Se, EC and SAR	Soil and Ground Water
APEC-2: Railway	Northern Portion of the Phase One Property	PCA #46 – Rail Yards, Tracks and Spurs	Off-Site	Metals, Sb, As, Se, PHCs, BTEX, OCs, PAHs	Soil
				Metals, Sb, As, Se, PHCs and BTEX, PAHs	Ground Water

*Potentially Contaminating Activity (PCA) described specifically for the Phase One Property with reference to the applicable item number in the Table of Potentially Contaminating Activities provided in Schedule D of *O. Reg. 153/04* as amended, where applicable.

Sb, As, Se – Antimony, Arsenic and Selenium

EC – Electrical Conductivity

PHCs – Petroleum Hydrocarbons

SAR – Sodium Absorption Ratio

BTEX – Benzene, toluene, ethylbenzene, xylenes

PAHs – Polycyclic Aromatic Hydrocarbons

OCs – Organochlorine Pesticides

As such, Wood completed the following scope of work for the Phase Two ESA.

4.0 SCOPE OF THE INVESTIGATION

4.1 Overview of Site Investigation

The investigation consisted of the following activities:

- Developing a Health & Safety Plan and a Sampling and Analysis Plan for the intrusive work at the Phase Two Property. In accordance with Schedule E of *O. Reg. 153/04 as amended*, a copy of the Sampling and Analysis Plan is provided in **Appendix B**;
- Undertaking clearance of all public underground utility services (i.e., telephone, hydro, natural gas, cable television and sewer/water). In addition, Wood retained a private utility locate contractor to identify the location of any private services on the Phase Two Property. Wood requested that the owner identify any privately-owned services, as well prior to commencement of the work (none were identified by the owner);
- Advancing a total of three boreholes with monitoring wells in 2015 (BH/MW101, BH/MW102, BH/MW103) and two boreholes with monitoring wells in 2016 (BH/MW201, BH/MW202) at the Phase Two Property to maximum depths of 6.1 mbgs using a Geoprobe 7822 DT;

Note: BH/MW103 was damaged and no longer in use for Wood's 2018 / 2019 assessment work.

- Advancing a total of twenty-one testpits in 2015 (TP101 through TP121) at the Phase Two Property to maximum depths ranging from 1.5 to 4.0 mbgs using a CAT 420F IT rubber-tired backhoe;
- A total of twenty-nine delineation testpits in 2016 (TP201 to TP229) were excavated across the Phase Two Property using a rubber-tired backhoe to maximum depths ranging from 1.0 to 2.0 mbgs;
- A total of forty-eight (48) delineation boreholes (BH401 to BH448) were proposed to be advanced at the Phase Two Property to maximum depths ranging from 4.6 to 21.0 mbgs using a tracked drill rig. However, it is noted that BH409, BH420, BH421, BH423, BH433, BH435 and BH437 were not drilled due to access issues so a total of forty-one (41) delineation boreholes were drilled;
- A total of nineteen (19) delineation boreholes (BH501 to BH511, BH513 to BH515, BH517 to BH521) were drilled to depths of 3 to 8.2 mbgs using a tracked drill rig.

- Field screening all soil samples collected during the drilling and testpitting programs both visually and measuring Combustible Organic Vapours (COVs) and Total Organic Vapours (TOVs) utilizing an RKI Eagle 2, equipped with dual sensors which were calibrated to a known isobutylene standard (for TOV sensor) and to a known hexane standard (for COV sensor);
- Installing ground water monitoring wells in the fifteen boreholes (BH/MW101, BH/MW102, BH/MW103, BH/MW201, BH/MW202, BH/MW412, BH/MW421, BH/MW431, BH/MW438, BH/MW440, BH/MW441, BH/MW445, BH/MW446, BH/MW447, BH/MW448) and developing the wells with dedicated sampling equipment after installation;
- Conducting ground water monitoring at the newly installed monitoring wells as well as two existing monitoring wells including measuring ground water levels and checking for free-phase petroleum product/sheens;
- Purging the monitoring wells using a low flow sampling technique with dedicated sampling equipment prior to collecting ground water samples;
- Sampling the ground water in the existing and newly installed monitoring wells;
- Submitting selected soil and ground water samples for laboratory analyses for contaminants of potential concern (COPCs) including: metals including hydrides, inorganics (including pH, Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR)) petroleum hydrocarbons (PHC) in the F1 to F4 ranges, Benzene, Toluene, Ethylbenzene and Xylenes (referred to as BTEX), and/or polycyclic aromatic hydrocarbons (PAHs);
- Completing a hydrogeological assessment in the newly installed and existing monitoring wells;
- Evaluating the results of the chemical analyses against the applicable assessment criteria; and
- Preparing a Phase Two ESA report documenting the findings of the investigation.

4.2 Media Investigated

Soil samples were collected during the drilling and testpitting programs. Furthermore, as the COPCs included BTEX and PHCs which can become mobilized and potentially be transported to the ground water, ground water media was sampled. Ground water samples were collected in four monitoring wells installed during the Phase Two ESA, as well as two monitoring wells which were previously installed at the Phase Two Property.

No sediment samples were analyzed because no water bodies are present on the Phase Two Property.

4.3 Phase One ESA Conceptual Site Model

The rationale for the development of the Phase One Conceptual Site Model (CSM) is provided in the Wood's Phase One ESA. The summary of the physical setting included in the Phase One CSM is as provided in Section 3.1 of this report.

Based on Wood's Phase One ESA, APECs associated with current or former PCAs associated with the Phase One Property and the surrounding properties are as follows:

Area of Potential Environmental Concern (APEC)	Location of APEC on Site	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC-1: Historic Infilling	Southern Portion of the Phase One Property	PCA #30 – Importation of Fill Material of Unknown Quality	On-Site	Metals, Sb, As, Se, EC and SAR	Soil and Ground Water
APEC-2: Railway	Western Portion of the Phase One Property	PCA #46 – Rail Yards, Tracks and Spurs	Off-Site	Metals, Sb, As, Se, PHCs, BTEX, OCs, PAHs	Soil
				Metals, Sb, As, Se, PHCs and BTEX, PAHs	Ground Water

*Potentially Contaminating Activity (PCA) described specifically for the Phase One Property with reference to the applicable item number in the Table of Potentially Contaminating Activities provided in Schedule D of *O. Reg. 153/04* as amended, where applicable.

Sb, As, Se – Antimony, Arsenic and Selenium

EC – Electrical Conductivity

PHCs – Petroleum Hydrocarbons

SAR – Sodium Absorption Ratio

BTEX – Benzene, toluene, ethylbenzene, xylenes

PAHs – Polycyclic Aromatic Hydrocarbons

OCs – Organochlorine Pesticides

As such, Wood completed the following scope of work for the Phase Two ESA.

4.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan is included in **Appendix B**. There were no major deviations from the Sampling and Analysis Plan with the exception of the additional two ground water samples from the existing monitoring wells in 2016. In addition, a delineation testpitting program was completed in December 2016 and the monitoring wells were re-sampled in January 2017. During

the resampling of the monitoring wells, BH/MW103 was found to be damaged beyond repair. An additional 41 boreholes were sampled for delineation including the installation of ten monitoring wells in 2018 and 2019 and 19 additional delineation boreholes in 2020 and 2021.

4.5 Impediments

There were physical impediments of denial of access during the Phase Two ESA including the thick brush and vegetation which made some areas of the Phase Two Property inaccessible. Wood revised the access plan and routes to the boreholes due to the presence of the wetlands. During the 2021 delineation program, there was no access to BH512 and BH516 due to the presence of trees so these areas were not drilled.

5.0 INVESTIGATION METHOD

5.1 General

This section describes the methods used during this subsurface investigation work, including all conventional drilling, testpitting, soil sampling, monitoring well installation and ground water monitoring activities. Quality Assurance/Quality Control (QA/QC) procedures are also discussed. The borehole drilling, testpitting, monitoring well installations, ground water monitoring, and hydrogeological testing activities were undertaken between December 2, 2015 and March 19, 2021.

The investigation activities were conducted in accordance with Wood's SOPs as of July 2011 and updated in October 2013. The Sampling and Analysis Plan (**Appendix B**) lists the relevant SOPs.

5.2 Drilling

Five boreholes (BH/MW101, BH/MW102, BH/MW103) were drilled on December 2 and 3, 2015 by Direct Environmental Drilling Inc. (DED) of St. Thomas, Ontario (MECP License Number 7320). The boreholes were advanced to a maximum depth of 6.1 mbgs using a Geoprobe 7822 DT. Continuous core samples of 1.5 m lengths were obtained throughout the borehole advancement using the Geoprobe's macro core sampling system, which uses dedicated (disposable) sample liners to prevent cross contamination.

All three of the boreholes (BH/MW101, BH/MW102, BH/MW103) were completed as ground water monitoring wells to depths of 6.1 mbgs.

An additional forty-one boreholes (BH401 to BH408, BH410 to BH419, BH422, BH424 to BH432, BH434, BH436, BH438 to BH448) were drilled between August 21, 2018 and July 9, 2019 by a geoprobe operated by Landshark Drilling (MECP License Number 7464) and Tri-Phase Drilling (MECP License Number 7437) using a geoprobe or Elite Drilling (MECP License Number 7003) using a track-mounted rig to maximum depths ranging from 4.6 to 26.4 mbgs. Ten of these boreholes were completed as ground water monitoring wells to depths of 6.1 mbgs.

An additional nineteen boreholes (BH501 to BH511, BH513 to BH515, BH517 to BH521) were drilled between November 26, 2020 and March 19, 2021 by Elite Drilling (MECP License Number 7003) using a track-mounted rig to maximum depths ranging from 3.0 to 9.2 mbgs. No ground water monitoring wells were installed as part of this additional delineation work.

The locations of the boreholes/monitoring wells are indicated on **Figure 3**. The borehole logs are included in **Appendix A**.

The sampling equipment was cleaned between each sample to minimize the potential for cross-contamination. Soil cuttings generated during the borehole investigation were stored in 205 litre (L) drums. Residue Management is discussed in Section 5.10 and **Appendix C**.

5.3 Testpitting

Twenty-one testpits (TP101 through TP121) were excavated on December 8 and 9, 2015 by Cotton Inc. of Niagara Falls, Ontario. The testpits were advanced to a maximum depth ranging from 1.5 to 4.0 mbgs. Samples were obtained at every 0.5 m using a decontaminated stainless-steel shovel.

Twenty-nine testpits (TP201 to TP229) were excavated on December 21 and 22, 2016 by H.S. Cole Excavating of St. Catharines, Ontario using a Hitachi Zaxis 160 LC Backhoe. The delineation testpits were advanced to a maximum depth of 2.0 mbgs. Samples were obtained at every 0.5 m using a decontaminated stainless-steel shovel.

The locations of the testpits are indicated on **Figures 3**. The testpit logs are included in **Appendix A**.

The sampling equipment was cleaned between each sample to minimize the potential for cross-contamination.

5.4 Soil: Sampling

Soil samples collected during the drilling and testpitting programs were split into duplicate fractions upon recovery. The primary sample fractions were placed into laboratory supplied unpreserved glass jars with Teflon-lined lids and 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 samples were collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. All soil sampling equipment (including trowels, spatulas, spoons, etc.) was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination.

The subsurface conditions encountered at the Phase Two Property are described in the borehole and testpit logs provided in **Appendix A**.

Visual or olfactory evidence of petroleum hydrocarbon or other chemical impacts were not observed by Wood during the drilling or testpitting program.

The cross-section plans will be updated and finalized upon completion of the soil remediation program.

5.5 Field Screening Measurements

All soil samples collected during the drilling and testpitting programs 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 COV and TOV concentrations using the sample headspace method. COV and TOV concentrations were measured using an RKI EAGLE 2™ combustible vapour analyzer equipped with dual sensors and calibrated to known hexane and isobutylene standards and operated in methane elimination mode. The RKI EAGLE 2™ is capable of detecting 0-11,000 parts per million (ppm) and 0-100 % Lower Explosive Limit (LEL) with an accuracy of +/- 5% and the calibration standard is Hexane. The equipment is calibrated every day prior to the commencement of fieldwork.

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 from individual boreholes for laboratory analysis.

Soil samples were selected for laboratory analysis based on observations in the field. The depth intervals of samples selected for analysis and the parameters they were submitted for are included in the Tables appendix at the end of this report.

The soil vapour concentrations are included in the borehole and testpit logs in **Appendix A**. There were no deviations from the field screening method from the Sampling and Analysis Plan.

5.6 Ground Water: Monitoring Well Installation

Overburden monitoring wells were installed in fifteen boreholes between 2015 and 2019 (BH/MW101 to BH/MW103, BH/MW201 and BH/MW202, BH/MW412, BH/MW421, BH/MW431, BH/MW438, BH/MW440, BH/MW441, BH/MW445, BH/MW446, BH/MW447, BH/MW448) to obtain hydrogeologic and ground water quality information from the hydrostratigraphic zone. The monitoring wells were installed by using 100 millimetre (mm) diameter casings by direct push method. The casings are washed prior to coming to the Phase Two Property and drilling proceeds from the least to the inferred most contaminated borehole in order to reduce the potential for cross-contamination. No ground water samples were collected during drilling.

The monitoring wells were constructed using either 32 mm or 51 mm diameter, schedule 40, flush-joint threaded PVC monitoring well supplies. The monitoring wells were completed with a 3.05 m length of #10 mil slotted intake screen. The tops of the intake screens were then extended to the ground surface using solid riser pipe. A silica sand filter pack was placed between the intake screen and the wall of the borehole. The filter pack was extended approximately 0.3 m above the top of the well screen. A grout/bentonite seal was placed above the sand pack to surface. The wells were completed with stick-up casings. The locations of the monitoring wells are shown on **Figure 3**. Details of the monitoring well constructions are included in the borehole logs in **Appendix A**.

The ground water monitoring wells installed were instrumented with dedicated Waterra™ foot valve inertial pumps fitted with polyethylene tubing to facilitate well development. The wells were developed by removing three well volumes using dedicated instrumentation (i.e., foot valve and tubing) on December 7, 2015, January 8, 2016 and July 4, 2019. The locations of the monitoring wells are shown in **Figure 3**. It is noted that BH/MW103 was damaged and could not be sampled in 2019 and there was an unknown monitoring well (installed by others) which was also sampled in 2019 (indicated on **3**). Wood recorded the stabilization parameters (including pH, conductivity and temperature) as outlined in Wood's SOPs. During development, an oil/water interface meter was used to measure potential accumulations of Light Non-Aqueous Phase Liquids (LNAPL) or Dense Non-Aqueous Phase Liquids (DNAPL), and ground water levels in the wells.

5.7 Ground Water: Field Measurement of Water Quality Parameters

The wells (BH/MW101, BH/MW102, BH/MW103, BH/MW201, BH/MW202) were purged on January 20, 2016 using low flow sampling techniques until the pH, conductivity and temperature had reached stabilization criteria as outlined in Wood's SOPs. MW202 was purged on January 3, 2017 using low flow sampling techniques. The wells (BH/MW412, BH/MW421, BH/MW431, BH/MW438, BH/MW440, BH/MW441, BH/MW445, BH/MW446, BH/MW447, BH/MW448) were purged on August 23, 2019. During purging, an oil/water interface meter was used to measure potential accumulations of LNAPL or DNAPL, and ground water levels in the wells.

5.8 Ground Water: Sampling

Following monitoring and purging activities, Wood collected ground water samples (BH/MW101, BH/MW102, BH/MW103, BH/MW201 and BH/MW202) on January 20, 2016 using low flow sampling techniques. MW202 was sampled on January 3, 2017 using low flow sampling techniques. All monitoring wells were sampled on July 29, 31 or August 23, 2019 (excluding BH/MW103). The samples were collected into laboratory-provided containers using the dedicated instrumentation. Ground water samples for metals were field-filtered. All samples were stored in

coolers on ice after collection and during transportation to the laboratory where they were delivered under continuous Chain of Custody documentation.

Representative ground water samples collected during the investigation in the wells were submitted for laboratory analysis of suspect parameters of concern. The sampling methodology including jar, bottle and preservative requirements followed the Ministry of the Environment, *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, July 2011 (Analytical Protocol). Field duplicate samples as well as other QA/QC samples including field, trip and spike blanks were collected as required throughout the assessment work.

Ground water elevation measurements were collected on July 29, 30, 31 and August 23, 2019 and are further discussed in Section 6.2.

5.9 Sediment: Sampling

No sediment samples were collected during the Phase Two ESA.

5.10 Analytical Testing

Wood collected soil/fill and ground water samples which were submitted to Paracel Laboratories Ltd. (Paracel), an ISO 17025-certified laboratory located in Hamilton and Ottawa, Ontario for laboratory analysis.

5.11 Residue Management Procedures

The soil cuttings generated during the drilling investigation were left on-site within the vicinity of the boreholes. Soil/fill removed as part of the testpit excavation activities were placed back in the testpit in reverse order of removal and nominally compacted with the bucket of the backhoe upon completion. Liquid wastes generated during the investigation (well development and purged water) were stored on-site in 205 L steel drums. Residue management is discussed further in **Appendix C**.

5.12 Elevation Surveying

An elevation survey was completed by Wood on January 19, 2016 and V&S Engineering on February 10, 2016. The ground surface elevations at the borehole/monitoring well and testpits locations were surveyed to a permanent and recoverable benchmark. The benchmark is described as "the top of concrete pedestal for flashing lights at CN crossing at Dorchester Road". This

benchmark was assigned an arbitrary elevation of 100.00 m which was then assigned a geodetic elevation of 178.42 mASL as per the V&S Engineering survey.

An elevation survey of the new boreholes was completed by Wood on July 12, 2019. The ground surface elevations of the borehole and monitoring well locations were surveyed and referenced to a local base station part of the TopNet Live RTK Network which refers to the Canadian Geodetic Vertical Datum of 2013 (CGVD2013). The 500 series boreholes were surveyed in March 2021.

5.13 Quality Assurance and Quality Control Measures

Soil samples collected during the drilling and testpitting programs were split into duplicate fractions upon recovery. The primary sample fractions were placed into laboratory supplied unpreserved glass jars with Teflon-lined lids and subsequently stored in coolers on ice for future potential laboratory analysis. Samples that were potentially going to be submitted for analysis for volatiles were collected in 40 millilitre (mL) vials and field preserved. Samples for analysis for metals and other parameters were placed into 250 mL glass jars with Teflon-lined lids and subsequently stored in coolers on ice packs for future potential laboratory analysis. 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. No deviations from the Sampling and Analysis Plan were noted.

The sampling methodology including jar, bottle and preservative requirements followed Analytical Protocol. Field duplicate soil and ground water samples as well as other QA/QC samples including field, trip and spike blanks for ground water samples were to be collected as required throughout the assessment work. A minimum of one field duplicate for every ten samples in soil was submitted. The field instruments were calibrated on a daily basis.

All soil sampling equipment was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination. Decontamination activities included:

- Physical removal of any adhered debris;
- Wash/scrub in "Alconox" soap solution;
- Distilled water rinse; and
- Methanol rinse/air drying.

In addition to field activities pertaining to quality assurance (decontamination of non-dedicated equipment, blind duplicate samples, instrument calibration, etc.), an analytical quality assurance program was also implemented.

The chemical analyses completed on selected soil samples were carried out at Parcel.

The validity of the analytical results reported for the samples collected during this investigation has been assessed using the criteria presented in the Analytical Protocol.

The Analytical Protocol establishes Acceptance Limits for use when assessing the reliability of data reported by analytical laboratories. These include maximum hold times for the storage of samples/sample extracts between collection and analysis, specified/approved analytical methods, required field and/or laboratory quality assurance samples such as blanks and field and laboratory duplicates, specified recovery ranges for spiked samples and surrogates (compounds added to samples in known concentrations for data validation purposes), required Reporting Limits (RL, maximum allowable detection limits) and specified precision required when analyzing laboratory duplicate samples.

The results of the analytical quality assurance program are discussed in Section 6.9.

6.0 REVIEW AND EVALUATION

6.1 Geology

The subsurface conditions encountered in the boreholes and testpits consisted of either a topsoil, or granular surface layer, underlain by fill material consisting of silty clay/clayey silt fill to depths ranging from 0.2 to 7.2 mbgs overlying a native silty clay/clayey to depth. The fill material is believed to be associated with the infilling of the former Welland River channel and the excavation of the Queenston-Chippawa Power Canal that transferred the Phase Two Property. The fill layer extends outside the former river boundaries but is still inferred to be associated with the infilling of the former river channel. A peat/organic layer was encountered in BH/MW101 at a depth of 4.4 mbgs. Trace slag was noted in TP221 (0.5 mbgs). Black and/or white seams were noted in the fill material in TP221, TP226, TP227 and TP228. The stratigraphy in the delineation testpits and boreholes was consistent with the boreholes and testpits completed in 2015.

No odours or staining were noted during the drilling and testpitting.

Bedrock was not encountered during the drilling program.

The Phase Two ESA included the investigation of two geologic units (considered aquifers) including the fill layer and the underlying native silty clay/clayey silt. These geologic units consist of a low permeability silty clay/clayey silt, the mobility of DNAPLs or petroleum related contaminants (if any) were minimal and therefore, additional aquifers or aquitards were not investigated.

The silty clay is considered an aquitard and consists of a silty clay with a low permeability. The mobility of DNAPLs or petroleum related contaminants (if any) were considered to be minimal and therefore this unit was not investigated for DNAPLs or petroleum related contaminants. The thickness of this unit was not determined as the boreholes were terminated in this unit.

No other geologic unit or bedrock was encountered in any of the boreholes or testpits at the Phase Two Property.

6.2 Ground Water: Elevations and Flow Direction

The monitoring wells were placed in order for the screened intervals to assess the aquifer and to interpret the horizontal flow direction. The screened intervals were set to straddle the water table based on observations during drilling. No free-flowing product was noted in the monitoring wells. Further details of the ground water monitoring wells are included in **Table 1**.

On March 1, 2016 following completion of the hydraulic testing, the depth to ground water measured from surface ranged from approximately 0.17 to 3.49 mbgs at the Phase Two Property which corresponds to geodetic elevations ranging from 171.80 to 179.62 mASL. It is worth noting that BH/MW102 was not located during this monitoring event.

In July and August 2019, the depth to ground water was measured in all on-site monitoring wells. The water levels in these monitoring wells was used to infer a horizontal ground water flow direction.

The depth to ground water measured from ground surface in the monitoring wells ranged from approximately 2.05 to 5.79 mbgs, which corresponds to geodetic elevations ranging from 172.93 to 179.76 mASL as shown in **Figure 4**. Across the Phase Two Property, the hydraulic gradient varies by an order of magnitude generally between 0.02 and 0.002 m/m.

The water levels in these monitoring wells have been used to infer horizontal ground water flow directions across the Phase Two Property. Using Surfer® to interpolate the on-site data, lines of equivalent ground water level were determined across the Phase Two Property. Ground water flow is perpendicular to these lines moving from higher head to lower head. Ground water flow in the southwestern portion of the Phase Two Property generally moves radially away from BH/MW412, which is a topographic high on the Phase Two Property. From BH/MW412, water moves west towards the Queenston-Chippawa Power Canal, south towards the Welland River, north towards the railway tracks adjacent to the Phase Two Property, or east through the Phase Two Property. The ground water moving east through the eastern portion of the Phase Two Property is met by a groundwater divide that generally creates groundwater flow north to northwest towards the railway tracks and south towards the Welland River. Ground water from the east portion of the Phase Two Property flows west towards the groundwater divide describe above.

It is worth noting that the Phase Two Property is large, has significant changes in topography and has significant areas of fill while others are native. It is believed that generally the ground water flow direction would be towards the Welland River in the southern portion of the Phase Two Property and towards the Queenston-Chippawa Power Canal in the northern portion of the Phase Two Property.

6.3 Ground Water: Hydraulic Gradients

Hydraulic testing (single well response tests) were initiated on February 2, 2016 to assess the hydraulic conductivity of the screened overburden soils at the Phase Two Property.

Rising head tests were conducted at BH/MW101, BH/MW103 and BH/MW202 by removing a volume of water sufficient to cause a displacement of the water level in the monitoring well and allowed it to recover back to equilibrium. A non-vented pressure transducer programmed to take measurements every minute was placed in the monitoring well prior to the start of the test and recorded the water level through the test. Manual water level measurements were initially taken to corroborate the transducer data, due to expected very slow recovery, the transducers were left in the monitoring wells to record the recovery over several days.

On February 19, 2016 water levels were measured in the monitoring wells, it was determined that the tests in BH/MW101 and BH/MW202 were complete however the tests in BH/MW103 was not and was left to continue recording. It was also determined that the data for the test in BH/MW202 was not sufficient and needed to be repeated. The transducer was reset to record every second and the test was repeated.

On March 1, 2016 water levels were measured in the monitoring wells, it was determined that the test in BH/MW103 was reasonably complete.

The hydraulic test data was analysed using the Bouwer-Rice method (Bouwer & Rice, 1976) in AQTESOLV version 4.5 (Duffield, 2007).

The estimated hydraulic conductivities are presented in the following table.

Monitoring Well	Test Type	Hydraulic Conductivity
BH/MW101	Rising Head	5.7×10^{-8} m/s
BH/MW103	Rising Head	3.6×10^{-10} m/s
BH/MW202	Rising Head	4.8×10^{-7} m/s

The results of the hydraulic testing are consistent with expected results based on the soil descriptions in the borehole logs. BH/MW101 is screened in sandy silt fill and peat. BH/MW103 was screened in silty clay and BH/MW202 is screened in buried topsoil and silty clay to clayey silt but has a sand pack which extends up into fill.

The results of the analysis can be found in **Appendix D**.

6.4 Medium and Fine Soil Texture

Six samples (TP112-6 & TP108-4, TP119-4 & TP121-4, BH406-SS6, BH422-SS4, BH439-SS5 and BH439-SS10) were submitted for grain size distribution tests (**Appendix A**). Grain size distribution results for sample TP119-4 and TP121-4 consisted of 37% of particles less than 75 µm in diameter. This silty sand is classified as a coarse-textured soil (i.e., contains more than 50% by mass of particles that are 75 µm or larger in mean diameter (*O. Reg. 153/04, s.42 (2)*). The remaining five

samples consisted of 85 to 99% of particles less than 75 µm in diameter and this silty clay is classified as a medium and fine textured soil (i.e., contains 50% or more by mass of particles that are smaller than 75 µm in mean diameter (*O. Reg. 153/04, s.42 (2)*). As more than 1/3 of the soil at the property consists of medium and fine textured soils, the soil materials at the Phase Two Property have been classified as medium and fine textured (*O. Reg. 153/04, s.42 (1)*).

6.5 Soil: Field Screening

COV concentration headspace measurements recorded in the soil samples collected from the boreholes and testpits ranged from non-detectable to 230 ppm. The TOV concentrations from the boreholes and testpits ranged from non-detectable to 2 ppm. The COV and TOV concentrations headspace measurements are summarized in the borehole logs in **Appendix A**.

It is Wood's opinion that the results of the screening program suggest a low potential for the presence of significant combustible soil headspace vapour levels in the boreholes. Laboratory analysis is required to confirm and quantify these field screening results (details follow).

Visual or olfactory evidence of petroleum hydrocarbon impacts were not observed by Wood during the drilling or testpitting program.

No LNAPL or DNAPL was observed at the time of development or sampling of any of the monitoring wells.

6.6 Soil Quality

The results of the soil sample analyses and their respective Table 3 SCS are summarized in **Tables 2, 3 and 4**. The laboratory certificates of analysis and previous data tables are included in **Appendix E**.

In accordance with Schedule E of *O. Reg. 153/04 as amended*, **Table 5** lists the maximum concentration for each tested parameter on the soil samples, which also includes the location of each corresponding sample.

The soil analyses completed on each sample, and the Table 3 SCS exceedances are summarized in the following table:

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 3 SCS R/P/I
Soil Samples from Borehole Samples 2015									
BH/MW101-1-C	0.1-1.5	✓	✓	✓					Thallium (1.2 µg/g versus 1.0 µg/g)
BH/MW101-2A-D	1.5				✓				
BH/MW102-1A-C	0-0.6	✓	✓	✓					
BH/MW102-3-D	3.8				✓				
BH/MW103-1A-C	0.1-0.5	✓	✓	✓					Thallium (1.2 µg/g versus 1.0 µg/g)
BH/MW103-3D	3.8				✓				
Soil Samples from Testpits 2016									
TP101-5D	2.5	✓		✓					
TP102-1	0.5			✓					
TP103-1	0.5			✓					
TP104-1	0.5			✓					-
TP105-1	0.5			✓					
TP106-1	0.5			✓					
TP107-1	0.5			✓					
TP108-1	0.5			✓					
TP109-2	1.0			✓					
TP110-1C	0.5			✓		✓			
TP111-1	0.5			✓					
TP112-2D	1.0			✓		✓		✓	
TP113-1	0.5			✓					
TP113-7	3.5			✓	✓	✓		✓	
TP114-1	0.5	✓	✓	✓					
TP115-1	0.5			✓					
TP116-2	1.0			✓					
TP117-3	1.5	✓	✓	✓					EC (2,990 microSiemens per centimetre (µS/cm) versus 700 µS/cm and surrounding delineation testpits TP224 to TP229 with EC ranging from 772 to 3,040 µS/cm.
TP118-1	0.5			✓					

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified Table 3 SCS R/P/I
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	
TP119-1C	0.5			✓					
TP119-8C	4.0	✓	✓					✓	
TP119-8D	4.0				✓				
TP120-1	0.5			✓					
TP121-1	0.5			✓					
TP121-5	2.5			✓	✓	✓		✓	
TP201-2	1.0			✓					
TP201-3	1.5			✓					
TP202-2 & Dup AA	1.0			✓					
TP202-3	1.5			✓					
TP203-2	1.0			✓					
TP203-3	1.5			✓					
TP204-1	0.5			✓					
TP204-2	1.0			✓					
TP205-1	0.5			✓					
TP205-2	1.0			✓					
TP206-1	0.5			✓					
TP206-2	1.0			✓					
Composite TP207	0.5-1.5			✓					
Composite TP208	0.-1.5			✓					
TP208-4 & Dup AC	2.0			✓					
Composite TP209	0-1.5			✓					
TP209-4	2.0			✓					
Composite TP210	0-1.5			✓					
TP211-1	0.5			✓					
TP211-2	1.0			✓					
Composite TP212	0-1.5			✓					
TP212-4	2.0			✓					
TP213-1	0.5			✓					
TP213-2	1.0			✓					
TP214-1	0.5			✓					
TP214-2	1.0			✓					

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 3 SCS R/P/I
Composite TP215	0-1.0			✓					
TP215-3	1.5			✓					
TP216-1	0.5			✓					
TP216-2	1.0			✓					
TP217-1	0.5			✓					
TP217-2	1.0			✓					
TP218-1	0.5			✓					
TP218-2	1.0			✓					
TP219-1	0.5			✓					
TP219-2	1.0			✓					
TP220-1	0.5			✓					
TP220-2	1.0			✓					
TP221-1	0.5			✓					
TP221-2	1.0			✓					
TP222-1	0.5			✓					
TP222-1	1.0			✓					
TP223-1	0.5			✓					
TP223-2	1.0			✓					
TP224-1	0.5		✓						SAR not tested in these locations EC (2,990 microSiemens per centimetre (µS/cm) versus 700 µS/cm and surrounding delineation testpits TP224 to TP229 with EC ranging from 772 to 3,040 µS/cm.
TP224-2	1.0		✓						
TP224-4	2.0		✓						
TP225-1	0.5		✓						
TP225-2	1.0		✓						
TP225-4	2.0		✓						
TP226-1	0.5		✓						
TP226-2	1.0		✓						
TP226-4	2.0		✓						
TP227-1	0.5		✓						
TP227-2	1.0		✓						
TP227-3	1.5		✓						
TP226-1	0.5		✓						
TP226-2	1.0		✓						

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified Table 3 SCS R/P/I
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	
TP226-4	2.0		✓						
TP228-1 & Dup A3	0.5		✓						
TP228-2	1.0		✓						
TP228-4	2.0		✓						
TP229-1	0.5		✓						
TP229-2	1.0		✓						
TP229-4	2.0		✓						
Soil Samples from Boreholes 2018 and 2019									
BH401-1D	0.3				✓				
BH401-1C	0.03-0.6			✓					
BH402-1C	0.03-0.6			✓					
BH403-4C	3.0-3.5			✓					
Composite BH403	0.4-4.0			✓					
BH404-4D	2.4				✓				
BH404-4C	2.3-2.7			✓					
Composite BH404	0.1-2.9			✓					
BH405-4C	3.0-3.5			✓					
BH406-1D	0.3						✓		
BH406-1C	0.03-0.6			✓		✓			
BH407-4	2.3-2.9			✓					
BH408-2C	0.8-1.4			✓					
BH410-1	0.3				✓	✓			
BH410-2	0.8-1.2			✓					
BH411-1	0-0.8			✓					
BH411-4	2.3-2.9								
BH/WM412-3C	1.5-2.0								
BH413-2C	0.8-1.5			✓					
BH414-2	0.8-1.2			✓					
BH415-4	2.2-3.0			✓					
BH416-2	0.8-1.2			✓					
BH417-5	3.0-3.8								
BH417-6	4.6-5.2			✓					

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 3 SCS R/P/I
BH417-7	6.0-6.7								
BH418-3C	1.5-2.1								
BH419-1C	12.2-12.6								
BH420-5	3.0-3.7			✓					
BH/MW421-3	1.5-2.1								
BH/MW421-4	2.3-2.9								
BH422-1C	0.03-0.6			✓					
BH424-1C	0.8-1.2			✓					
BH424-2C	0.8-1.2								
BH425-1	0.03-0.6			✓					
BH425-4	2.3-2.9			✓					
BH426-4	2.3-2.9			✓					
BH427-2	0.6-1.2								
BH427-3	1.5-2.1			✓					
BH427-4	2.3-2.9								
BH428-1	0.03-0.6			✓					
BH429-2	0.6-1.2								
BH429-3	1.5-2.1			✓					Antimony (9.8 µg/g versus 7.5 µg/g)
BH429-4	2.3-2.9								
BH429-5	3.0-3.7								
BH430-2	0.6-1.2								
BH/MW431-1	0-0.6			✓					
BH/MW431-5	3-3.7				✓				
BH430-2	0.6-1.2			✓					
BH432-1	0.03-0.6								
BH432-2	0.8-1.2			✓					
BH432-3	1.5-2.1								
BH434-1	0.03-0.8			✓					
BH436-1	0.03-0.8								
BH436-2	0.8-1.2			✓					
BH436-3	1.5-2.1								
BH/MW438-1	0-0.6			✓		✓			

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 3 SCS R/P/I
BH/MW438-2	0.8-1.5					✓			
BH/MW439-2C	0.8-1.2		✓	✓					EC (963 µS/cm versus 700 µS/cm)
BH/MW439-3C	1.5-2.1								
BH/MW440-3C	1.5-2.0		✓	✓					
BH/MW440-4C	2.3-2.7								
BH/MW441-1	0-0.6				✓				
BH/MW441-2	0.8-1.4			✓					
BH/MW441-9	9.1-9.8				✓	✓			
BH442-2	0.8-1.2		✓	✓					EC (1,310 µS/cm versus 700 µS/cm)
BH442-3	1.5-2.1		✓	✓					EC (2,690 µS/cm versus 700 µS/cm)
BH442-4	2.3-2.9		✓	✓					EC (1,190 µS/cm versus 700 µS/cm)
BH442-5	3.0-3.7			✓					
BH443-2C	0.8-1.2			✓					
BH444-2C	0.8-1.2								
BH/MW445-1D	0.15				✓		✓		
BH/MW445-1C	0.03-0.9			✓		✓			
BH/MW445-2D	0.9								
BH/MW446-1D	0.15				✓	✓	✓		
BH/MW447-1D	0.15				✓	✓	✓		
BH/MW448-1D & Dup BB	0.15			✓		✓	✓		Various metals and PAH parameters
BH/MW448-2D	1.1				✓				
BH501-1C	0-0.6			✓					
BH501-2C	0.8-1.4			✓					
BH502-1C	0-0.6			✓					
BH502-2C	0.8-1.4			✓					
BH503-1C	0-0.6			✓					
BH503-2C	0.8-1.4			✓					
BH504-1C	0-0.6			✓					
BH504-2C	0.8-1.4			✓					
BH505-1C	0-0.6			✓					
BH505-2C	0.8-1.4			✓					
BH506-1C	0-0.6			✓					

Sample Name	Sample Depth (mbgs)	Sample Analyses							Exceedances Identified
		pH	EC, SAR	Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 3 SCS R/P/I
BH506-5C & Dup-500-A	3.1-3.7			✓					
BH507-1C	0-0.6			✓					
BH507-5C	3.1-3.7			✓					
BH508-1C	0-0.6			✓					
BH508-5C	3.1-3.7			✓					
BH509-1C	0-0.6			✓					
BH509-5C	3.1-3.7			✓					
BH510-1C	1.5-2.1			✓					
BH510-2C & Dup B	2.3-2.9			✓					
BH511-1C	1.5-2.1			✓					
BH511-3C	3.1-3.7			✓					
BH513-2C	0.8-1.4			✓					
BH513-3C	1.5-2.1			✓					
BH513-5C	3.8-4.4			✓					
BH514-2C	0.8-1.4			✓					
BH514-4C	2.3-2.9			✓					
BH515-2C	2.3-2.9			✓					
BH515-3C	3.1-3.7			✓					
BH515-4C	3.8-4.4			✓					
BH517-1C	1.5-2.1			✓					
BH517-3C	2.3-2.9			✓					
BH518-2C & Dup-C	2.3-2.9		✓						
BH518-5C	3.1-3.7		✓						
BH518-6C	5.3-5.9		✓						EC (950 µS/cm versus 700 µS/cm)
BH519-1C	3.1-3.7		✓						EC (1,380 µS/cm versus 700 µS/cm)
BH519-3C	4.6-5.2		✓						EC (1,210 µS/cm versus 700 µS/cm)
BH519-4C	5.3-5.9		✓						EC (1,210 µS/cm versus 700 µS/cm)
BH520-1C	3.1-3.7		✓						EC (883 µS/cm versus 700 µS/cm)
BH520-4C	5.3-5.9		✓						EC (2,140 µS/cm versus 700 µS/cm)
BH520-5C	6.1-6.7		✓						EC (1,180 µS/cm versus 700 µS/cm)
BH521-2C	0.8-1.3		✓						
BH521-3C	1.5-2.1		✓						

The sample locations and sample analyses are indicated on **Figures 5A, 5B and 5C**. No chemical or biological transformations were noted in the analysis nor did the results indicate that the soil/fill at the Phase Two Property is a contaminant mass contributing to ground water impact. No LNAPL or DNAPL was suspected.

6.7 Ground Water Quality

The results of the ground water sample analyses collected from the newly installed monitoring wells, and their respective Table 3 SCS, are summarized in **Tables 6, 7 and 8**. The laboratory certificates of analysis and previous data tables are included in **Appendix E**.

In accordance with Schedule E of *O. Reg. 153/04*, **Table 9** lists the maximum concentration for each tested parameter on the ground water samples including their location and the screened depth of the well for each corresponding sample.

The results of the ground water analyses are summarized below.

Ground water samples were collected from BH/MW101, BH/MW102, BH/MW201 and BH/MW202. MW202 was resampled on January 3, 2017. The monitoring wells BH/MW101, BH/MW102, BH/MW201, BH/MW202, BH/MW412, BH/MW421, BH/MW431, BH/MW438, BH/MW440, BH/MW441, BH/MW445, BH/MW446, BH/MW447, BH/MW448 were sampled on July 29, 31 and or August 23, 2019. The ground water sample depth interval was 2.4 to 5.5 mbgs in BH/MW101, BH/MW102, 3.0 to 6.1 mbgs in BH/MW201, 3.0 to 4.6 mbgs in BH/MW202, 3.0 to 6.0 mbgs in BH/MW412, BH/MW421, BH/MW431, BH/MW438 and BH/MW441, 10.5 to 13.5 mbgs in BH/MW440, 1.6 to 4.6 in BH/MW445, BH/MW446, BH/MW447 and BH/MW448. The samples for metals analysis were field filtered. The ground water analytical results of this Phase Two ESA are summarized below and there were no exceedances of the Table 3 SCS in ground water:

Sample Name	Depth Interval (mbgs)	Sample Analyses					Exceedances Identified
		Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 1 SCS R/P/I/I/C/C*
BH/MW101	2.4-5.5	✓	✓				
BH/MW102	2.4-5.5	✓	✓				
BH/MW103	3.0-6.1		✓				This well was destroyed and replaced by BH/MW441.
BH/MW201	3.0-6.0	✓	✓				
BH/MW202	3.0-4.6	✓	✓				

Sample Name	Depth Interval (mbgs)	Sample Analyses					Exceedances Identified
		Metals	PHC/BTEX	PAHs	OCs	Hg, Cr VI	Table 1 SCS R/P/I/I/C/C*
BH/MW412	3.0-6.0	✓	✓	✓			
BH/MW421	3.0-6.0	✓	✓	✓			
BH/MW431	3.0-6.0	✓	✓	✓			
BH/MW438	3.0-6.0	✓	✓	✓			
BH/MW440	10.5-13.5	✓					
BH/MW441	3.0-6.0	✓	✓	✓			
BH/MW445	1.6-4.6	✓					
BH/MW446	1.6-4.6	✓					
BH/MW447	1.6-4.6	✓					
BH/MW448	1.6-4.6	✓					
Unknown Well	'-	✓					

The sample locations and sample analyses are indicated on **Figure 6**. No chemical or biological transformations were noted in the analysis nor did the results indicate that the soil/fill at the Phase Two Property is a contaminant mass contributing to ground water impact. No LNAPL or DNAPL was suspected.

6.8 Sediment Quality

Sediment was not assessed as part of the Phase Two ESA.

6.9 Quality Assurance and Quality Control Results

Field QA/QC Program - Soil

The field QA/QC program consisted of analyzing field duplicates soil/fill samples for each of the following parameters/parameter groups: pH, conductivity, SAR, and metals, and one field duplicate soil/fill sample for each of the following parameters/parameter groups: mercury, hexavalent chromium, PHCs, VOCs, and PAHs. Duplicate samples are analyzed in order to assess the precision of the field sampling and laboratory analytical processes. To accurately calculate a statistically valid relative percent difference (RPD) for the duplicate sample, the concentration of the analytes found in both the original and duplicate sample must be greater than five (5) times the MDL. The field duplicate samples are summarized as follows:

- The field borehole soil/fill sample duplicate Dup-A was a duplicate of sample TP114-1 for pH, conductivity, SAR, and metals, Dup-C was a duplicate of TP117-3 for pH, conductivity, SAR and metals, Dup-G was a duplicate of TP112-2D for mercury, hexavalent chromium and PAHs, DUP-1 was a duplicate sample of BH/MW105-3-C for PHC and VOCs, DUP AA was a duplicate sample of TP202-2 for metals, DUP AC was a duplicate of TP208-4 for metals, Dup KA was a duplicate of BH428-1 for metals, EC, SAR and pH, Dup AD was a duplicate of BH/MW412-3C for metals, Dup E1 was a duplicate of BH420-5 for metals, Dup F3 was a duplicate of BH425-1 for metals, Dup L-1 was a duplicate of BH432-2 for metals, Dup BB was a duplicate of BH446-1D for metals, OCs, PHCs, BTEX and PAHs and Dup L1 was a duplicate of BH438-1 for PAHs. An assessment of the RPDs for the duplicate samples was completed (**Tables 2, 3 and 4**). The RPDs were either not calculable as both values were not greater than 5 times the MDL or were below the RPD limit (0.3 pH units, 10% for conductivity, 30% for metals, mercury and PHCs, 40% for PAHs, 35% for hexavalent chromium and 50% for BTEX/VOCs with the following exceptions:
 - Conductivity in TP117-3 and DUP-G (RPD of 80%);
 - Lead in BH420-5 and BH432-2 (RPDs of 36% and 51% respectively);
 - Cobalt in BH432-2 (RPD of 35%);
 - Conductivity in BH518-2C and Dup-C (RPD of 51%); and
 - Barium and Vanadium in BH510-2C and Dup-B (RPD of 56% and 37%, respectively).

It is noted that the RPD values in the Analytical Protocol are for duplicate samples collected at the laboratory and are used for comparison to the RPDs calculated for field duplicates.

Field QA/QC Program – Ground Water

The field QA/QC program consisted of analyzing field duplicate ground water sample Dup-A, field duplicate of BH/MW202 for metals, VOCs and PHC (F1-F4), Dup TA, field duplicate of BH/MW412 for metals, BTEX, PHCs and PAHs, Dup TB, field duplicate of BH/MW440 for metals and Dup A2, field duplicate of BH/MW445 for metals, BTEX, PHCs and PAHs. Duplicate samples are analyzed in order to assess the precision of the field sampling and laboratory analytical processes. The field duplicate samples are summarized as follows:

An assessment of the RPDs for the duplicate samples was completed (**Tables 6, 7 and 8**). The RPDs were either not calculable as both values were not greater than 5 times the MDL or were below the RPD limit [20% for metals and 30% for VOC and PHCs and 40% for PAHs], with the exception of Copper in Dup TB (40%) and zinc in Dup A2 (29%).

It is noted that the RPD values in the Analytical Protocol are for duplicate samples collected at the laboratory and are used for comparison to the RPDs calculated for field duplicates.

Field blank samples were submitted for analysis of VOCs or BTEX during each sample round. Field blanks are samples of laboratory provided reverse osmosis deionized (RODI) water, which is poured into a set of sample bottles at the same time and in the same general area as the samples are collected. The field blank is used to determine if there is presence of contamination as a result of field handling. The field blank was non-detectable for all parameters analyzed indicating that the field activities did not bias the reported results.

Trip blanks were submitted for analysis for VOCs or BTEX during each sample round. A trip blank is a sample of RODI water prepared and filled into the relevant sample bottles by the laboratory. The sample is sent with the bottle shipment, taken out to the field and then shipped back with the collected samples for analysis (not opened at any time by field staff). All parameters were found to be non-detectable in the trip blank.

Trip spikes were submitted for analysis for VOCs or BTEX during each sample round. A trip spike is a sample of RODI water to which a known amount of analyte of interest and appropriate preservative has been added by the laboratory. This sample is also sent with the bottle shipment, taken out to the field and then shipped back with the collected samples for analysis (not opened at any time by field staff). The trip spike recoveries were considered acceptable.

Laboratory QA/QC Program - Soil

The laboratory results for soil samples obtained during Wood's investigation met the Acceptance Limits of the Analytical Protocol with the exception of laboratory qualifiers noted by the laboratory **Appendix E**. It is noted that the spike recovery in report # 1924517 was outside the laboratory's quality control criteria due to matrix interference. All samples were analyzed within laboratory hold times and preservation method, storage requirements and container type were utilized as the Analytical Protocol. No issues with the QA/QC that would impact the results of the assessment were noted. The results of the QA/QC analyses are included on the laboratory Certificates of Analyses presented in **Appendix E**.

Laboratory QA/QC Program – Ground Water

The laboratory results for soil and ground water samples obtained during Amec Foster Wheeler's investigation met the Acceptance Limits of the Analytical Protocol with the exception of laboratory qualifiers noted by the laboratory **Appendix E**. No issues with the QA/QC that would impact the results of the assessment were noted. All samples were analyzed within laboratory hold times and preservation method, storage requirements and container type were utilized as the Analytical

Protocol. Elevated reporting limits for PAHs in BH/MW446 ground water sample due to low sample volume (Report #1935095). The results of the QA/QC analyses are included on the laboratory Certificates of Analyses presented in **Appendix E**.

Certification of Analytical Results

Based on the review of the QA/QC results for soil, the Chain of Custody forms and the laboratory Certificates of Analysis, it is concluded that:

- All Certificates of Analysis received pursuant to Section 47(2) of *O. Reg. 153/04* complies with Section 47(3) of *O. Reg. 153/04*;
- A Certificate of Analysis has been received for each sample submitted for analysis; and
- Copies of all Certificates of Analysis are provided in **Appendix E** of this report.

No issues with the analytical results affected decision-making or prevented the overall objectives of the investigation from being met.

6.10 Phase Two Conceptual Site Model

The Phase Two CSM is provided below:

Regulatory Requirement	Phase Two Property Information
<p>i. Areas where potentially contaminating activity has occurred, areas of potential environmental concern and subsurface structures and utilities that may affect contaminant distribution and transport.</p>	<p>The location of the Phase One and Two Property is shown in Figure 1. Based on the findings of the Phase One ESA, APECs and PCAs associated with the Phase Two Property are as follows (Figures 3 and 7):</p> <ul style="list-style-type: none"> - APEC #1 – Historic infilling along the southern portion of the Phase Two Property (PCA #30 - importation of fill material of unknown quality). - APEC #2 – Railway line present to the north of the Phase Two Property (PCA#46 – railway yards, tracks and spurs). <p>APEC #1 is an on-site PCA #30 related to the historical infilling of the Welland River which formerly transversed the south end of the Phase Two Property prior to the mid 1930s. It is inferred that the fill material consisted of fill material from the construction of the Queenston-Chippawa Power canal and/or dredging activities in the Welland River. The fill is native to the area and similar to the native soil on-site. The Contaminants of Potential Concern (COPCs) associated with APEC #1 include metals, including hydrides (Sb, As and Se), Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR), in soil and ground water. APEC#1 was addressed by BH/MW101, BH/MW201, BH/MW202, TP101 to TP117, TP201 to TP229, BH401 to BH/MW446 and BH506 to BH521.</p> <p>APEC #2 is an off-site PCA #46 relating to the adjacent railway line to the north of the Phase Two Property. The railway line has been present prior to the 1930s. The COPCs associated with APEC #2 include metals, including hydrides (Sb, As and Se), Organochlorine Pesticides (OCs) (soil only), Petroleum Hydrocarbons (PHCs) in the F1 to F4 ranges, Benzene, Toluene, Ethylbenzenes and Xylenes (collectively referred</p>

Regulatory Requirement	Phase Two Property Information
	<p>to as BTEX) and Polycyclic Aromatic Hydrocarbons (PAHs). APEC #2 was addressed by BH/MW445 to BH/MW448 and BH501 to BH505.</p> <p>There are no buildings or other structures present on the Phase Two Property. No active utilities are present on the Phase Two Property. Subsurface features that may affect contaminant distribution at the Phase Two Property include the infilling of the Phase Two Property with material from the former Welland River as depicted on Figures 2 and 3.</p> <p>No RSCs have been filed on the Phase Two Property.</p>
<p>ii. Description and figures illustrating the physical setting of the property including, stratigraphy, hydrogeological characteristics, depth to bedrock, depth to water table, aspect related to Section 41 or 43.1 that apply to the property, areas where soil has been brought onto the property, location of any proposed buildings.</p>	<p>The stratigraphy at the Phase Two Property is depicted on the cross sections which will be updated following completion of the soil remediation program. and in general, the subsurface conditions encountered at the Phase Two Property are described as follows: a topsoil, or granular surface layer, underlain by fill material consisting of silty clay/clayey silt fill to depths ranging from 0.2 to 7.2 mbgs overlying a native silty clay/clayey to depth. The fill material is believed to be associated with the infilling of the former Welland River channel that transferred the Phase Two Property. The fill layer extends outside the former river boundaries but is still inferred to be associated with the infilling of the former river channel. A peat/organic layer was encountered in BH/MW101 at a depth of 4.4 mbgs. Trace slag was noted in TP221 (0.5 mbgs). Black and/or white seams were noted in the fill material in TP221, TP226, TP227 and TP228. The stratigraphy in the delineation testpits and boreholes was consistent with the boreholes and testpits completed in 2015.</p>
	<p>No odours or staining were noted during the drilling and testpitting.</p> <p>Bedrock was not encountered at the maximum drilled depth of the boreholes (26.4 mbgs). The bedrock is anticipated to be of the Middle and Lower Silurian Age, consisting of sandstone, shale, dolostone and siltstone of the Lockport Formation. Bedrock is anticipated to be encountered at depths ranging from 20 to 25 mbgs. The results of the COV and TOV head space screening program suggest a low potential for the presence of significant combustible soil headspace vapour levels in the boreholes and testpits.</p> <p>On-site vapour intrusion is not considered a concern at the Phase Two Property as no volatile COCs were identified on the property during the Phase Two ESA. There are no buildings on the Phase Two Property.</p> <p>The property was vacant at the time of the Phase Two ESA. The owner intends to develop the Phase Two Property for mixed residential, commercial and park land use.</p> <p>The regional ground water flow direction, based on topographic features and knowledge gained from other sites in the area, is expected to be to the southwest towards the Welland River in the southern portion of the Phase Two Property and towards the Queenston-Chippawa Power Canal in the northern portion of the Phase Two Property. Locally, however, the shallow ground water flow may be influenced by underground utility trenches, conduits, and structures, variations in soil type, and minor fluctuations in topography. Figure 4 shows the interpreted ground water flow.</p> <p>The Phase Two Property is located outside the 30 m buffer for the designated protected area (presence of wetlands) based on mapping in the City of Niagara Falls Official Plan and the Region of Niagara Core Natural Heritage Map. The pH in the surface and subsurface soil was within the acceptable ranges (5 to 9 for surface and 5 to 11 for subsurface soils). As the wetlands are greater than 30 m from the Phase Two Property, conditions under Section 41 (Environmentally Sensitive Areas) would not apply to the Phase Two Property.</p>



Regulatory Requirement	Phase Two Property Information
	<p>The Phase Two Property does not include land that is within 30 m of a water body as described in <i>O.Reg. 153/04</i>, as amended. The Phase Two Property is not considered a shallow soil property as the depth to bedrock is greater than 2 m [1/3 or more of the area consists of soil equal to or less than 2 m in depth beneath the soil surface, excluding any non-soil surface treatment such as asphalt, concrete or aggregate]. Therefore, there are no conditions that would apply to the Phase Two Property under Section 43.1.</p> <p>The Phase Two Property is not municipally serviced but will be in the future. All other properties located within 250 m of the boundaries of the property are supplied by a municipal drinking water system and the property is not located within an area the Regional Municipality of Niagara deems an area for protection of ground water. The City of Niagara Falls and Regional Municipality of Niagara have been contacted regarding the use of the non-potable ground water standard. Should they have no objection to the use of the non-potable Table 3 SCS, then there would be no conditions that would apply to the Phase Two Property under Section 35. This will be confirmed prior to the RSC filing.</p> <p>The depth to ground water measured from ground surface in the monitoring wells ranged from approximately 2.05 to 5.79 mbgs, which corresponds to geodetic elevations ranging from 172.93 to 179.76 mASL as shown in Figure 4. Across the Phase Two Property, the hydraulic gradient varies by an order of magnitude generally between 0.02 and 0.002 m/m.</p> <p>The water levels in these monitoring wells have been used to infer horizontal ground water flow directions across the Phase Two Property. Using Surfer® to interpolate the on-site data, lines of equivalent ground water level were determined across the Phase Two Property. Ground water flow is perpendicular to these lines moving from higher head to lower head. Ground water flow in the southwestern portion of the Phase Two Property generally moves radially away from BH/MW412, which is a topographic high on the Phase Two Property. From BH/MW412, water moves west towards the Queenston-Chippawa Power Canal, south towards the Welland River, north towards the railway tracks adjacent to the Phase Two Property, or east through the Phase Two Property. The ground water moving east through the eastern portion of the Phase Two Property is met by a groundwater divide that generally creates groundwater flow north to northwest towards the railway tracks and south towards the Welland River. Ground water from the east portion of the Phase Two Property flows west towards the groundwater divide describe above.</p> <p>Based on falling head tests, the estimated hydraulic conductivities are as follows:</p> <ul style="list-style-type: none"> • 5.7×10^{-8} m/s (BH/MW01); • 3.6×10^{-10} m/s (BH/MW103); and • 4.8×10^{-7} m/s (BH/MW202). <p>The standards used for the identification of COCs were Table 3 SCS for use with a residential/parkland/institutional property use and medium and fine textured soils.</p>
iii. Contaminants on the Site	<p>The contaminants in soil located on the Phase Two Property and their origin are as follows:</p> <ul style="list-style-type: none"> • One or more metals parameters including: Antimony in BH429-3 and Thallium in BH/MW101 and BH/MW103 and various metals in BH448;

Regulatory Requirement	Phase Two Property Information
	<ul style="list-style-type: none"> • Electrical Conductivity in fill materials at TP117, TP224 to TP229., BH439, BH440, BH442, BH518, BH519 and BH520; • Various PAH parameters in BH448; <p>There were not exceedances of the Table 3 SCS in ground water at the Phase Two Property.</p> <p>The location of these boreholes and testpits are indicated on Figure 3 and the exceedances in soil are shown on Figures 5A, 5B and 5C. The exceedances are attributed to the historical in-filling on-site with fill material of unknown quality. The migration of the contaminants away from any APEC via a preferential pathway is not likely as the contaminants of concern are not considered mobile. There are no contaminants discharging to the natural environment.</p> <p>The COCs in soil are likely attributed to the historical infilling of the former Welland River on the Phase Two property. The estimated horizontal and vertical distribution of the contaminants in each area is indicated on the cross-section figures which will be updated and included once the soil remediation program is completed.</p> <p>The COCs in ground water are likely attributed to the historical infilling of the former Welland River on the Phase Two property. The estimated horizontal and vertical distribution of the contaminants in each area is indicated on the cross-section figures which will be updated and included once the soil remediation program is completed.</p> <p>The transport of these COCs in the surface would not be likely to be influenced by seasonal fluctuations in ground water elevation. There are no known climatic or meteorological conditions that may have influenced the distribution of contaminants, such as temporal fluctuations in ground water levels, at the Phase Two Property.</p> <p>As there are impacts above the Ministry's standards in the soil at the Phase Two Property, an RSC could not be filed at this time. The contaminants would need to be addressed using one of or a combination of the following techniques before an RSC could be filed:</p> <ul style="list-style-type: none"> • Soil Remediation – the impacted materials would be removed for off-site disposal at a licensed landfill; or • Site Specific Risk Assessment – impacted materials can remain in place if they are below site specific criteria that would be generated for the Phase Two Property. <p>A Soil Remediation Program (SRP) will be completed and reported under separate cover. The CSM will be updated with the SRP results for the RSC filing.</p>
<p>iv. Cross-Sections and distribution of contaminants, depth to water, stratigraphy, subsurface structures or utilities affecting distribution.</p> <p>For areas of contamination, release mechanisms, transport pathways, receptors, exposure points and routes of exposure.</p>	<p>The depth to water in July and August 2019 ranged from 2.05 to 5.79 mbgs. The stratigraphy is fill over native silty clay). There are no significant subsurface features that affect distribution of contaminants. The horizontal distribution of contaminants in soil is indicated in Figures 5A, 5B and 5C.</p> <p>Fill materials were present beneath the topsoil at a majority of the borehole and testpit locations across the Phase Two Property. The fill extended as deep as 5.6 mbgs in some locations and it is believed to be associated with infilling of former Welland River (APEC #1). Furthermore, exceedances for PAHs were noted in APEC #2 associated with the railway to the north of the Phase Two Property. The contaminants noted (EC and metals parameters) are not considered mobile and were not noted in the ground water. There were no ground water exceedances noted in APEC #1 and APEC #2.</p>



The Phase Two CSM is shown in **Figure 7**.

7.0 CONCLUSIONS

Wood was retained by GR (CAN) Investments Co., Ltd. to conduct a Phase Two ESA of the property known as the Riverfront Community Development, in Niagara Falls, Ontario (the Phase Two Property). The Phase Two Property does not have a current municipal address. The Client is considering developing the Phase Two Property for proposed mixed land use. A RSC, acknowledged by the MECP, is required as a condition of the planned redevelopment from vacant to mixed land use for the Client to receive a Brownfields grant from the City of Niagara Falls.

A Phase Two ESA in support of an RSC is legislated under Ontario Regulation 153/04 as amended (*O. Reg. 153/04* as amended). The regulation outlines the procedure to follow to complete Phase One and Two ESAs including the requirement to complete a Phase One ESA prior to completing a Phase Two ESA.

Wood previously completed a Phase I ESA, the findings of which were documented in the report entitled *"Phase I Environmental Site Assessment Thundering Waters Development, East & North of Dorchester Road & West of Progress Street, Niagara Falls, Ontario"* dated January 25, 2016, (Phase I ESA). It is noted that the name of the development has changed from Thundering Waters to Riverfront Community. The Phase I ESA was updated in September 2018 to meet the requirements of Ontario Regulation 153/04 as amended (*O. Reg. 153/04* as amended). The updated Phase One ESA is entitled, *"Phase One Environmental Site Assessment, Riverfront Community, Niagara Falls, Ontario"* dated September 10, 2018. It is noted that Wood's Phase One ESA included a larger property which included the Phase Two Property. The Phase One ESA is greater than 18 months old and will need to be updated prior to the filing of the RSC.

This Phase Two ESA was carried out in accordance with Wood's proposal dated October 16, 2015 and authorization to proceed, signed by the Client on November 15, 2015. A delineation testpitting and ground water sampling program was carried out in accordance with Wood's proposal dated December 2, 2016 and authorization to proceed, signed by the Client on December 3, 2016. A supplemental delineation investigation was carried out in accordance with Wood's proposal dated June 15, 2018 and authorization to proceed, and email authorization to proceed, by the Client on June 15, 2018. An additional delineation investigation was carried out in accordance with Wood's proposal dated November 3, 2020 and authorization of Change Work Order #10 by the Client to proceed.

The primary findings of this Phase Two ESA are as follows:

- Wood drilled seventy-one boreholes, including the installation and monitoring of monitoring wells in fifteen boreholes, excavated 50 testpits, completed hydrogeological testing and an elevation survey between December 2, 2015 and March 19, 2021. The locations of the boreholes, monitoring wells and testpits were selected to address APECs resulting from PCAs identified during the Phase One ESA.
- The subsurface conditions encountered in the boreholes and testpits consisted of either a topsoil, or granular surface layer, underlain by fill material consisting of silty clay/clayey silt fill to depths ranging from 0.2 to 7.2 mbgs overlying a native silty clay/clayey to depth. The fill material is believed to be associated with the infilling of the former Welland River channel and spoil from the Queenston-Chippawa Power Canal that transferred the Phase Two Property. The fill layer extends outside the former river boundaries but is still inferred to be associated with the infilling of the former river channel. A peat/organic layer was encountered in BH/MW101 at a depth of 4.4 mbgs. Trace slag was noted in TP221 (0.5 mbgs). Black and/or white seams were noted in the fill material in TP221, TP226, TP227 and TP228. The stratigraphy in the delineation testpits and boreholes was consistent with the boreholes and testpits completed in 2015.
- Bedrock was not encountered at the maximum drilled depth of the boreholes (26.4 mbgs). The bedrock is anticipated to be of the Middle and Lower Silurian Age, consisting of sandstone, shale, dolostone and siltstone of the Lockport Formation. Bedrock is anticipated to be encountered at depths ranging from 20 to 25 mbgs.
- Visual or olfactory evidence of petroleum hydrocarbon impacts was not observed by Wood during the drilling or testpitting programs.
- It is Wood's opinion that the results of the COV and TOV head space screening program suggest a low potential for the presence of significant combustible soil headspace vapour levels in the boreholes and testpits.
- The depth to ground water measured from ground surface in the monitoring wells ranged from approximately 2.05 to 5.79 mbgs, which corresponds to geodetic elevations ranging from 172.93 to 179.76 mASL. Across the Phase Two Property, the hydraulic gradient varies by an order of magnitude generally between 0.02 and 0.002 m/m.
- The water levels in these monitoring wells have been used to infer horizontal ground water flow directions across the Phase Two Property. Using Surfer® to interpolate the on-site data, lines of equivalent ground water level were determined across the Phase Two

Property. Ground water flow is perpendicular to these lines moving from higher head to lower head. Ground water flow in the southwestern portion of the Phase Two Property generally moves radially away from BH/MW412, which is a topographic high on the Phase Two Property. From BH/MW412, water moves west towards the Queenston-Chippawa Power Canal, south towards the Welland River, north towards the railway tracks adjacent to the Phase Two Property, or east through the Phase Two Property. The ground water moving east through the eastern portion of the Phase Two Property is met by a ground water divide that generally creates ground water flow north to northwest towards the railway tracks and south towards the Welland River. Ground water from the east portion of the Phase Two Property flows west towards the ground water divide described above.

- The assessment criteria applicable to the Phase Two Property, if an RSC was to be filed for the Phase Two Property, are the Table 3 Full Depth Generic SCS for residential/parkland/institutional property use and medium and fine textured soils (Table 3 SCS).
- The results of the soil testing indicated exceedances of the Table 3 SCS, as follows:
 - One or more metals parameters including: Antimony in fill material in BH429-3 and Thallium in fill materials at BH/MW101 and BH/MW103;
 - Conductivity in fill materials at TP117, TP224 to TP229., BH439, BH440, BH442, BH518, BH519 and BH520;
 - Various Polycyclic Aromatic Hydrocarbons (PAH) and metals parameters in BH448;
- The results of the ground water testing indicated no exceedances of the Table 3 SCS.

As there are impacts above the Ministry's standards in the soil at the Phase Two Property, an RSC could not be filed at this time. The contaminants would need to be addressed using one of or a combination of the following techniques before an RSC could be filed:

- Soil Remediation – the impacted materials would be removed for off-site disposal at a licensed landfill; or
- Site Specific Risk Assessment – impacted materials can remain in place if they are below site specific criteria that would be generated for the Phase Two Property.

Once the ground water monitoring wells are no longer required, they must be maintained or abandoned in accordance with the requirements of Section 21(3) of Ontario Regulation 903 – Wells which states *“the well owner shall immediately abandon the well if it is not being used or maintained for future use as a well”*.

7.1 Signatures

The undersigned carried out the Phase Two ESA documented herein, including developed the Sampling and Analysis Plan, supervised all field activities, reviewing the resulting data and prepared this report, including the findings and conclusions presented herein, acting either as a Qualified Person or under the supervision of a Qualified Person. Any practice of geoscience documented within this report was undertaken by or under the supervision of a Professional Engineer or Professional Geoscientist licensed in the Province of Ontario.

This report was prepared for the exclusive use of GR (CAN) Investments Co., Ltd. and is intended to provide information regarding the property located east and north of Dorchester Road and west of Progress Street in Niagara Falls, Ontario at the time of the field work. Wood shall provide written confirmation to any third party identified by GR (CAN) Investments Co., Ltd. that such party may rely on any reports, documents and materials generated by Wood during this Project. Any use which an unauthorized 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.

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 date(s) 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, 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, which were not investigated directly. 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 attached in **Appendix F**.

We trust that the information presented in this report meets your current requirements. Should you have any questions or require further information, please contact the undersigned.

Yours truly,

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

Prepared by:



Deanna Mazachowsky, B.A.
Environmental Scientist



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

Reviewed by:



Patrick Shriner, P.Ge.
Associate, Environmental Geoscientist

8.0 REFERENCES

Amec Foster Wheeler Environment & Infrastructure, "*Phase I Environmental Site Assessment, Thundering Waters Development, East & North of Dorchester Road & West of Progress Street, Niagara Falls, Ontario*" dated January 25, 2016, prepared for GR (CAN) Investments Co., Ltd.

Wood, "*Phase One Environmental Site Assessment, Riverfront Community, Niagara Falls, Ontario*" dated September 10, 2018, prepared for GR (CAN) Investments Co. Ltd.

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Barnett, P.J., Cowan, W.R., and Henry, A.P. Map 2556. *Quaternary Geology of Ontario, Southern Sheet*. [Map]. s.l., Ontario, Canada: Ontario Geological Survey, 1991. 1:200,000.

Precambrian Geology and Engineering and Terrain Geology, Ontario Geological Survey; Map 2544. *Bedrock Geology of Ontario, Southern Sheet*. [Map]. 1991. 1:1,000,000.

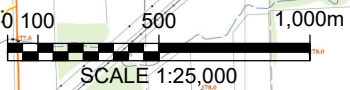
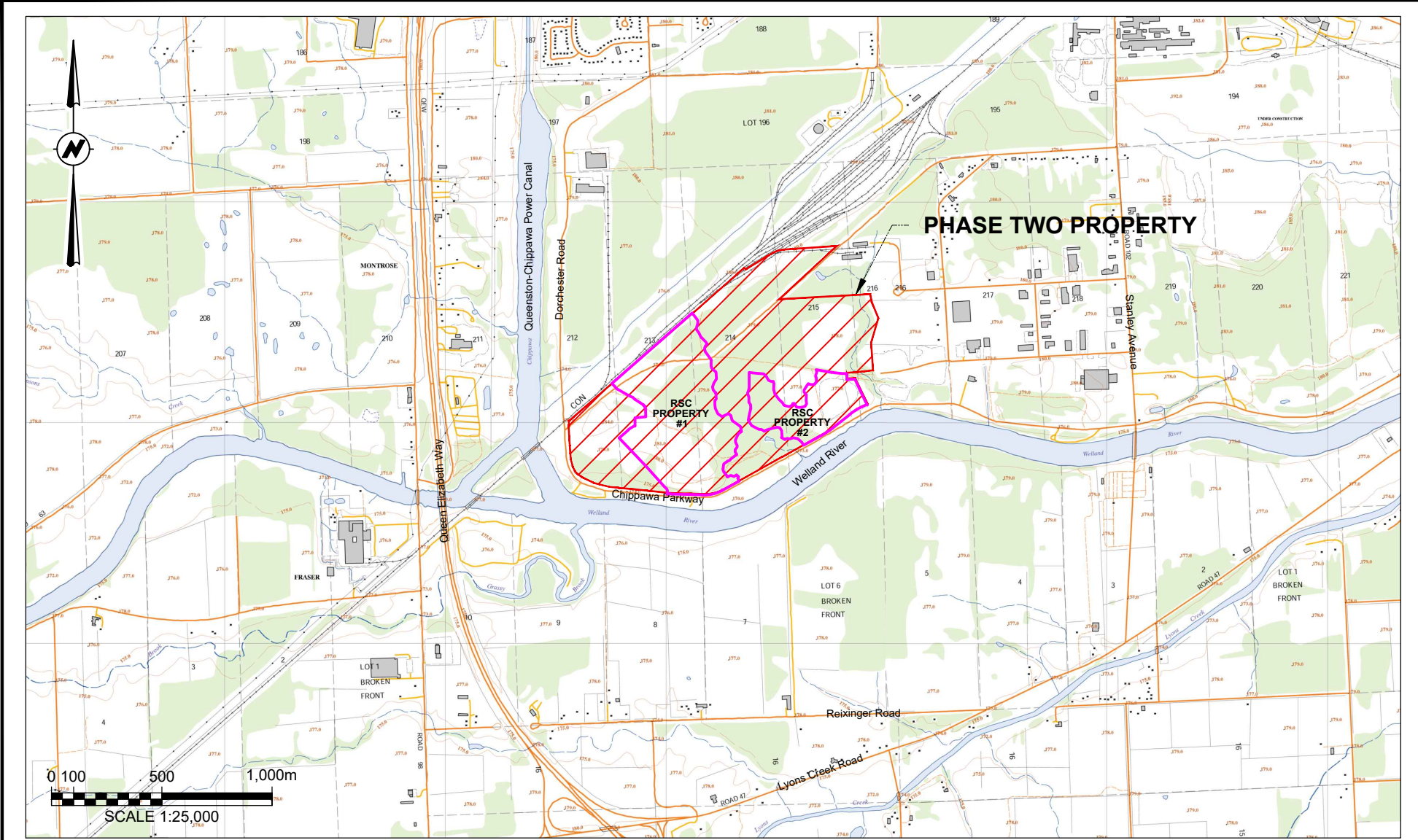
United States Department of Agriculture, *Soil Survey Manual*, October 1993.



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

FIGURES



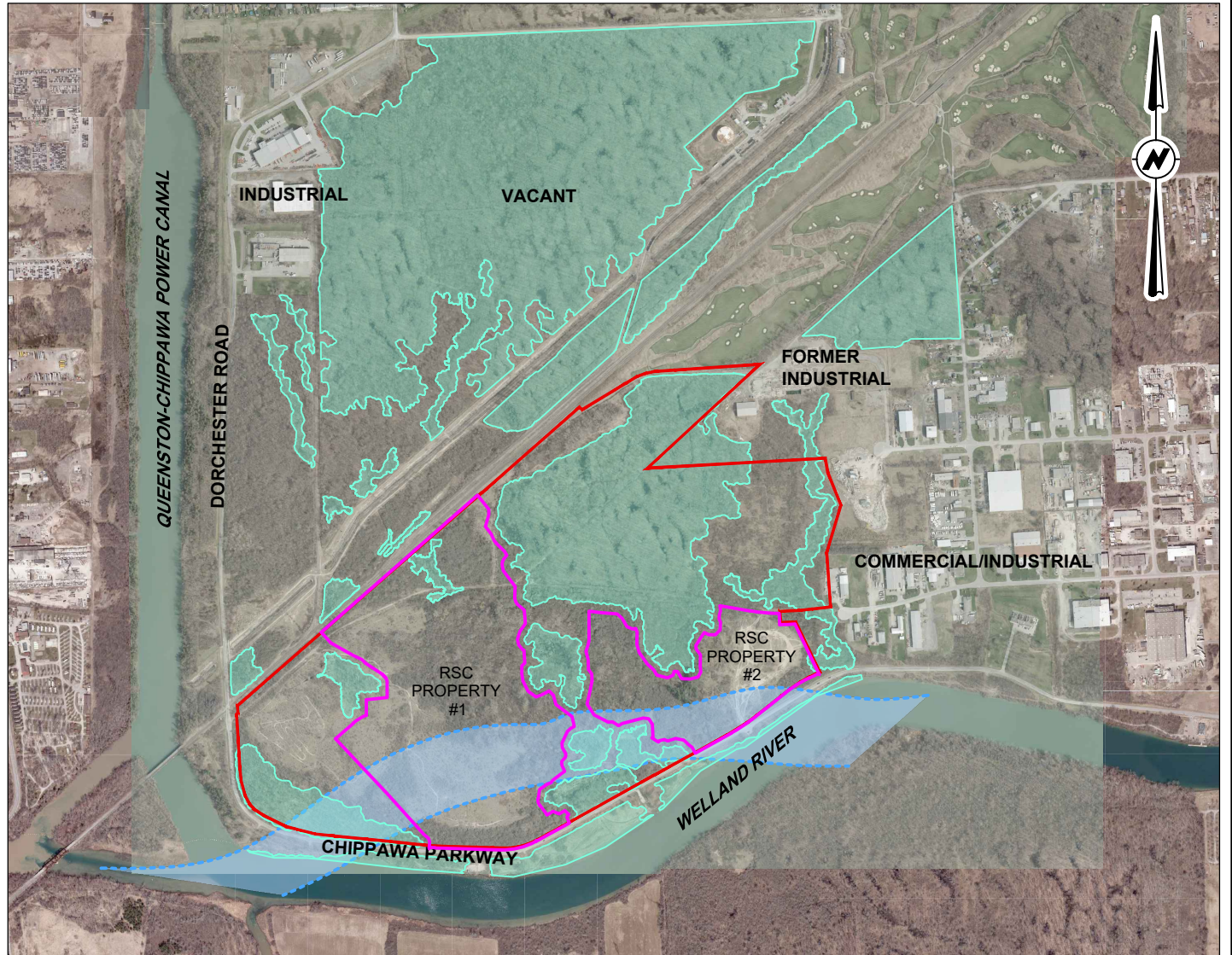


REFERENCE: Base plan provided by FIRST BASE SOLUTIONS.

FOR ILLUSTRATION PURPOSES ONLY.

CLIENT: GR (CAN) Investments Co., Ltd.		LEGEND:  PHASE TWO PROPERTY LOCATION  RSC PROPERTY BOUNDARY	DWN BY: LMK	PROJECT: PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD NIAGARA FALLS, ONTARIO	DATE: JUNE 2021
Wood Environment & Infrastructure Solutions 110 JAMES ST. SUIT 301 ST. CATHARINES, ONTARIO L2R 7E8 905-687-6616			CHK'D BY: KP		DATUM: NAD83
			PROJECTION: UTM Zone 17	TITLE: PROPERTY LOCATION MAP	REV. No: 0
			SCALE: 1:25,000		FIGURE No: 1

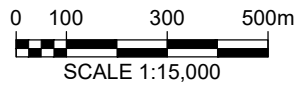
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NOTE:
RSC PROPERTY BOUNDARIES OUTSIDE
30m BUFFER FOR WETLANDS.

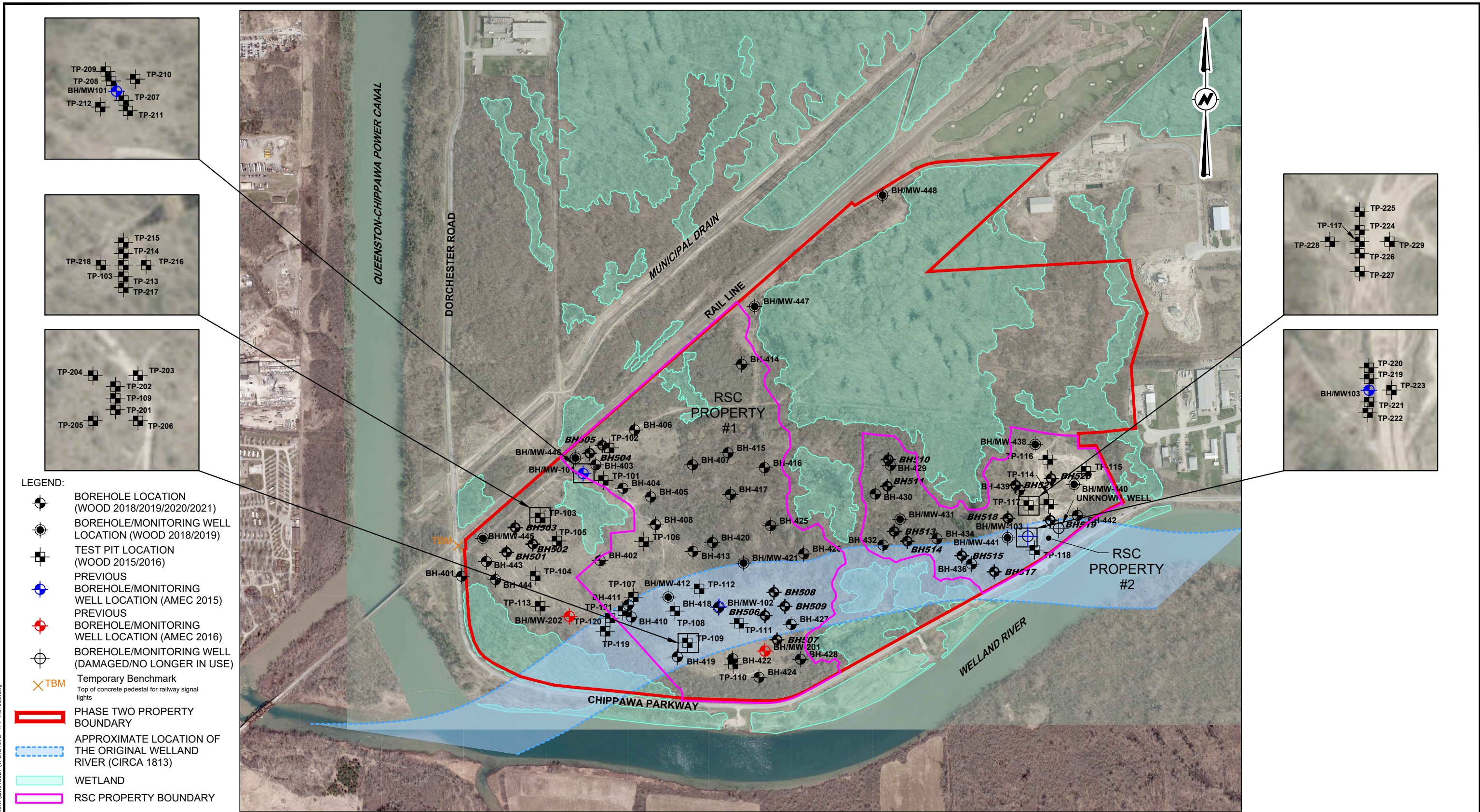
LEGEND:

- PHASE TWO PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF THE ORIGINAL WELLAND RIVER (CIRCA 1813)
- WETLAND
- RSC PROPERTY BOUNDARY



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

<p>CLIENT:</p> <h2 style="margin: 0;">GR (CAN) Investments Co., Ltd.</h2>		<p>DWN BY: LMK</p> <p>CHK'D BY: KP</p> <p>DATUM: NAD83</p> <p>PROJECTION: UTM Zone 17</p> <p>SCALE: 1:15,000</p>	<p>PROJECT:</p> <p style="text-align: center;">PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD NIAGARA FALLS, ONTARIO</p> <p>TITLE:</p> <p style="text-align: center;">PHASE TWO PROPERTY LAYOUT WITH RSC PROPERTY BOUNDARIES</p>	<p>DATE: JUNE 2021</p> <p>PROJECT No: TPB184078</p> <p>REV. No: 0</p> <p>FIGURE No: 2</p>
<p>Wood Environment & Infrastructure Solutions 110 JAMES ST. SUIT 301 ST. CATHARINES, ONTARIO L2R 7E8 905-687-6616</p>				



NOTES:
 THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. TPB184078.
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REFERENCE:
 BASE PLAN PROVIDED BY NIAGARA NAVIGATOR,
<https://maps-beta.niagararegion.ca/Navigator/>

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 L2R 7E8
 905-687-6616

DWN BY: LMK
 CHK'D BY: KP
 DATUM: NAD83
 PROJECTION: UTM Zone 17
 SCALE: 1:7,500

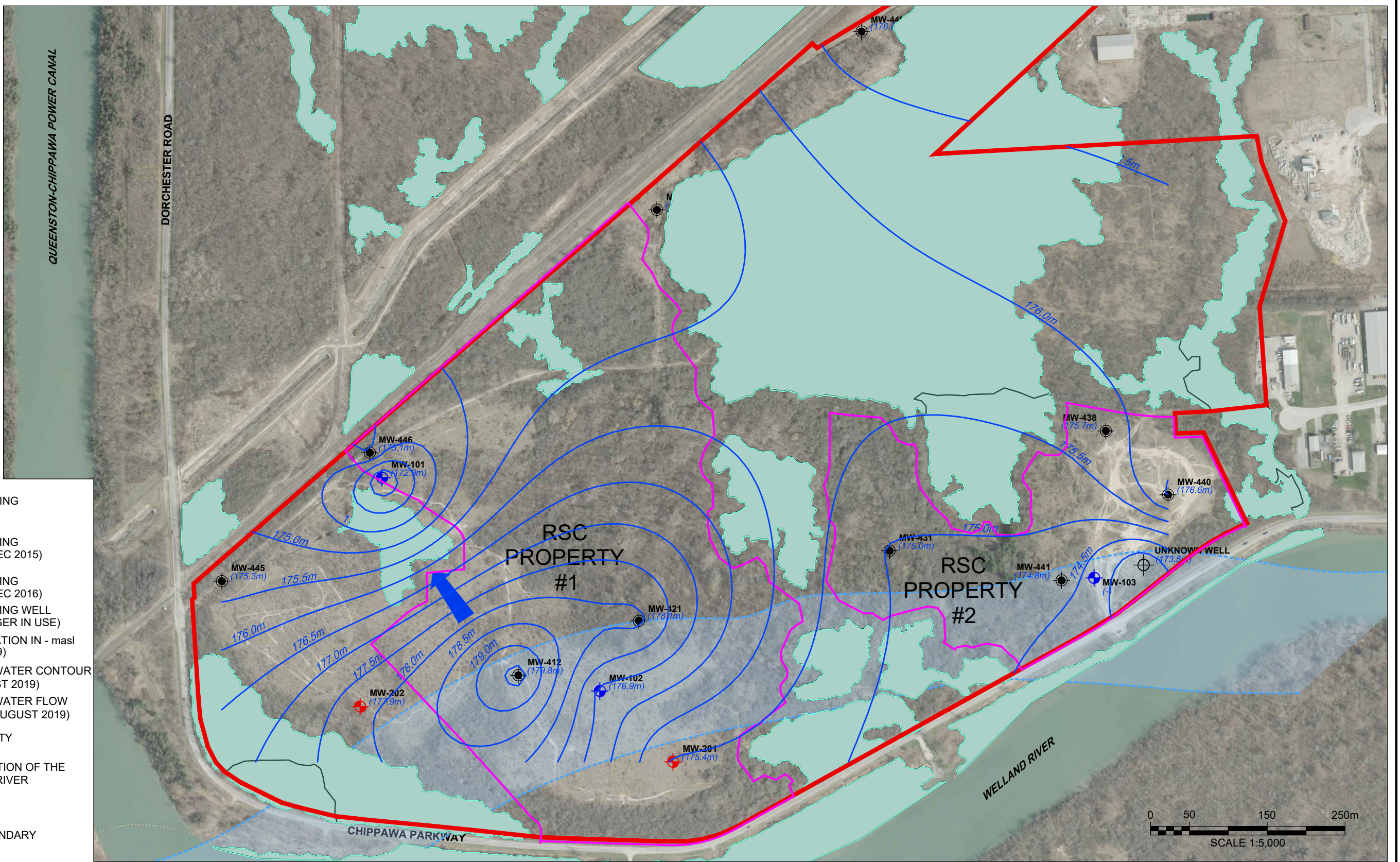
wood.

PROJECT:
**PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
 PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD
 NIAGARA FALLS, ONTARIO**

TITLE:
**BOREHOLE/MONITORING WELL AND TESTPIT
 LOCATION PLAN**

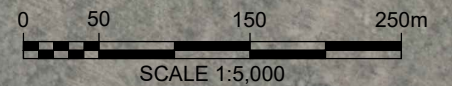
DATE: JUNE 2021
 PROJECT No: TPB184078
 REV No: 0
 FIGURE No: 3

DATE PLOTTED: 6/23/2021 1:07:44 AM
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LEGEND:

- BOREHOLE/MONITORING WELL LOCATION
- PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2015)
- PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2016)
- BOREHOLE/MONITORING WELL (DAMAGED / NO LONGER IN USE)
- (174.4) WATER LEVEL ELEVATION IN - masl (JULY & AUGUST 2019)
- 183.0m INFERRED GROUNDWATER CONTOUR - masl (JULY & AUGUST 2019)
- INFERRED GROUNDWATER FLOW DIRECTION (JULY & AUGUST 2019)
- PHASE TWO PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF THE ORIGINAL WELLAND RIVER (CIRCA 1813)
- WETLAND
- RSC PROPERTY BOUNDARY



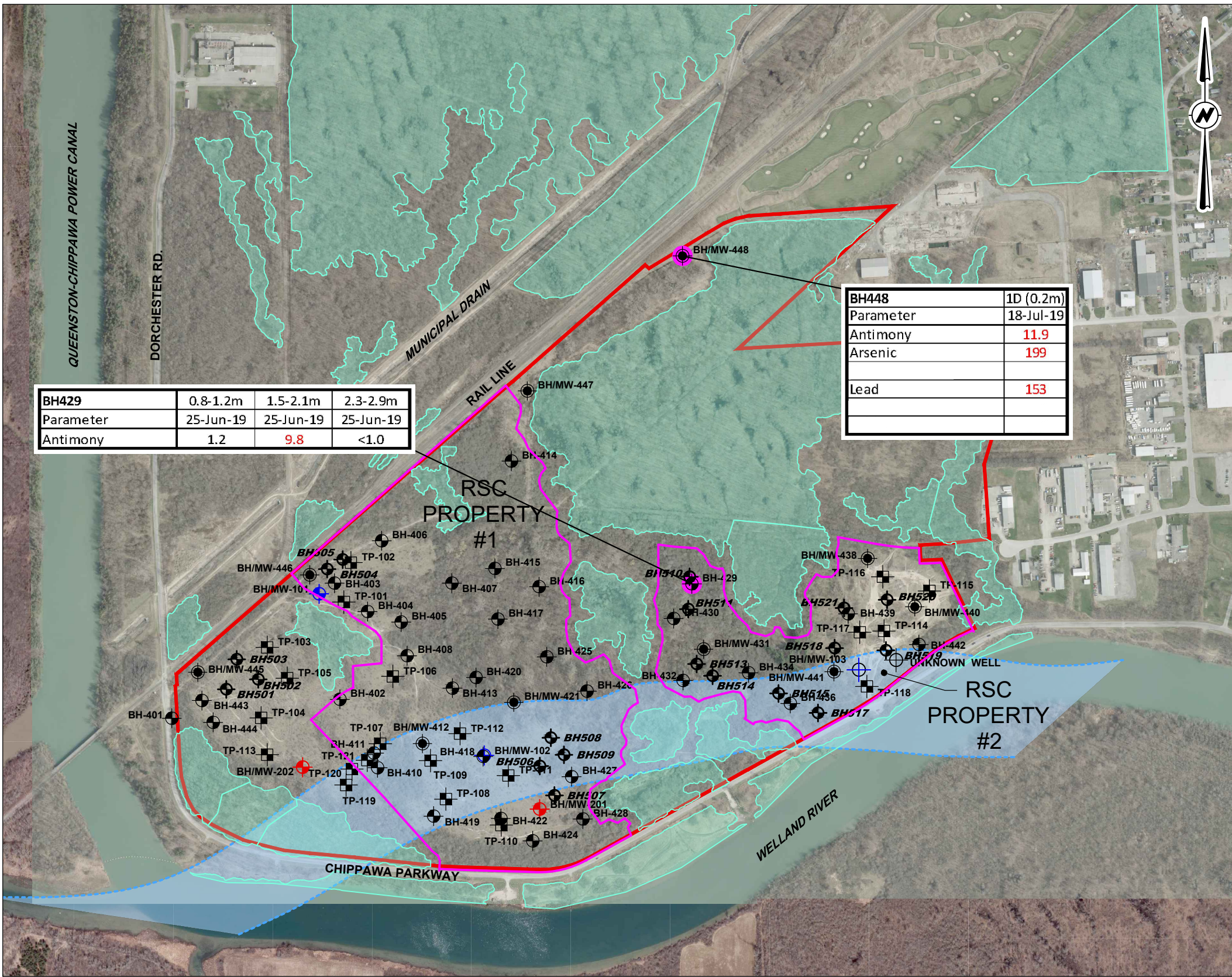
NOTES:
 THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. TPB184078.
 masl = METERS ABOVE SEA LEVEL.
 FOR ILLUSTRATION PURPOSES ONLY.

REFERENCE:
 BASE PLAN PROVIDED BY NIAGARA NAVIGATOR,
<https://maps-beta.niagararegion.ca/Navigator/>

CLIENT: GR (CAN) Investments Co., Ltd.	
Wood Environment & Infrastructure Solutions 110 JAMES ST. SUIT 301 ST. CATHARINES, ONTARIO L2R 7E8 905-687-6616	

DWN BY:	LMK	PROJECT:	DATE:
CHK'D BY:	KP	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD NIAGARA FALLS, ONTARIO	JUNE 2021
DATUM:	NAD83		PROJECT No:
PROJECTION:	UTM Zone 17	TITLE:	TPB184078
SCALE:	1:5,000	INTERPRETED GROUND WATER FLOW PLAN (JULY AND AUGUST 2019)	REV No:
			0
			FIGURE No:
			4

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ANALYTICAL LEGEND:

Identification Sample Number Sample Depth (m bgs) Date

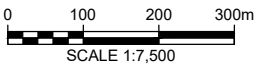
BH/MW101	1C (0.1-1.5m)	MECP TABLE 1
Parameter	3-Dec-15	SOIL
Antimony		7.5 µg/g
Arsenic		18 µg/g

BH429	0.8-1.2m	1.5-2.1m	2.3-2.9m
Parameter	25-Jun-19	25-Jun-19	25-Jun-19
Antimony	1.2	9.8	<1.0

BH448	1D (0.2m)
Parameter	18-Jul-19
Antimony	11.9
Arsenic	199
Lead	153

mbgs = METERS BELOW GROUND SURFACE
µg/g = MICROGRAMS PER GRAMS

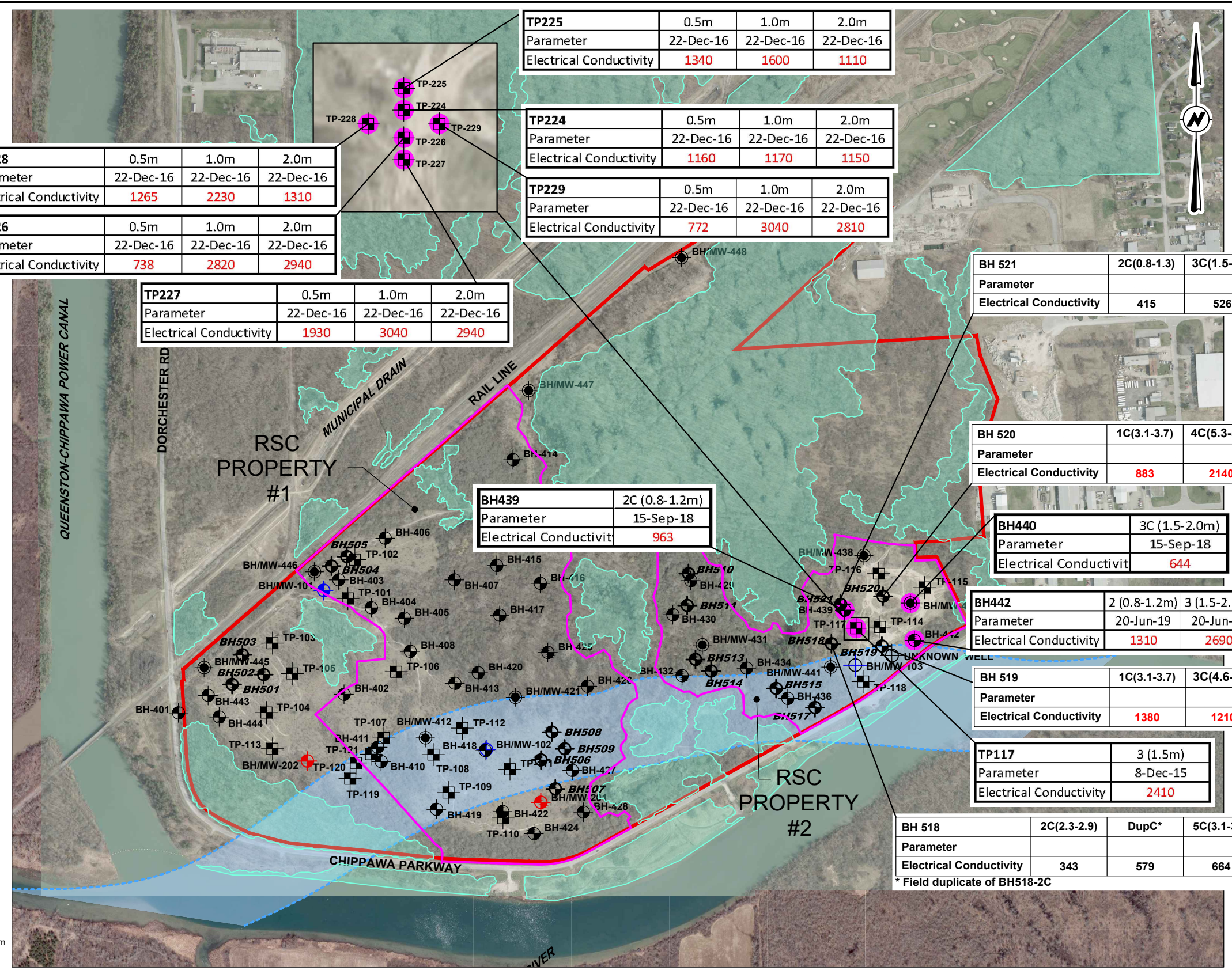
- LEGEND:
- BOREHOLE LOCATION
 - BOREHOLE/MONITORING WELL LOCATION
 - TEST PIT LOCATION
 - PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2015)
 - PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2016)
 - BOREHOLE/MONITORING WELL (DAMAGED/NO LONGER IN USE)
 - EXCEEDANCE OF TABLE 3 SCS
 - PHASE TWO PROPERTY BOUNDARY
 - APPROXIMATE LOCATION OF THE ORIGINAL WELLAND RIVER (CIRCA 1813)
 - WETLAND
 - RSC PROPERTY BOUNDARY



NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. TPB184078.
mbgs = METERS BELOW GROUND SURFACE
µg/L = MICROGRAMS PER LITRE
FOR ILLUSTRATION PURPOSES ONLY.
REFERENCE:
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<https://maps-beta.niagara-region.ca/Navigator/>

CLIENT:	GR (CAN) Investments Co., Ltd.		DWN BY:	LMK	PROJECT:	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD NIAGARA FALLS, ONTARIO	DATE:	JUNE 2021
	Wood Environment & Infrastructure Solutions 110 JAMES ST. SUIT 301 ST. CATHARINES, ONTARIO L2R 7E8 905-687-6616		CHK'D BY:	KP			PROJECT No:	TPB184078
			DATUM:	NAD83	TITLE:	SOIL SAMPLE LOCATIONS WITH TABLE 3 SCS EXCEEDANCES - METALS	REV No:	0
			PROJECTION:	UTM Zone 17	SCALE:	1:7,500	FIGURE No:	5A

DATE PLOTTED: 6/23/2021 1:14:54 AM
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TP228	0.5m	1.0m	2.0m
Parameter	22-Dec-16	22-Dec-16	22-Dec-16
Electrical Conductivity	1265	2230	1310

TP226	0.5m	1.0m	2.0m
Parameter	22-Dec-16	22-Dec-16	22-Dec-16
Electrical Conductivity	738	2820	2940

TP225	0.5m	1.0m	2.0m
Parameter	22-Dec-16	22-Dec-16	22-Dec-16
Electrical Conductivity	1340	1600	1110

TP224	0.5m	1.0m	2.0m
Parameter	22-Dec-16	22-Dec-16	22-Dec-16
Electrical Conductivity	1160	1170	1150

TP229	0.5m	1.0m	2.0m
Parameter	22-Dec-16	22-Dec-16	22-Dec-16
Electrical Conductivity	772	3040	2810

TP227	0.5m	1.0m	2.0m
Parameter	22-Dec-16	22-Dec-16	22-Dec-16
Electrical Conductivity	1930	3040	2940

BH 521	2C(0.8-1.3)	3C(1.5-2.1)
Parameter		
Electrical Conductivity	415	526

BH 520	1C(3.1-3.7)	4C(5.3-5.9)	5C(6.1-6.7)
Parameter			
Electrical Conductivity	883	2140	118

BH440	3C (1.5-2.0m)
Parameter	15-Sep-18
Electrical Conductivity	644

BH442	2 (0.8-1.2m)	3 (1.5-2.1m)	4 (2.3-3.0m)
Parameter	20-Jun-19	20-Jun-19	20-Jun-19
Electrical Conductivity	1310	2690	1190

BH 519	1C(3.1-3.7)	3C(4.6-5.2)	4C(5.3-5.9)
Parameter			
Electrical Conductivity	1380	1210	1210

TP117	3 (1.5m)
Parameter	8-Dec-15
Electrical Conductivity	2410

BH 518	2C(2.3-2.9)	DupC*	5C(3.1-3.7)	6C(5.3-5.9)
Parameter				
Electrical Conductivity	343	579	664	950

* Field duplicate of BH518-2C

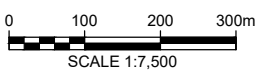
ANALYTICAL LEGEND:

Identification	Sample Depth (m bgs)	Date
TP227	0.5m	MECP TABLE 1
Parameter	22-Dec-16	SOIL
Electrical Conductivity		700 µS/cm

mbgs = METERS BELOW GROUND SURFACE
µS/cm = MICROSIEMENS PER CENTIMETER

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE/MONITORING WELL LOCATION
- TEST PIT LOCATION
- PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2015)
- PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2016)
- BOREHOLE/MONITORING WELL (DAMAGED/NO LONGER IN USE)
- EXCEEDANCE OF TABLE 3 SCS
- PHASE TWO PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF THE ORIGINAL WELAND RIVER (CIRCA 1813)
- WETLAND
- RSC PROPERTY BOUNDARY



NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. TPB184078.
FOR ILLUSTRATION PURPOSES ONLY.
REFERENCE:
BASE PLAN PROVIDED BY NIAGARA NAVIGATOR,
<https://maps-beta.niagararegion.ca/Navigator/>

CLIENT:	GR (CAN) Investments Co., Ltd.	DWN BY:	LMK	PROJECT:	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD NIAGARA FALLS, ONTARIO	DATE:	JUNE 2021
		CHK'D BY:	KP			PROJECT No:	TPB184078
		DATUM:	NAD83	TITLE:	SOIL SAMPLE LOCATIONS WITH TABLE 3 SCS EXCEEDANCES - ELECTRICAL CONDUCTIVITY	REV No:	0
		PROJECTION:	UTM Zone 17			FIGURE No:	5B
		SCALE:	1:7,500				

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110 JAMES ST. SUIT 301
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L2R 7E8
905-687-6616



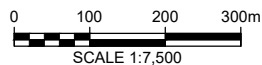
ANALYTICAL LEGEND:

Identification	Sample Number	Sample Depth (m bgs)	Date
BH448	1D (0.2m)	MECP TABLE 3	
Parameter	18-Jul-19	SOIL STANDARDS	
Acenaphthylene		0.17 µg/g	
Anthracene		0.74 µg/g	
Benzo[a]anthracene		0.63 µg/g	
Benzo[a]pyrene		0.3 µg/g	
Benzo[b]fluoranthene		0.78 µg/g	
Benzo[g,h,i]perylene		7.80 µg/g	
Benzo[k]fluoranthene		0.78 µg/g	
Dibenzo[a,h]anthracene		0.1 µg/g	
Fluoranthene		0.69 µg/g	
Indeno[1,2,3-cd]pyrene		0.48 µg/g	

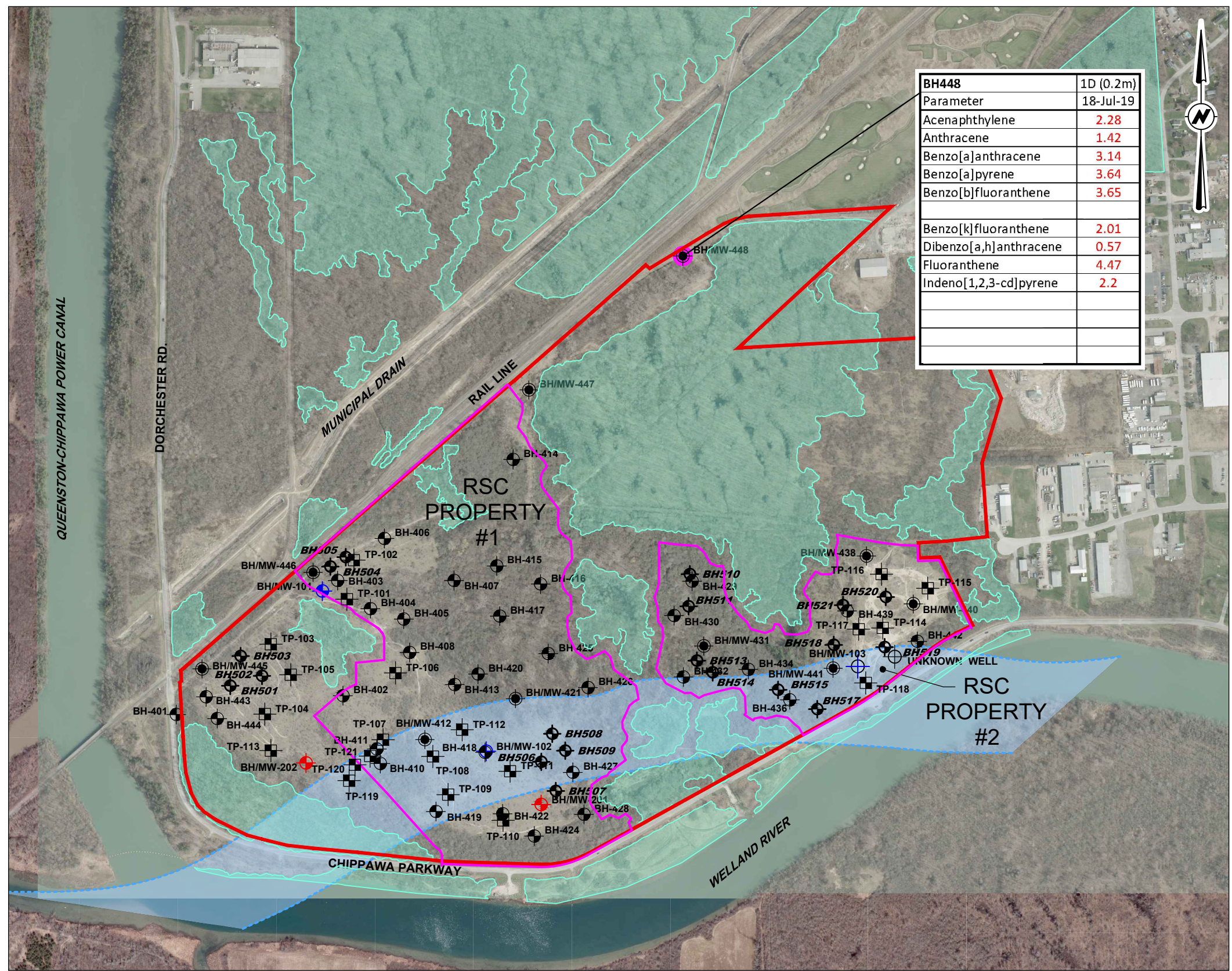
mbgs = METERS BELOW GROUND SURFACE
µg/g = MICROGRAMS PER GRAM

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE/MONITORING WELL LOCATION
- TEST PIT LOCATION
- PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2015)
- PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2016)
- BOREHOLE/MONITORING WELL (DAMAGED/NO LONGER IN USE)
- EXCEEDANCE OF TABLE 3 SCS
- PHASE TWO PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF THE ORIGINAL WELLAND RIVER (CIRCA 1813)
- WETLAND
- RSC PROPERTY BOUNDARY



BH448	1D (0.2m)
Parameter	18-Jul-19
Acenaphthylene	2.28
Anthracene	1.42
Benzo[a]anthracene	3.14
Benzo[a]pyrene	3.64
Benzo[b]fluoranthene	3.65
Benzo[k]fluoranthene	2.01
Dibenzo[a,h]anthracene	0.57
Fluoranthene	4.47
Indeno[1,2,3-cd]pyrene	2.2



NOTES:
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CLIENT:
GR (CAN) Investments Co., Ltd.

Wood Environment & Infrastructure Solutions
110 JAMES ST. SUIT 301
ST. CATHARINES, ONTARIO
L2R 7E8
905-687-6616

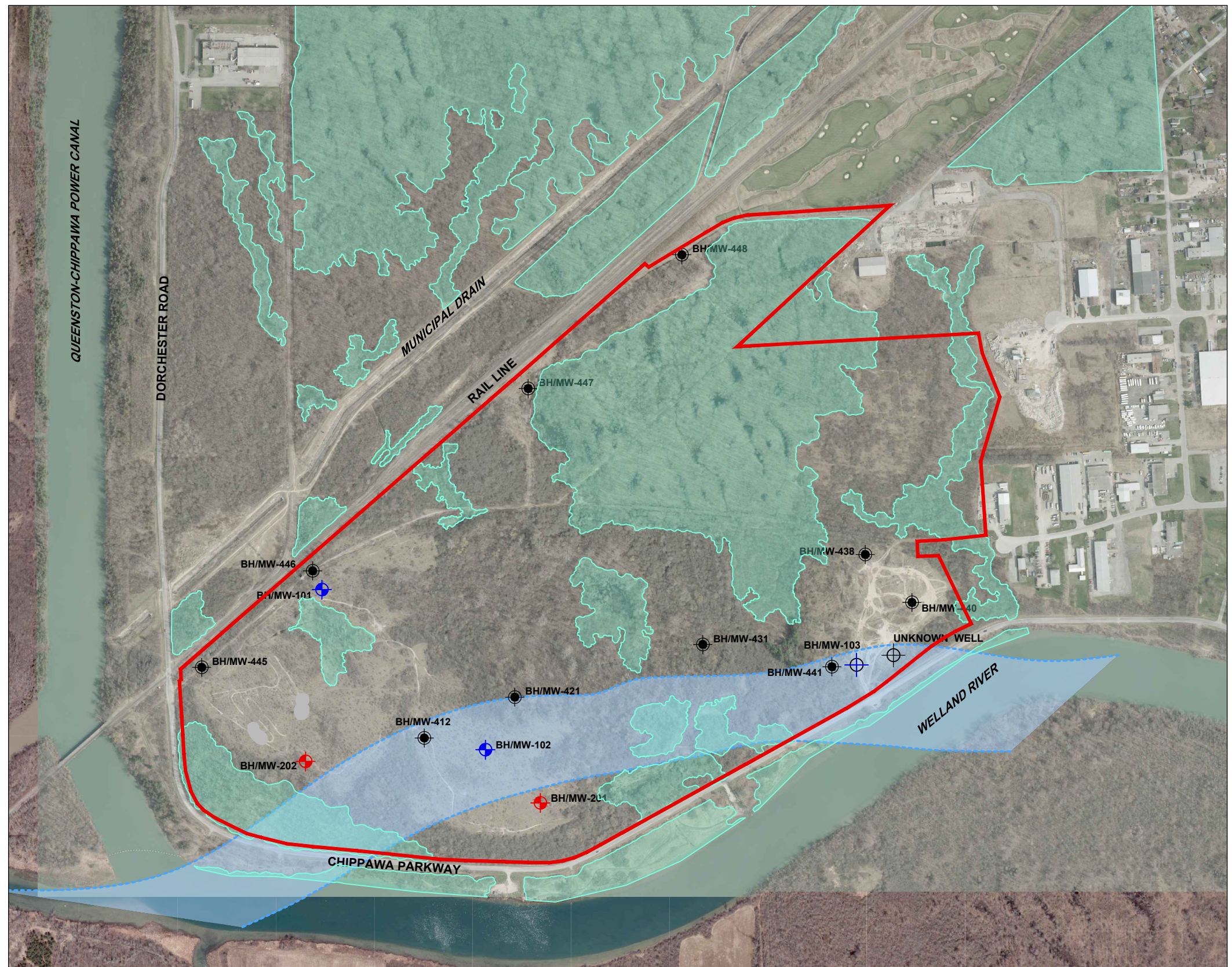
DWN BY: LMK
CHK'D BY: KP
DATUM: NAD83
PROJECTION: UTM Zone 17
SCALE: 1:7,500








PROJECT:
**PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD
NIAGARA FALLS, ONTARIO**

TITLE:
**SOIL SAMPLE LOCATIONS WITH TABLE 3 SCS
EXCEEDANCES - PAHS**


DATE: JUNE 2021
PROJECT No: TPB184078
REV No: 0
FIGURE No: 5C

DATE PLOTTED: 6/23/2021 1:30:52 AM
FILE LOCATION: G:\temp\namech\csc-ete\view-work\ems48921\TPB184078-14-R01055c.dwg

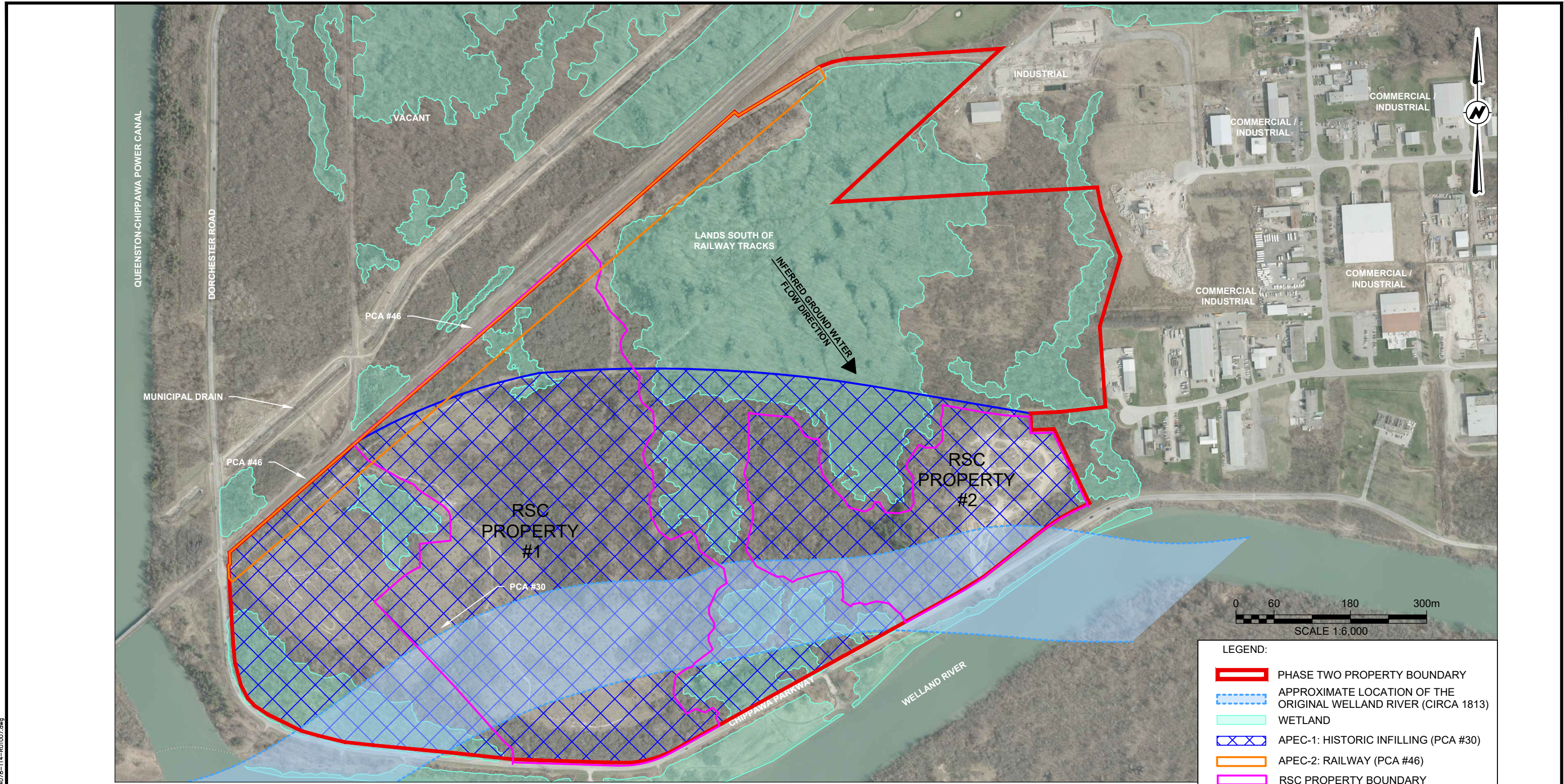


- LEGEND:**
-  BOREHOLE/MONITORING WELL LOCATION
 -  PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2015)
 -  PREVIOUS BOREHOLE/MONITORING WELL LOCATION (AMEC 2016)
 -  BOREHOLE/MONITORING WELL (DAMAGED/NO LONGER IN USE)
 -  PHASE TWO PROPERTY BOUNDARY
 -  APPROXIMATE LOCATION OF THE ORIGINAL WELLAND RIVER (CIRCA 1813)
 -  WETLAND

NOTES:
 THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS REPORT No. TPB184078.
 mbgs = METERS BELOW GROUND SURFACE
 µg/L = MICROGRAMS PER LITRE
 FOR ILLUSTRATION PURPOSES ONLY.
REFERENCE:
 BASE PLAN PROVIDED BY NIAGARA NAVIGATOR,
<https://maps-beta.niagararegion.ca/Navigator/>

CLIENT: <p style="text-align: center;">GR (CAN) Investments Co., Ltd.</p>	DWN BY: LMK CHK'D BY: KP DATUM: NAD83 PROJECTION: UTM Zone 17 SCALE: 1:7,500	PROJECT: <p style="text-align: center;">PHASE TWO ENVIRONMENTAL SITE ASSESSMENT PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD NIAGARA FALLS, ONTARIO</p>	DATE: <p style="text-align: center;">JUNE 2021</p>
Wood Environment & Infrastructure Solutions 110 JAMES ST. SUIT 301 ST. CATHARINES, ONTARIO L2R 7E8 905-687-6616		TITLE: <p style="text-align: center;">GROUND WATER SAMPLE LOCATIONS</p>	PROJECT No: <p style="text-align: center;">TPB184078</p>
			REV No: <p style="text-align: center;">0</p>
			FIGURE No: <p style="text-align: center;">6</p>

DATE PLOTTED: 6/22/2021 3:21:08 PM
 FILE LOCATION: G:\temp\amec\work\work\ams48921\TPB184078-14-R01006.dwg



LEGEND:

- PHASE TWO PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF THE ORIGINAL WELLAND RIVER (CIRCA 1813)
- WETLAND
- APEC-1: HISTORIC INFILLING (PCA #30)
- APEC-2: RAILWAY (PCA #46)
- RSC PROPERTY BOUNDARY

Reference: Base Map from Niagara Navigator.

FOR ILLUSTRATION PURPOSES ONLY.

CLIENT:
GR (CAN) Investments Co., Ltd.

DWN BY: DN

CHK'D BY: KP

DATUM: NAD 83

PROJECTION: UTM ZONE 17

SCALE: AS SHOWN

PROJECT:
**PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
PROPOSED RIVERFRONT COMMUNITY, DORCHESTER ROAD
NIAGARA FALLS, ONTARIO**

REV. NO.: 0

DATE: JUNE 2021

PROJECT NO.:

TPB184078

TITLE:
CONCEPTUAL SITE MODEL

FIGURE No.:
7

Wood Environment & Infrastructure Solutions
110 JAMES ST. SUIT 301
ST. CATHARINES, ONTARIO
L2R 7E8
905-687-6616



DATE PLOTTED: 6/22/2021 3:24:19 PM
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wood.

TABLES



Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH401-1-C	BH402-1-C	Composite BH403	BH403-4-C	Composite BH404	BH404-4-C	BH405-4-C	BH406-1-C	BH407-4	BH408-2-C	BH410-2	
Sample Depth (m)	0.1-0.8	0.1-0.8	0.4-4.0	3.0-3.5	0.1-2.9	2.3-2.9	3.0-3.5	0.1-0.8	2.2-2.9	0.8-1.2	0.8-1.2	
Date Collected	9/10/2018	8/27/2018	9/6/2018	9/6/2018	08/30/2018	08/30/2018	9/4/2018	9/4/2018	6/12/2019	8/29/2018	8/21/2018	
Laboratory ID	1837166-02	1835202-02	1836440-01	1836440-02	1835626-01	1835626-03	1836203-01	1836206-02	1924517-02	1835501-01	1834327-02	
Date Analyzed - SAR		9/4/2019										
Date Analyzed - Conductivity		8/31/2019										
Date Analyzed - pH		8/30/2019										
Date Analyzed - Metals	9/14/2018	8/30/2019	09/11/2018	09/11/2018	9/6/2018	9/6/2018	9/10/2018	9/10/2018	6/18/2019	9/6/2018	8/28/2018	
Parameter	Units	MDL	Table 3SCS*									
General Inorganics												
SAR	-	0.01	5	-	0.09	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	203	-	-	-	-	-	-	-
pH	pH Units	0.05	+	-	7.7	-	-	-	-	-	-	-
Metals												
Antimony	µg/g	1	7.5	<	<	<	<	<	<	<	<	<
Arsenic	µg/g	1	18	3.4	3.3	2.5	3.1	2.9	2.4	4.4	4.0	5.0
Barium	µg/g	1	390	129	104	126	130	81.1	125	105	83.2	138
Beryllium	µg/g	0.5	5	1.2	0.8	<	0.6	0.6	0.6	1.1	0.9	0.5
Boron	µg/g	5	120	12.5	18.0	13.6	15.2	16.2	20.4	25.0	13.9	8.9
Cadmium	µg/g	0.5	1.2	<	<	<	<	0.7	<	<	<	<
Chromium	µg/g	5	160	26.4	20.8	12.2	17.6	17.0	15.3	31.6	26.5	17.7
Cobalt	µg/g	1	22	12.8	10.9	7.0	8.8	8.1	6.8	16.5	12.7	9.5
Copper	µg/g	5	180	19.3	19.7	10.7	16.7	16.5	14.0	30.2	25.8	14.9
Lead	µg/g	1	120	10.6	10.1	7.0	7.5	46.6	17.2	11.5	9.0	22.1
Molybdenum	µg/g	1	6.9	<	<	<	<	<	<	<	<	<
Nickel	µg/g	5	130	26.3	25.3	14.3	19.8	21.1	15.3	37.6	29.0	18.3
Selenium	µg/g	1	2.4	<	<	<	<	<	<	<	<	<
Silver	µg/g	0.3	25	<	<	0.3	0.4	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<	<	1.0	<	<	<
Vanadium	µg/g	10	86	38.9	29.8	19.6	26.0	24.5	24.9	43.1	35.4	25.1
Zinc	µg/g	20	340	44.3	51.1	38.0	38.7	201	79.9	55.2	42.9	48.9

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/parkland/institutional property use; established *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

Bolded values exceed the Table 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 its field duplicate, where parameter <MDL, MDL used to calculate average. Note: the duplicate average must exceed the SCS for there to be an exceedance.

*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, Conductivity 10%). The Protocol does not indicate an RPD value for SAR.

** 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 General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH411-1	BH411-4	BH/MW412-3C	Dup AD	Duplicate Average	RPD	BH413-2-C	BH414-2	BH415-4	BH416-2	BH417-5
Sample Depth (m)	0.1-0.8	2.3-2.9	1.5-2.0	Field Duplicate of BH/MW412-3C	BH/MW412-3C and Dup AD	BH/MW412-3C and Dup AD	0.8-1.5	0.8-2.1	2.2-3.0	0.8-2.1	3.0-3.7
Date Collected	8/21/2018	8/21/2018	8/23/2019	8/23/2019			8/27/2018	6/12/2019	6/12/2019	6/11/2019	6/13/2019
Laboratory ID	1834330-01	1834330-02	1834641-01	1834641-02			1835202-01	1924517-03	1924517-01	1924359-04	1924724-02
Date Analyzed - SAR											
Date Analyzed - Conductivity		25/08/2019									
Date Analyzed - pH											
Date Analyzed - Metals	27/08/2018		8/29/2019	8/29/2019			8/30/2019	6/18/2019	6/18/2019	6/18/2019	6/20/2019
Parameter	Units	MDL	Table 3SCS*								
General Inorganics											
SAR	-	0.01	5	-	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	-	-	-	-
pH	pH Units	0.05	+	-	7.8	-	-	-	-	-	-
Metals											
Antimony	µg/g	1	7.5	<	-	<	<	NC	<	<	1.1
Arsenic	µg/g	1	18	3.5	-	3.4	3.5	3.5	NC	3.5	6.7
Barium	µg/g	1	390	133	-	95.7	101	98.4	5%	114	153
Beryllium	µg/g	0.5	5	0.9	-	0.8	0.6	0.7	NC	1.0	1.0
Boron	µg/g	5	120	8.4	-	18.8	12.7	15.8	NC	22.2	21.9
Cadmium	µg/g	0.5	1.2	<	-	<	<	<	NC	<	<
Chromium	µg/g	5	160	23.3	-	20.5	19.8	20.2	NC	21.8	28.9
Cobalt	µg/g	1	22	12.2	-	11.1	10.5	10.8	6%	11.4	13.9
Copper	µg/g	5	180	21.9	-	20.3	19.3	19.8	NC	20.4	13.3
Lead	µg/g	1	120	11.0	-	8.3	9.2	8.8	10%	10.1	11.1
Molybdenum	µg/g	1	6.9	<	-	<	<	<	NC	<	<
Nickel	µg/g	5	130	28.7	-	25.0	24.7	24.9	NC	26.2	29.9
Selenium	µg/g	1	2.4	<	-	<	<	<	NC	<	<
Silver	µg/g	0.3	25	<	-	<	<	<	NC	<	<
Thallium	µg/g	1	1	<	-	<	<	<	NC	<	<
Uranium	µg/g	1	23	<	-	<	<	<	NC	<	<
Vanadium	µg/g	10	86	28.8	-	28.2	27.4	27.8	NC	31.1	40.8
Zinc	µg/g	20	340	69.9	-	48.9	50.1	49.5	NC	55.5	60.7

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m
Bolded values exceed the Table 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; wh
 *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 2f
 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH417-6	BH417-6 Re-Analysis	Duplicate Average	BH417-7	BH418-3C	BH419-1C	BH420-5	Dup-E1 Field Duplicate of BH420-5	Duplicate Average	RPD
Sample Depth (m)	4.6-5.2		BH417-6 and Re-Analysis	6.0-6.7	1.5-2.1	12.2-12.6	3.0-3.7		BH420-5 and Dup E1	BH420-5 and Dup E1
Date Collected	6/13/2019	6/13/2019		6/13/2019	8/24/2019	8/24/2019	6/17/2019	6/17/2019		
Laboratory ID	1924724-01	1924724-01		1924724-03	1835068-01	1835068-02	1925238-01	1925238-02		
Date Analyzed - SAR					30/08/2019					
Date Analyzed - Conductivity					29/08/2019					
Date Analyzed - pH					28/08/2019		6/21/2019			
Date Analyzed - Metals	6/20/2019	6/20/2019		6/20/2019	29/08/2019	29/08/2019	6/24/2019	6/24/2019		
Parameter	Units	MDL	Table 3SCS*							
General Inorganics										
SAR	-	0.01	5	-	-	-	0.19	-	-	-
Conductivity	µS/cm	5	700	-	-	-	383	-	-	-
pH	pH Units	0.05	+	-	-	-	7.8	-	7.4	-
Metals										
Antimony	µg/g	1	7.5	<	1.1	1.1	<	<	<	<
Arsenic	µg/g	1	18	4.7	5.9	5.3	5.6	3.0	2.7	4.0
Barium	µg/g	1	390	107	130	119	168	127	114	94.3
Beryllium	µg/g	0.5	5	0.9	1.0	1.0	0.9	0.8	0.9	<
Boron	µg/g	5	120	17.5	17.8	17.7	20.2	16.4	16.7	10.0
Cadmium	µg/g	0.5	1.2	<	<	<	<	<	<	<
Chromium	µg/g	5	160	25.5	24.5	25.0	29.3	23.3	25.0	16.9
Cobalt	µg/g	1	22	11.9	14.2	13.1	14.3	10.8	11.7	8.5
Copper	µg/g	5	180	19.9	23.8	21.9	13.1	19.9	21.2	14.9
Lead	µg/g	1	120	25.6	26.7	26.2	10.6	9.0	9.2	20.6
Molybdenum	µg/g	1	6.9	1.6	<	1.3	<	<	<	<
Nickel	µg/g	5	130	26.5	31.2	28.9	29.6	25.7	27.5	18.4
Selenium	µg/g	1	2.4	<	<	<	<	<	<	<
Silver	µg/g	0.3	25	0.8	<	0.6	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<	<	<	<
Vanadium	µg/g	10	86	34.3	39.6	37.0	41.1	30.0	32.6	23.6
Zinc	µg/g	20	340	53.4	67.6	60.5	56.2	48.8	49.6	46.1

Notes:
 a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m
Bolded values exceed the Table 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 its field duplicate; wh
 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 2
 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH422-1-C	BH424-1-C	BH425-1	Dup F3	Duplicate Average	RPD	BH425-4	BH426-4
Sample Depth (m)	0.1-0.7	0.8-1.2	0.1-0.8	Field Duplicate of BH425-1	BH425-1 and Dup F3	BH425-1 and Dup F3	2.3-2.9	2.3-2.9
Date Collected	8/22/2018	8/22/2018	6/18/2019	6/21/2019			6/19/2019	6/11/2019
Laboratory ID	1834476-01	1834472-01	1925481-01	1925481-04			1925481-02	1924359-03
Date Analyzed - SAR								
Date Analyzed - Conductivity								
Date Analyzed - pH								
Date Analyzed - Metals	8/28/2018	8/29/2018	6/24/2019	6/24/2019			6/24/2019	6/18/2019
Parameter	Units	MDL	Table 3SCS*					
General Inorganics								
SAR	-	0.01	5	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	-
pH	pH Units	0.05	+	-	-	-	-	-
Metals								
Antimony	µg/g	1	7.5	<	<	<	<	1.3
Arsenic	µg/g	1	18	2.7	3.7	3.9	5.2	5.1
Barium	µg/g	1	390	89.8	107	136	141	114
Beryllium	µg/g	0.5	5	0.7	1.1	<	<	0.7
Boron	µg/g	5	120	8.9	13.0	8.9	10.8	11.3
Cadmium	µg/g	0.5	1.2	<	<	<	<	<
Chromium	µg/g	5	160	20.1	26.4	13.1	16.8	21.7
Cobalt	µg/g	1	22	10.5	12.8	6.7	8.5	12.2
Copper	µg/g	5	180	24.1	23.9	13.2	18.9	21.9
Lead	µg/g	1	120	12.9	9.7	34.3	26.2	9.5
Molybdenum	µg/g	1	6.9	<	<	<	<	<
Nickel	µg/g	5	130	23.5	29.7	15.8	24.5	26.1
Selenium	µg/g	1	2.4	<	<	<	<	<
Silver	µg/g	0.3	25	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<	1.0
Vanadium	µg/g	10	86	27.9	35.4	19.3	23.5	29.5
Zinc	µg/g	20	340	66.1	44.9	40.3	66.5	63.0

Notes:
 a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m
Bolded values exceed the Table 3 SCS.
 µg/g - micrograms per gram, parts per million.
 MDL - method detection limit.
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 Duplicate Average - average of results of sample and it's field duplicate; wh
 NC - RPD not calculable as both values are not greater than 5x the MDL.
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 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH427-2	BH427-3	BH427-3	Duplicate Average	BH427-4	BH 506-1C	BH 506-5C	Dup-500-A	Duplicate Average	RPD
			Re-Analysis			Delineating BH427	Delineating BH427	Delineating BH427		
Sample Depth (m)	0.8-1.2	1.5-2.1		BH427-3 and Re-Analysis	2.3-2.9	0.0-0.6	3.1-3.7	3.1-3.7	BH506-5C and Dup-500-A	BH506-5C and Dup-500-A
Date Collected	6/11/2019	6/11/2019	6/11/2019		6/11/2019	11/26/2020	11/26/2020	11/26/2020		
Laboratory ID	1924359-05	1924359-01	1924359-01		1924359-06	2049348-11	2049348-12	2049348-19		
Date Analyzed - SAR										
Date Analyzed - Conductivity										
Date Analyzed - pH										
Date Analyzed - Metals	8/1/2019	6/18/2019	8/1/2019		8/1/2019	12/4/2020	12/4/2020	12/4/2020		
Parameter	Units	MDL	Table 3SCS*							
General Inorganics										
SAR	-	0.01	5	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	-	-	-
pH	pH Units	0.05	+	-	-	-	-	-	-	-
Metals										
Antimony	µg/g	1	7.5	2.4	2.3	1.5	1.9	1.6	<	<
Arsenic	µg/g	1	18	3.9	5.3	5.0	5.2	5.8	4.6	4.9
Barium	µg/g	1	390	113	132	122	127	108	126	94.7
Beryllium	µg/g	0.5	5	<	0.7	0.8	0.8	0.8	0.6	0.8
Boron	µg/g	5	120	9.5	13.0	14.4	13.7	17.1	9.7	12.5
Cadmium	µg/g	0.5	1.2	<	<	<	<	<	<	<
Chromium	µg/g	5	160	15.5	23.7	17.9	20.8	27.1	17.4	19.9
Cobalt	µg/g	1	22	8.1	12.1	11.3	11.7	12.7	8.8	10.5
Copper	µg/g	5	180	<	22.1	20.5	21.3	13.3	17.6	18.0
Lead	µg/g	1	120	7.9	13.1	10.1	11.6	11.8	7.0	9.3
Molybdenum	µg/g	1	6.9	<	<	<	<	<	<	<
Nickel	µg/g	5	130	16.4	27.1	22.9	25.0	27.8	19.2	21.6
Selenium	µg/g	1	2.4	<	<	<	<	<	<	<
Silver	µg/g	0.3	25	<	<	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<	<	<	<
Vanadium	µg/g	10	86	23.0	32.7	31.9	32.3	36.6	24.5	28.3
Zinc	µg/g	20	340	38.4	63.5	60.0	61.8	64.8	50.5	47.5

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m
Bolded values exceed the Table 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 its field duplicate; wh
 *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 2
 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH 507-1C	BH 507-5C	BH 508-1C	BH 508-5C	BH 509-1C	BH 509-5C	BH427-8	BH428-1	Dup KA	Duplicate Average	RPD			
	Delineating BH427	Delineating BH427	Delineating BH427	Delineating BH427	Delineating BH427	Delineating BH427			Field Duplicate of BH428-1					
Sample Depth (m)	0.0-0.6	3.1-3.7	0.0-0.6	3.1-3.7	0.0-0.6	3.1-3.7	7.6-8.2	0.1-0.8		BH428-1 and Dup KA	BH428-1 and Dup KA			
Date Collected	11/26/2020	11/26/2020	11/26/2020	11/26/2020	11/26/2020	11/26/2020	6/11/2019	6/10/2019	6/10/2019					
Laboratory ID	2049348-13	2049348-14	2049348-15	2049348-16	2049348-17	2049348-18	1924359-02	1924225-01	1924225-02					
Date Analyzed - SAR								6/13/2019	6/13/2019					
Date Analyzed - Conductivity								6/12/2019	6/12/2019					
Date Analyzed - pH								6/12/2019	6/12/2019					
Date Analyzed - Metals	12/4/2020	12/4/2020	12/4/2020	12/4/2020	12/4/2020	12/4/2020	6/13/2019	6/13/2019	6/13/2019					
Parameter	Units	MDL	Table 3SCS*											
General Inorganics														
SAR	-	0.01	5	-	-	-	-	-	0.10	0.08	0.09	22%		
Conductivity	µS/cm	5	700	-	-	-	-	-	315	347	331	10%		
pH	pH Units	0.05	+	-	-	-	-	-	7.4	7.3	7.4	0.1 pH Units		
Metals														
Antimony	µg/g	1	7.5	<	<	<	<	<	-	<	1.2	1.1	NC	
Arsenic	µg/g	1	18	2.3	3.1	4.6	3.2	3.5	3.6	6.9	6.8	6.9	1%	
Barium	µg/g	1	390	37.4	78.5	108	96.0	63.1	46.5	110	117	114	6%	
Beryllium	µg/g	0.5	5	<	<	0.7	<	<	<	0.9	0.9	0.9	NC	
Boron	µg/g	5	120	<	9.4	13.5	8.0	6.5	7.5	-	16.3	16.0	16.2	NC
Cadmium	µg/g	0.5	1.2	<	0.7	<	<	<	<	<	<	<	NC	
Chromium	µg/g	5	160	6.8	15.0	22.8	12.9	10.9	13.0	-	29.0	29.2	29.1	1%
Cobalt	µg/g	1	22	3.9	7.5	11.1	6.9	5.9	7.1	-	14.1	14.2	14.2	1%
Copper	µg/g	5	180	7.3	12.7	19.8	12.8	11.2	11.6	-	28.2	28.1	28.2	0%
Lead	µg/g	1	120	3.7	6.8	11.6	6.5	5.7	4.7	-	20.5	23.0	21.8	11%
Molybdenum	µg/g	1	6.9	<	<	<	<	<	<	-	<	<	<	NC
Nickel	µg/g	5	130	7.9	16.0	23.7	13.8	12.8	14.8	-	36.5	37.3	36.9	2%
Selenium	µg/g	1	2.4	<	<	<	<	<	<	-	<	<	<	NC
Silver	µg/g	0.3	25	<	<	<	<	<	<	-	<	<	<	NC
Thallium	µg/g	1	1	<	<	<	<	<	<	-	<	<	<	NC
Uranium	µg/g	1	23	<	<	<	<	<	<	-	<	<	<	NC
Vanadium	µg/g	10	86	11.2	20.8	31.3	19.7	17.0	19.1	-	38.2	37.8	38.0	NC
Zinc	µg/g	20	340	27.4	155	81.2	45.0	45.7	35.8	-	87.9	86.6	87.3	NC

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m

Bolded values exceed the Table 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 its field duplicate, when

*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 2f

** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH429-2	BH429-3	BH429-4	BH429-5	BH510-1C	BH510-2C	Dup B	Duplicate Average	RPD	BH511-1C	BH511-3C
					Delineating BH429	Delineating BH429	Delineating BH429	Delineating BH429	Delineating BH429	Delineating BH429	Delineating BH429
Sample Depth (m)	0.8-1.2	1.5-2.1	2.3-2.9	3.0-3.7	1.5-2.1	2.3-2.99	Field Duplicate of BH510-2C	BH510-2C & Dup B	BH510-2C & Dup B	1.5-2.1	3.1-3.7
Date Collected	6/25/2019	6/25/2019	6/25/2019	6/25/2019	3/18/2021	3/18/2021	3/18/2021	3/18/2021		3/18/2021	3/18/2021
Laboratory ID	1926322-03	1926322-01	1926322-04	1926322-02	2113114-01	2113114-02	2113114-21			2113114-03	2113114-04
Date Analyzed - SAR											
Date Analyzed - Conductivity											
Date Analyzed - pH											
Date Analyzed - Metals	8/2/2019	7/3/2019	8/2/2019	6/27/2019 7/3/2019	3/24/2021	3/24/2021	3/24/2021			3/24/2021	3/24/2021
Parameter	Units	MDL	Table 3SCS*								
General Inorganics											
SAR	-	0.01	5	-	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	-	-	-	-
pH	pH Units	0.05	+	-	-	7.6	-	-	-	-	-
Metals											
Antimony	µg/g	1	7.5	1.2	9.8	<	<	<	<	NC	<
Arsenic	µg/g	1	18	5.1	5.4	6.4	-	4.3	5.5	4.7	5.1
Barium	µg/g	1	390	119	163	112	-	92.6	196	110	153.0
Beryllium	µg/g	0.5	5	0.9	1.2	0.8	-	0.6	1.2	0.9	1.1
Boron	µg/g	5	120	17.7	20.4	13.9	-	10.8	25.2	16.5	20.9
Cadmium	µg/g	0.5	1.2	<	<	<	-	<	<	<	NC
Chromium	µg/g	5	160	26.7	33.8	26.5	-	18.7	36.7	25.8	31.3
Cobalt	µg/g	1	22	12.7	15.0	14.4	-	10.7	15.3	11.7	13.5
Copper	µg/g	5	180	11.4	24.2	17.7	-	18.6	26.9	22.5	24.7
Lead	µg/g	1	120	11.7	48.2	11.6	-	7.4	11.3	10.6	11.0
Molybdenum	µg/g	1	6.9	<	1.4	<	-	<	<	<	NC
Nickel	µg/g	5	130	27.3	34.5	29.9	-	22.4	38.7	29.4	34.1
Selenium	µg/g	1	2.4	<	<	<	-	<	<	<	NC
Silver	µg/g	0.3	25	<	<	<	-	<	<	<	NC
Thallium	µg/g	1	1	<	<	<	-	<	<	<	NC
Uranium	µg/g	1	23	<	1.2	<	-	<	1.3	<	1.2
Vanadium	µg/g	10	86	37.6	46.5	37.6	-	26.4	50.3	34.5	42.4
Zinc	µg/g	20	340	55.2	70.5	52.1	-	40.1	76.0	63.9	70.0

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m

Bolded values exceed the Table 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, wh

*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 2f

** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH430-2	BH431-1	BH432-1	BH432-2	Dup L-1	Duplicate Average	RPD	BH432-3
Sample Depth (m)	0.8-2.1	0.1-0.8	0.1-0.8	0.8-1.5	Field Duplicate of BH432-2	BH432-2 and Dup L-1	BH432-2 and Dup L-1	1.5-2.1
Date Collected	6/24/2019	6/24/2019	6/26/2019	6/26/2019	6/26/2019			6/26/2019
Laboratory ID	1926320-01	1926320-03	1926593-03	1926593-01	1926593-02			1926593-04
Date Analyzed - SAR								
Date Analyzed - Conductivity								
Date Analyzed - pH								
Date Analyzed - Metals	7/3/2019	7/3/2019	7/4/2019	7/4/2019	7/5/2019			7/4/2019
Parameter	Units	MDL	Table 3SCS*					
General Inorganics								
SAR	-	0.01	5	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	-
pH	pH Units	0.05	+	-	-	-	-	-
Metals								
Antimony	µg/g	1	7.5	1.3	<	<	<	2.4
Arsenic	µg/g	1	18	5.6	5.7	5.1	4.7	3.3
Barium	µg/g	1	390	93.4	84.0	93.4	85.6	87.5
Beryllium	µg/g	0.5	5	0.9	0.9	0.6	0.6	<
Boron	µg/g	5	120	17.4	18.6	13.7	10.0	8.0
Cadmium	µg/g	0.5	1.2	<	<	<	<	<
Chromium	µg/g	5	160	27.9	24.4	20.6	19.1	12.7
Cobalt	µg/g	1	22	13.1	11.8	9.2	9.4	6.6
Copper	µg/g	5	180	22.5	21.8	7.9	18.3	12.5
Lead	µg/g	1	120	34.5	17.7	16.5	11.3	6.7
Molybdenum	µg/g	1	6.9	<	<	<	<	<
Nickel	µg/g	5	130	30.3	26.9	21.9	21.7	14.4
Selenium	µg/g	1	2.4	<	<	<	<	<
Silver	µg/g	0.3	25	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<	<
Vanadium	µg/g	10	86	37.1	33.0	26.3	25.3	17.9
Zinc	µg/g	20	340	66.8	59.2	89.9	52.8	36.7

Notes:
 a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m
Bolded values exceed the Table 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; wh
 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 2t
 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH513-2C	BH513-3C	BH513-5C	BH514-2C	BH514-4C	BH434-1	BH436-1	BH436-2	BH436-2	Duplicate Average
	Delineating BH432	Delineating BH432	Delineating BH432	Delineating BH432	Delineating BH432				Re-Analysis	
Sample Depth (m)	0.8-1.4	1.5-2.1	3.8-4.4	0.8-1.4	2.3-2.9	0.1-0.8	0.1-0.8	0.8-1.2		BH436-2 and Re-Analysis
Date Collected	2113114-05	2113114-06	2113114-07	2113114-11	2113114-12	6/24/2019	6/20/2019	6/20/2019	6/20/2019	
Laboratory ID						1926320-02	1925481-05	1925481-03	1925481-03	
Date Analyzed - SAR										
Date Analyzed - Conductivity										
Date Analyzed - pH										
Date Analyzed - Metals	3/24/2021	3/24/2021	3/24/2021	3/24/2021	3/24/2021	7/3/2019	6/24/2019	6/24/2019	6/24/2019	
Parameter	Units	MDL	Table 3SCS*							
General Inorganics										
SAR	-	0.01	5	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	-	-	-
pH	pH Units	0.05	+	-	-	-	-	-	-	-
Metals										
Antimony	µg/g	1	7.5	<	<	<	<	<	3.7	<
Arsenic	µg/g	1	18	6.4	7.0	3.5	6.2	5.8	5.2	6.7
Barium	µg/g	1	390	92.7	160	199	96.4	161	119	164
Beryllium	µg/g	0.5	5	0.9	1.2	1.2	0.9	0.8	1.1	1.4
Boron	µg/g	5	120	21.2	18.5	25.6	20.1	16.8	14.4	20.4
Cadmium	µg/g	0.5	1.2	<	<	<	<	<	<	<
Chromium	µg/g	5	160	30.4	36.7	35.6	28.5	25.1	27.5	37.6
Cobalt	µg/g	1	22	13.7	14.7	14.1	12.7	13.6	13.8	18.4
Copper	µg/g	5	180	26.0	33.1	24.1	25.3	22.4	26.9	16.3
Lead	µg/g	1	120	8.5	11.0	10.9	8.1	8.2	29.9	14.1
Molybdenum	µg/g	1	6.9	<	<	<	<	<	<	<
Nickel	µg/g	5	130	32.3	37.7	33.9	30.8	30.4	32.3	41.0
Selenium	µg/g	1	2.4	<	<	<	<	<	<	<
Silver	µg/g	0.3	25	<	<	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<	<	<
Uranium	µg/g	1	23	<	<	1.1	<	<	<	<
Vanadium	µg/g	10	86	42.2	52.7	49.8	39.8	36.7	40.5	51.5
Zinc	µg/g	20	340	66.0	71.9	69.1	62.1	55.6	57.5	76.1

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m

Bolded values exceed the Table 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 its field duplicate; wh

*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 2

** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH436-3	BH515-2C Delineating BH436	BH515-3C Delineating BH436	BH515-4C Delineating BH436	BH517-1C Delineating BH436	BH517-3C Delineating BH436	BH438-1	BH439-2-C	BH440-3-C	BH 441-2	BH442-2	BH442-3	BH442-4
Sample Depth (m)	1.5-2.3	2.3-2.9	3.1-3.7	3.8-4.4	1.5-2.1	2.3-2.9	0.1-0.8	0.8-1.2	1.5-2.0	0.8-1.2	0.8-1.2	1.5-2.1	2.3-3.0
Date Collected	6/20/2019	3/19/2021	3/19/2021	3/19/2021	3/19/2021	3/19/2021	6/21/2019	9/12/2018	9/11/2018	6/25/2019	6/20/2019	6/20/2019	6/20/2019
Laboratory ID	1925481-06	2113114-08	2113114-09	211667-01	2113114-13	2113114-14	1926087-01	1837332-01	1837334-01	1926087-05	1927013-01	1926002-01	1927013-02
Date Analyzed - SAR													
Date Analyzed - Conductivity								18/09/2018	18/09/2018		7/3/2019	6/26/2019	7/3/2019
Date Analyzed - pH													
Date Analyzed - Metals	6/24/2019	3/24/2021	3/24/2021	4/20/2021	3/24/2021	3/24/2021	6/28/2019	9/15/2018	9/15/2018	6/28/2019	7/4/2019	6/27/2019	7/4/2019
Parameter	Units	MDL	Table 3 SCS*										
General Inorganics													
SAR	-	0.01	5	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-	310	963	644	-	1310	2690
pH	pH Units	0.05	+	-	-	-	-	-	-	-	-	-	-
Metals													
Antimony	µg/g	1	7.5	2.0	<	<	<	<	<	<	<	<	1.6
Arsenic	µg/g	1	18	7.2	6.5	3.2	5.2	4.6	5.8	7.1	3.4	5.2	10.4
Barium	µg/g	1	390	171	95.6	239	165	90.0	117	196	180	134	125
Beryllium	µg/g	0.5	5	1.2	0.8	1.0	1.1	0.7	0.7	1.6	1.3	1.1	0.9
Boron	µg/g	5	120	27.9	12.9	26.9	24.5	15.2	13.0	12.7	14.4	17.6	12.4
Cadmium	µg/g	0.5	1.2	<	<	<	<	<	<	<	<	<	<
Chromium	µg/g	5	160	34.4	22.7	29.3	30.2	20.6	25.0	38.5	27.1	27.3	28.8
Cobalt	µg/g	1	22	17.0	10.7	12.8	15.6	10.9	11.3	13.9	13.7	15.5	12.8
Copper	µg/g	5	180	15.7	25.5	22.3	24.2	18.0	21.7	28.0	21.3	23.2	32.6
Lead	µg/g	1	120	13.0	6.8	8.7	10.5	6.4	7.4	26.1	10.4	10.1	40.6
Molybdenum	µg/g	1	6.9	<	<	<	<	<	<	<	<	<	<
Nickel	µg/g	5	130	35.9	25.1	30.5	34.4	23.6	25.5	40.6	31.3	32.7	29.7
Selenium	µg/g	1	2.4	<	<	<	<	<	<	<	<	<	<
Silver	µg/g	0.3	25	<	<	<	<	<	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	<	<	<	<	<	<
Uranium	µg/g	1	23	1.3	<	<	<	<	<	1.1	<	<	<
Vanadium	µg/g	10	86	48.6	33.3	42.0	41.6	29.8	33.3	54.0	38.4	38.5	39.3
Zinc	µg/g	20	340	70.0	51.1	63.9	71.1	47.3	55.3	77.3	49.4	53.3	170

Notes:
 a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m.
Bolded values exceed the Table 3 SCS.
 µg/g - micrograms per gram, parts per million.
 MDL - method detection limit.
 c - sample results less than the MDL.
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 Duplicate Average - average of results of sample and it's field duplicate, wh
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Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH442-5	BH518-2C	Dup-C	Duplicate Average	RPD	BH518-5C	BH518-6C	BH519-1C	BH519-3C	BH519-4C
		Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117
Sample Depth (m)	3.0-3.7	2.3-2.9	Field Duplicate of BH518-2C	BH518-2C & Dup-C	BH518-2C & Dup-C	3.1-3.7	5.3-5.9	3.1-3.7	4.6-5.2	5.3-5.9
Date Collected	6/20/2019	3/18/2021	3/18/2021			3/18/2021	3/18/2021	3/18/2021	3/18/2021	3/18/2021
Laboratory ID	1926002-02	2113114-15	2113114-22			2113114-16	2116667-02	2113114-19	2113114-20	2116667-03
Date Analyzed - SAR										
Date Analyzed - Conductivity		25-Mar-21	25-Mar-21			25-Mar-21	21-Apr-21	25-Mar-21	25-Mar-21	21-Apr-21
Date Analyzed - pH	6/25/2019									
Date Analyzed - Metals										
Parameter	Units	MDL	Table 3SCS*							
General Inorganics										
SAR	-	0.01	5	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	-	343	579	461	51%	644	950
pH	pH Units	0.05	+	7.6	-	-	-	-	-	-
Metals										
Antimony	µg/g	1	7.5	-	-	-	-	-	-	-
Arsenic	µg/g	1	18	-	-	-	-	-	-	-
Barium	µg/g	1	390	-	-	-	-	-	-	-
Beryllium	µg/g	0.5	5	-	-	-	-	-	-	-
Boron	µg/g	5	120	-	-	-	-	-	-	-
Cadmium	µg/g	0.5	1.2	-	-	-	-	-	-	-
Chromium	µg/g	5	160	-	-	-	-	-	-	-
Cobalt	µg/g	1	22	-	-	-	-	-	-	-
Copper	µg/g	5	180	-	-	-	-	-	-	-
Lead	µg/g	1	120	-	-	-	-	-	-	-
Molybdenum	µg/g	1	6.9	-	-	-	-	-	-	-
Nickel	µg/g	5	130	-	-	-	-	-	-	-
Selenium	µg/g	1	2.4	-	-	-	-	-	-	-
Silver	µg/g	0.3	25	-	-	-	-	-	-	-
Thallium	µg/g	1	1	-	-	-	-	-	-	-
Uranium	µg/g	1	23	-	-	-	-	-	-	-
Vanadium	µg/g	10	86	-	-	-	-	-	-	-
Zinc	µg/g	20	340	-	-	-	-	-	-	-

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m

Bolded values exceed the Table 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 its field duplicate; wh

*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 2

** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH520-1C	BH520-4C	BH520-5C	BH521-2C	BH521-3C	BH443-2-C	BH444-2C	BH445-1C	BH445-1C	Duplicate Average
	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117	Delineating TP117				Re-Analysis	
Sample Depth (m)	3.1-3.7	5.3-5.9	6.1-6.7	0.8-1.3	1.5-2.1	0.8-2.1	0.8-1.2	0.1-0.8		BH445-1C and Re-Analysis
Date Collected	3/18/2021	3/18/2021	3/18/2021	3/18/2021	3/18/2021	9/10/2018	10/9/2018	7/18/2019	7/18/2019	
Laboratory ID	2113114-23	2113114-24	2116667-04	2113114-17	2113114-18	1837171-01	1837172-01	1929629-02	1929629-02	
Date Analyzed - SAR										
Date Analyzed - Conductivity	25-Mar-21	25-Mar-21	21-Apr-21	25-Mar-21	25-Mar-21					
Date Analyzed - pH										
Date Analyzed - Metals						9/17/2018	9/14/2019	7/24/2019	7/24/2019	
Parameter	Units	MDL	Table 3SCS*							
General Inorganics										
SAR	-	0.01	5	-	-	-	-	-	-	-
Conductivity	µS/cm	5	700	883	2140	1180	495	526	-	-
pH	pH Units	0.05	+	-	-	-	-	-	-	-
Metals										
Antimony	µg/g	1	7.5	-	-	-	-	<	<	2.3
Arsenic	µg/g	1	18	-	-	-	-	3.7	3.7	6.0
Barium	µg/g	1	390	-	-	-	-	91.8	146	194
Beryllium	µg/g	0.5	5	-	-	-	-	0.9	1.0	1.3
Boron	µg/g	5	120	-	-	-	-	15.5	14.9	17.7
Cadmium	µg/g	0.5	1.2	-	-	-	-	<	<	<
Chromium	µg/g	5	160	-	-	-	-	21.3	21.9	38.1
Cobalt	µg/g	1	22	-	-	-	-	10.9	11.3	18.1
Copper	µg/g	5	180	-	-	-	-	19.6	22.1	27.7
Lead	µg/g	1	120	-	-	-	-	10.3	10.6	29.8
Molybdenum	µg/g	1	6.9	-	-	-	-	<	<	<
Nickel	µg/g	5	130	-	-	-	-	24.2	24.8	40.1
Selenium	µg/g	1	2.4	-	-	-	-	<	<	<
Silver	µg/g	0.3	25	-	-	-	-	<	<	<
Thallium	µg/g	1	1	-	-	-	-	<	<	<
Uranium	µg/g	1	23	-	-	-	-	<	<	<
Vanadium	µg/g	10	86	-	-	-	-	30.7	31.5	51.2
Zinc	µg/g	20	340	-	-	-	-	47.5	77.6	79.2

Notes:
 *a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m
Bolded values exceed the Table 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 its field duplicate; wh
 *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 2
 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH 501-1C	BH 501-2C	BH 502-1C	BH 502-2C	BH 503-1C	BH 503-2C	BH445-2D
	Delineating BH445	Delineating BH445	Delineating BH445	Delineating BH445	Delineating BH445	Delineating BH445	
Sample Depth (m)	0.0-0.6	0.8-1.4	0.0-0.6	0.8-1.4	0.0-0.6	0.8-1.4	0.9
Date Collected	11/30/2020	11/30/2020	11/30/2020	11/30/2020	11/30/2020	11/30/2020	7/18/2019
Laboratory ID	2049348-01	2049348-02	2049348-03	2049348-04	2049348-05	2049348-06	1929629-03
Date Analyzed - SAR							
Date Analyzed - Conductivity							
Date Analyzed - pH							
Date Analyzed - Metals	12/4/2020	12/4/2020	12/4/2020	12/4/2020	12/4/2020	12/4/2020	7/24/2019
Parameter	Units	MDL	Table 3SCS*				
General Inorganics							
SAR	-	0.01	5	-	-	-	-
Conductivity	µS/cm	5	700	-	-	-	-
pH	pH Units	0.05	+	-	-	-	-
Metals							
Antimony	µg/g	1	7.5	<	<	<	<
Arsenic	µg/g	1	18	4.0	4.3	6.9	3.8
Barium	µg/g	1	390	106	141	88.3	93.8
Beryllium	µg/g	0.5	5	0.6	0.6	0.6	0.6
Boron	µg/g	5	120	11.6	12.3	11.5	11.9
Cadmium	µg/g	0.5	1.2	<	<	<	<
Chromium	µg/g	5	160	19.8	20.5	17.9	20.4
Cobalt	µg/g	1	22	9.7	10.8	7.6	9.8
Copper	µg/g	5	180	17.6	23.7	16.2	17.3
Lead	µg/g	1	120	8.3	7.9	5.8	7.5
Molybdenum	µg/g	1	6.9	<	<	<	<
Nickel	µg/g	5	130	22.3	22.9	18.8	21.1
Selenium	µg/g	1	2.4	<	<	<	<
Silver	µg/g	0.3	25	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<
Vanadium	µg/g	10	86	27.3	28.4	25.2	28.3
Zinc	µg/g	20	340	55.5	71.0	40.2	43.1

Notes:
 * - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m

Bolded values exceed the Table 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; wh

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 2t

** means as per O. Reg. 153/04 as amended, in order to apply the generic E

Table 2: Summary of Soil Analyses for General Inorganics and Metals

Client: GR (CAN) Investment Company Ltd.
 Site: Proposed Riverfront Development, Niagara Falls, Ontario
 Project: TPB184078 Phase 114

Sample ID	BH446-1D	Dup BB	Dup BB	Duplicate Average	RPD	BH 504-1C	BH 504-2C	BH 505-1C	BH 505-2C	BH447-1D	BH448-1D	BH448-1D	Duplicate Average			
		Field Duplicate of BH446-1D	Re-Analysis			Delineating BH446	Delineating BH446	Delineating BH446	Delineating BH446			Re-Analysis				
Sample Depth (m)	0.2			BH446-1D and Dup BB	BH446-1D and Dup BB	0.0-0.6	0.8-1.4	0.0-0.6	0.8-1.4	0.2	0.2	0.2	BH448-1D and Re-Analysis			
Date Collected	7/18/2019	7/18/2019	7/18/2019			11/26/2020	11/26/2020	11/26/2020	11/26/2020	7/18/2019	7/18/2019	7/18/2019				
Laboratory ID	1930227-01	1930227-05	1930227-05			2049348-07	2049348-08	2049348-09	2049348-10	1930227-02	1930227-03	1930227-03				
Date Analyzed - SAR																
Date Analyzed - Conductivity																
Date Analyzed - pH																
Date Analyzed - Metals	8/1/2019	8/1/2019	8/1/2019			12/4/2020	12/4/2020	12/4/2020	12/4/2020	8/1/2019	8/1/2019	8/1/2019				
Parameter	Units	MDL	Table 3SCS*													
General Inorganics																
SAR	-	0.01	5	-	-	-	-	-	-	-	-	-	-			
Conductivity	µS/cm	700	-	-	-	-	-	-	-	-	-	-	-			
pH	pH Units	0.05	+	-	-	-	-	-	-	-	-	-	-			
Metals																
Antimony	µg/g	1	7.5	<	1.5	2.6	1.7	NC	<	<	<	<	11.9	11.0	11.5	
Arsenic	µg/g	1	18	3.1	6.2	5.5	4.9	NC	3.3	3.5	4.4	4.1	5.7	199	179	189
Barium	µg/g	1	390	72.2	117	109	99.4	8%	74.0	77.0	89.4	125	173	162	122	142
Beryllium	µg/g	0.5	5	<	0.8	0.8	0.7	NC	<	<	0.6	0.7	1.3	1.0	0.9	1.0
Boron	µg/g	5	120	7.3	14.7	14.3	12.1	NC	6.6	9.6	12.5	13.5	18.5	11.1	9.9	10.5
Cadmium	µg/g	0.5	1.2	<	<	<	<	NC	<	<	<	<	<	0.8	0.7	0.8
Chromium	µg/g	5	160	22.0	26.4	19.5	22.6	NC	11.0	15.8	20.2	23.0	37.3	31.5	22.7	27.1
Cobalt	µg/g	1	22	7.8	13.0	12.7	11.2	3%	6.0	8.1	10.1	11.1	17.2	10.8	9.8	10.3
Copper	µg/g	5	180	17.7	22.4	22.1	20.7	NC	10.1	13.8	18.8	18.0	25.1	107	100	104
Lead	µg/g	1	120	8.8	10.8	10.4	10.0	4%	4.4	5.7	10.0	7.1	20.2	153	139	146
Molybdenum	µg/g	1	6.9	<	<	<	<	NC	<	<	<	<	<	5.6	5.0	5.3
Nickel	µg/g	5	130	19.5	28.0	25.7	24.4	NC	12.6	17.4	22.7	24.4	40.5	41.0	36.1	38.6
Selenium	µg/g	1	2.4	<	<	<	<	NC	<	<	<	<	<	1.7	1.5	1.6
Silver	µg/g	0.3	25	<	<	<	<	NC	<	<	<	<	<	<	<	<
Thallium	µg/g	1	1	<	<	<	<	NC	<	<	<	<	<	<	<	<
Uranium	µg/g	1	23	<	<	<	<	NC	<	<	<	<	1.1	<	<	<
Vanadium	µg/g	10	86	28.8	36.2	34.4	33.1	NC	15.9	22.3	28.2	31.6	49.8	27.8	24.5	26.2
Zinc	µg/g	20	340	38.5	59.9	58.2	52.2	NC	31.2	40.1	48.1	50.6	75.7	205	187	196

Notes:
 a - Table 3: Full Depth Generic Site Condition Standards for residential/park of the Environment and Climate Change, 15 April 2011 (MOECC). SCS for m.
Bolded values exceed the Table 3 SCS.
 µg/g - micrograms per gram, parts per million.
 MDL - method detection limit.
 c - sample results less than the MDL.
 - - not applicable or parameter not analyzed.
 Duplicate Average - average of results of sample and its field duplicate, wh
 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 2
 ** means as per O. Reg. 153/04 as amended, in order to apply the generic S

Table 3: Summary of Soil Analyses for BTEX, PHCs, and PAHs

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH410-1	BH404-4-D 8ft	BH406-1-C	BH401-1-D -1ft	BH421-5	BH438-1	Dup - 11	Duplicate Average	RPD	BH438-2	BH441-1	BH441-9	BH431-5	BH445-1D	BH445-1C	BH445-2D	BH446 - 1D	Dup BB	Duplicate Average	RPD	BH447 - 1D	BH448 - 1D	BH448 - 2D
Sample Depth (m)	0.3	2.4	0.1-0.8	0.3	3.1-3.5	0.1-0.8	Field Duplicate of BH438-1	BH438-1 and Dup-11	BH438-1 and Dup-11	0.8-1.5	0.1-0.8	9.1-9.7	3.0-3.7	0.2	0.1-0.8	0.1-0.8	0.2	7/18/2019	BH446-1D and Dup-BB	BH446-1D and Dup-BB	0.2	0.2	0.2
Date Collected	8/21/2018	08/30/2018	9/4/2018	9/10/2018	6/18/2019	6/21/2019	6/23/2019	6/23/2019	6/23/2019	6/22/2019	6/24/2019	6/24/2019	6/24/2019	6/24/2019	7/18/2019	7/18/2019	7/18/2019	7/18/2019	7/18/2019	7/18/2019	7/18/2019	7/18/2019	7/18/2019
Laboratory ID	1834327-01	1835626-02	1836206-02	1837166-01	1931392-01	1926087-01	1926087-03	1926087-03	1926087-03	1926087-02	1926087-04	1926087-06	1926320-04	1929629-01	1929629-02	1929629-03	1930227-01	1930227-05	1930227-05	1930227-01	1930227-03	1930227-04	1930227-04
Date Analyzed - Volatiles	8/28/2018	9/6/2018	-	9/13/2018	8/12/2019	-	28-Jun-19	28-Jun-19	28-Jun-19	28/06/19	28-Jun-19	28-Jun-19	7/3/2019	7/24/2019	7/24/2019	7/24/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019
Date Analyzed - PHCs (F1)	8/28/2018	9/5/2018	9/11/2018	9/13/2018	8/12/2019	-	28-Jun-19	28-Jun-19	28-Jun-19	28/06/19	28-Jun-19	28-Jun-19	7/3/2019	7/24/2019	7/24/2019	7/24/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019
Date Analyzed - PHCs (F2 to F4)	8/28/2018	9/5/2018	9/11/2018	9/11/2018	8/7/2019	-	28-Jun-19	28-Jun-19	28-Jun-19	28/06/19	28-Jun-19	28-Jun-19	7/3/2019	7/24/2019	7/24/2019	7/24/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019	25/07/2019
Date Analyzed - PHCs (F4G gravimetric)	8/28/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7/29/2019	7/29/2019	7/29/2019	7/29/2019	7/29/2019	7/29/2019	7/29/2019
Date Analyzed - PAHs	28/08/2018	-	9/8/2018	9/17/2018	-	28/06/19	28-Jun-19	-	-	-	-	28-Jun-19	-	7/24/2019	7/24/2019	7/24/2019	-	-	-	-	-	-	-
Parameter	Units	MDL	Table 3SCS ^a																				
Volatiles																							
Benzene	µg/g	0.02	0.17	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	µg/g	0.05	15	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Toluene	µg/g	0.05	6	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
m/p-Xylene	µg/g	0.05		<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
p-Xylene	µg/g	0.05		<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Xylenes, total	µg/g	0.05	25	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Hydrocarbons																							
F1 PHCs (C6-C10)	µg/g	7	65	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
F2 PHCs (C10-C16)	µg/g	4	150	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
F3 PHCs (C16-C34)	µg/g	8	1300	<	<	<	<	<	<	<	<	<	<	<	<	<	21	41	31	<	<	<	<
F4 PHCs (C34-C50)	µg/g	6	5600	<	<	<	<	<	<	<	<	<	<	<	<	<	11	60	36	<	<	<	<
F4G PHCs (gravimetric)	µg/g	50		<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
PAHs																							
Acenaphthene	µg/g	0.02	58	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Acenaphthylene	µg/g	0.02	0.17	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Anthracene	µg/g	0.02	0.74	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Benzo[a]anthracene	µg/g	0.02	0.63	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Benzo[a]pyrene	µg/g	0.02	0.3	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	0.03	0.03	<	<	<
Benzo[b]fluoranthene	µg/g	0.02	0.78	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Benzo[k]fluoranthene	µg/g	0.02	7.8	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	0.03	0.03	<	<	<
Benzo[e]pyrene	µg/g	0.02	0.78	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Chrysene	µg/g	0.02	7.8	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Dibenzof[a,h]anthracene	µg/g	0.02	0.1	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Fluoranthene	µg/g	0.02	0.69	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Fluorene	µg/g	0.02	69	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Indeno[1,2,3-cd]pyrene	µg/g	0.02	0.48	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
1-Methylnaphthalene	µg/g	0.02	3.4	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
2-Methylnaphthalene	µg/g	0.02	3.4	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Methylnaphthalene (1&2)	µg/g	0.04	3.4	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Naphthalene	µg/g	0.01	0.75	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Phenanthrene	µg/g	0.02	7.8	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Pyrene	µg/g	0.02	78	<	<	<	<	<	NC	<	<	<	<	<	<	<	<	<	<	<	<	<	<

Notes:
 a - Table 3: Full Depth Generic Site Condition Standards for residential/parkland/institutional 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 and Climate Change, 15 April 2011 (MOECC). SCS for medium to fine textured **Bolded** values exceed the Table 1 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 its field duplicate; where parameter <MDL, MDL used to calculate average. Note: the duplicate average must exceed the SCS for there to be an exceedance.
 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 (PHCs 30%, PAHs 40%, VOCs 30%).

Table 4: Summary of Soil Analyses for OC Pesticides

Client: GR (CAN) Investment Company Ltd.
Site: Proposed Riverfront Development, Niagara Falls, Ontario
Project: TPB184078 Phase 114

Sample ID	BH406-1-D	BH445-1D	BH446 - 1D	Dup BB	Duplicate Average	RPD	BH447 - 1D	BH448 - 1D
Sample Depth (m)	0.3	0.2	0.2				0.2	0.2
Date Collected	9/4/2018	7/18/2019	7/18/2019	7/18/2019			7/18/2019	7/18/2019
Laboratory ID	1836208-01	1929629-01	1930227-01	1930227-05			1930227-02	1930227-03
Date Analyzed - OC Pesticides	9/6/2018	7/29/2019	7/29/2019	7/29/2019			7/29/2019	7/29/2019
Parameter	Units	MDL	Table 3 SCS*					
OC Pesticides								
2,4'-DDD	µg/g	0.009	-	<	<	<	<	<
2,4'-DDE	µg/g	0.009	-	<	<	<	<	<
2,4'-DDT	µg/g	0.009	-	<	<	<	<	<
4,4'-DDD	µg/g	0.009	-	<	<	<	<	<
4,4'-DDE	µg/g	0.009	-	<	<	<	<	<
4,4'-DDT	µg/g	0.009	-	<	<	<	<	<
Aldrin	µg/g	0.009	0.05	<	<	<	<	<
DDD (Total)	µg/g	0.009	3.3	<	<	<	<	<
DDE (Total)	µg/g	0.009	0.26	<	<	<	<	<
DDT (Total)	µg/g	0.009	1.4	<	<	<	<	<
Dieldrin	µg/g	0.009	0.05	<	<	<	<	<
Endosulfan I	µg/g	0.009	-	<	<	<	<	<
Endosulfan I + II	µg/g	0.009	0.04	<	<	<	<	<
Endosulfan II	µg/g	0.009	-	<	<	<	<	<
Endosulfan sulfate	µg/g	0.009	-	<	<	<	<	<
Endrin	µg/g	0.009	0.04	<	<	<	<	<
Endrin aldehyde	µg/g	0.009	-	<	<	<	<	<
Heptachlor	µg/g	0.009	0.15	<	<	<	<	<
Heptachlor epoxide	µg/g	0.009	0.05	<	<	<	<	<
Hexachlorobenzene	µg/g	0.009	0.52	<	<	<	<	<
Hexachlorobutadiene	µg/g	0.009	0.014	<	<	<	<	<
Hexachloroethane	µg/g	0.009	0.071	<	<	<	<	<
Methoxychlor	µg/g	0.009	0.13	<	<	<	<	<
Mirex	µg/g	0.009	-	<	<	<	<	<
Oxychlorodane	µg/g	0.009	-	<	<	<	<	<
β-BHC	µg/g	0.009	-	<	<	<	<	<
α - Chlordane	µg/g	0.009	-	<	<	<	<	<
α + γ -Chlordane	µg/g	0.009	0.05	<	<	<	<	<
β-BHC	µg/g	0.009	-	<	<	<	<	<
γ - Chlordane	µg/g	0.009	-	<	<	<	<	<
γ-BHC (Lindane)	µg/g	0.009	0.01	<	<	<	<	<
δ-BHC	µg/g	0.009	-	<	<	<	<	<

Notes:
 * - Table 3: Full Depth Generic Site Condition Standards for residential/parade/institutional 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 and Climate Change, 15 April 2011 (MOECC). SCS for medium to fine textured soils utilized.

Bolded values exceed the Table 1 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.

<MDL, MDL used to calculate average. Note: the duplicate average must exceed the SCS for there to be an exceedance.

"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 (OCs 40%).

APPENDIX A

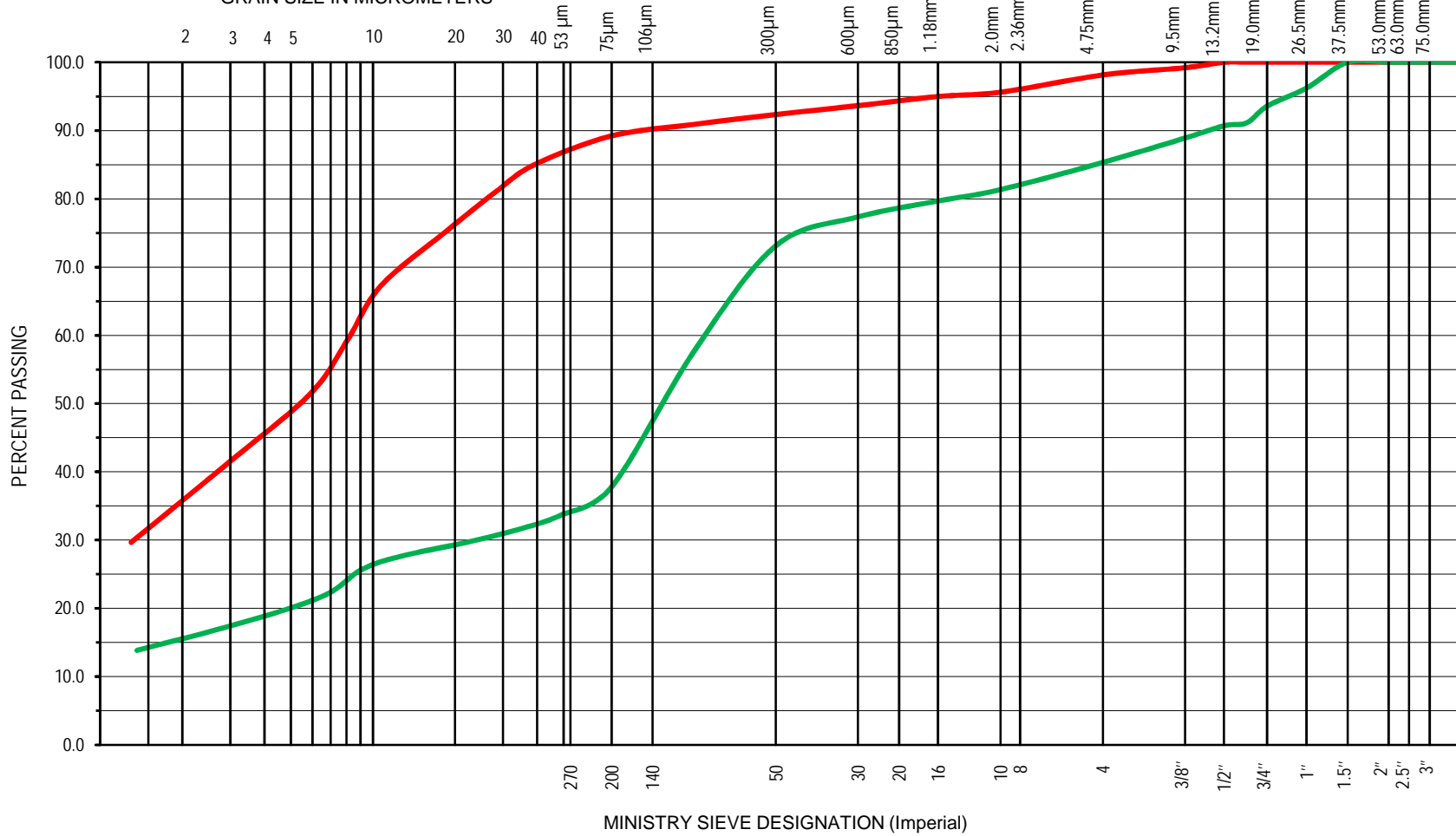
GRAIN SIZE ANALYSIS, BOREHOLE/MONITORING WELL & TESTPIT LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



— TP 112- 6 & 108-4

— TP 119-4 & 121-4

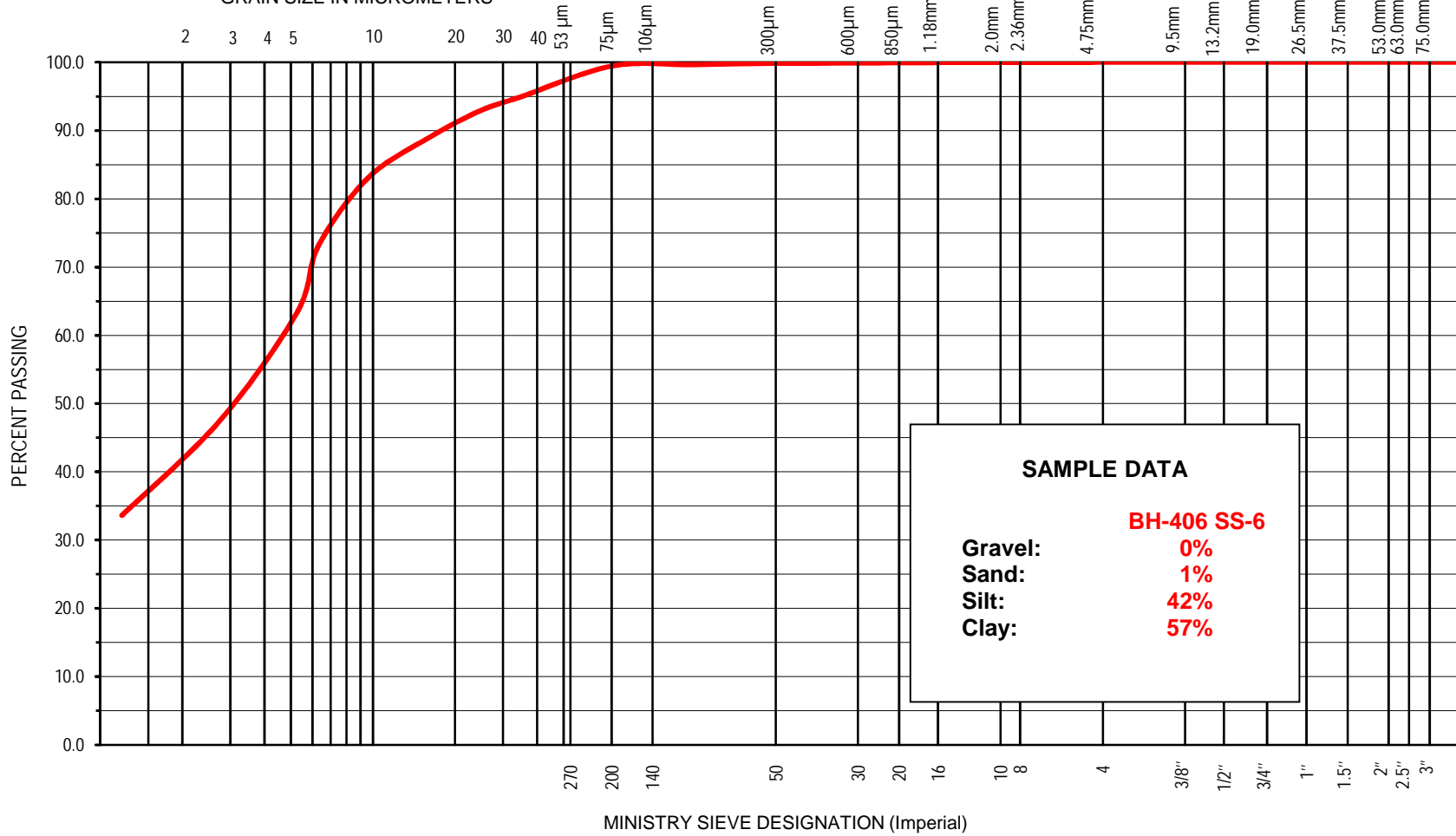
CLIENT <p style="text-align: center;">GR (CAN) Investments Co. Ltd.</p>	PREPARED BY <p style="text-align: center;">AM</p>	PROJECT <p style="text-align: center;">Riverfront Development</p>	DATE <p style="text-align: center;">March 18, 2016</p>
Wood Environment & Infrastructure Solutions 3300 Merrittville Highway, Unit #5 Thorold, Ontario 	CHECKED BY <p style="text-align: center;">PS</p>	TITLE <p style="text-align: center;">Grain Size Distribution</p>	PROJECT NO <p style="text-align: center;">TG151118</p>
			FIGURE NO

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



SAMPLE DATA

BH-406 SS-6

Gravel: 0%

Sand: 1%

Silt: 42%

Clay: 57%

— BH-406
SS-6

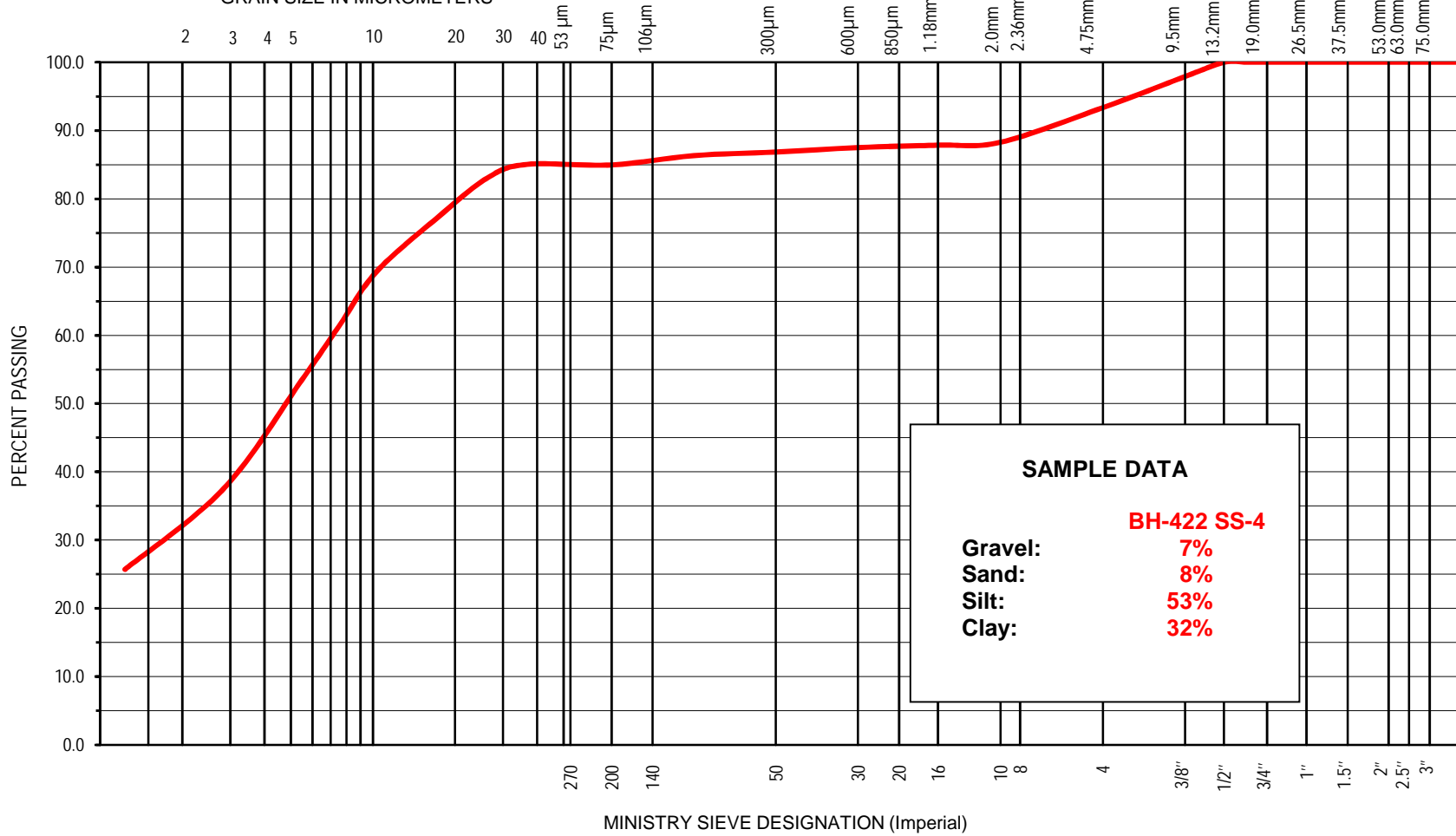
CLIENT <p style="text-align: center;">Riverfront Community</p>		PREPARED BY <p style="text-align: center;">AM</p>	PROJECT <p style="text-align: center;">Geotechnical Investigation Riverfront Community Niagara Falls, Ontario</p>	DATE <p style="text-align: center;">July 18, 2019</p>
Wood Environment & Infrastructure Solutions 3300 Merrittville Highway, Unit #5 Thorold, Ontario 		CHECKED BY <p style="text-align: center;">TR</p>	TITLE <p style="text-align: center;">Grain Size Distribution</p>	
				PROJECT NO <p style="text-align: center;">TPB184078</p>
				FIGURE NO

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



— BH-422
SS-4

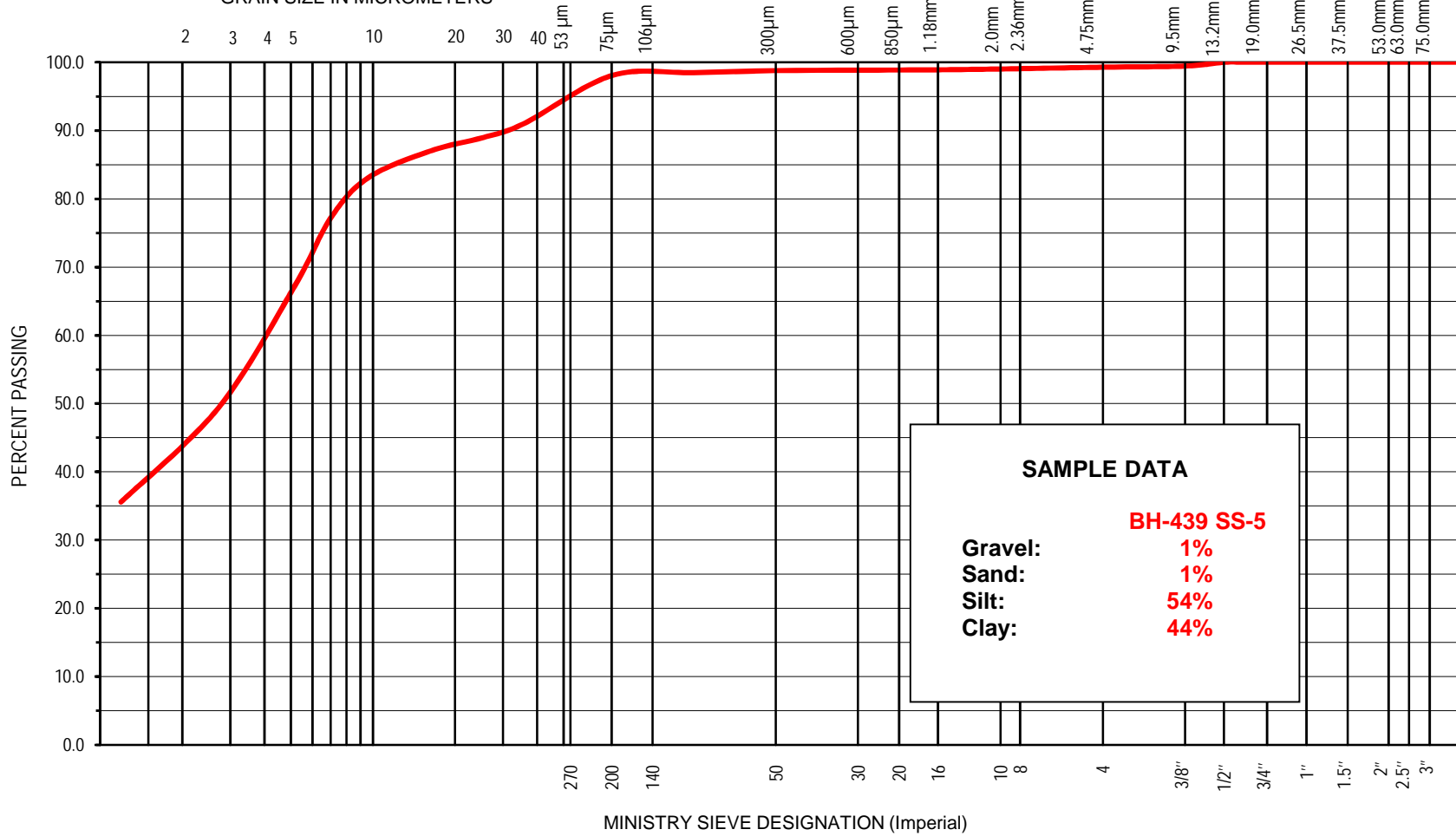
CLIENT <p style="text-align: center;">Riverfront Community</p>		PREPARED BY <p style="text-align: center;">AM</p>	PROJECT <p style="text-align: center;">Geotechnical Investigation Riverfront Community Niagara Falls, Ontario</p>		DATE <p style="text-align: center;">July 18, 2019</p>
Wood Environment & Infrastructure Solutions 3300 Merrittville Highway, Unit #5 Thorold, Ontario 		CHECKED BY <p style="text-align: center;">TR</p>	TITLE <p style="text-align: center;">Grain Size Distribution</p>		PROJECT NO <p style="text-align: center;">TPB184078</p>
					FIGURE NO

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



SAMPLE DATA	
	BH-439 SS-5
Gravel:	1%
Sand:	1%
Silt:	54%
Clay:	44%

— BH-439
SS-5

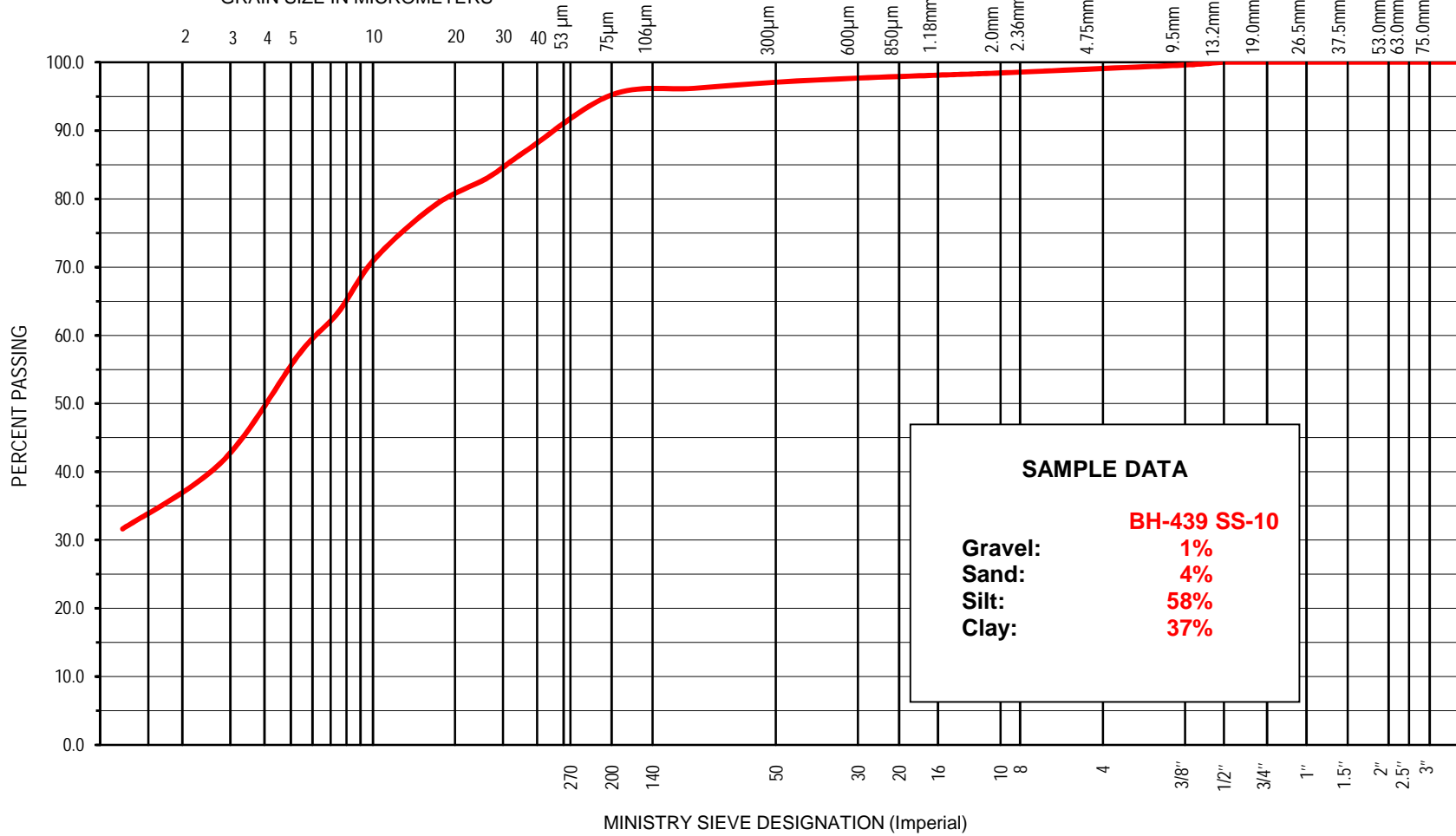
CLIENT <p style="text-align: center;">Riverfront Community</p>	PREPARED BY <p style="text-align: center;">AM</p>	PROJECT Geotechnical Investigation Riverfront Community Niagara Falls, Ontario	DATE <p style="text-align: center;">July 18, 2019</p>
Wood Environment & Infrastructure Solutions 3300 Merrittville Highway, Unit #5 Thorold, Ontario 	CHECKED BY <p style="text-align: center;">TR</p>	TITLE <p style="text-align: center;">Grain Size Distribution</p>	PROJECT NO <p style="text-align: center;">TPB184078</p>
			FIGURE NO

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

MINISTRY SIEVE DESIGNATION (Metric)

GRAIN SIZE IN MICROMETERS



SAMPLE DATA

BH-439 SS-10

Gravel: 1%

Sand: 4%

Silt: 58%

Clay: 37%

— BH-439
SS-10

CLIENT <p style="text-align: center;">Riverfront Community</p>		PREPARED BY <p style="text-align: center;">AM</p>	PROJECT <p style="text-align: center;">Geotechnical Investigation Riverfront Community Niagara Falls, Ontario</p>	DATE <p style="text-align: center;">July 18, 2019</p>
Wood Environment & Infrastructure Solutions 3300 Merrittville Highway, Unit #5 Thorold, Ontario		CHECKED BY <p style="text-align: center;">TR</p>	TITLE <p style="text-align: center;">Grain Size Distribution</p>	PROJECT NO <p style="text-align: center;">TPB184078</p>
				FIGURE NO

RECORD OF MONITORING WELL No. **BH/MW-101**

Project Number: **TG151118** Drilling Method: **100 mm Direct Push**
 Project Client: **GR (CAN) Investments Co. Ltd.** Drilling Machine: **Geoprobe 7822 DT**
 Project Name: **Phase Two Environmental Site Assessment** Date Started: **3 Dec 15** Date Completed: **3 Dec 15**
 Project Location: **Proposed Thundering Waters Subdivision** Logged by: **DN** Compiled by: **DN**
 Drilling Location: **4768139N; 653800E** Reviewed by: **PS** Revision No.: **0, 22/3/16**



Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	DEPTH (m)	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	Penetration Testing ○ SPT ● DCPT	* Combustible Organic Vapour (ppm)	* Combustible Organic Vapour (%LEL)	△ Total Organic Vapour (ppm)			
	Local Ground Surface Elevation: 180.8 m													
	100 mm TOPSOIL	180.7												
	Brown SILTY CLAY FILL trace sand, gravel, rootlets dtp	0.1												
				SS	1	17	N/A							
		180												
		179.3												
	Brown SILTY SAND FILL saturated	1.5												
		179.1		SS	2A	100	N/A							
	Brown SILTY CLAY FILL trace sand seams	1.7												
				SS	2B	31	N/A							
		179												
		177.7												
	Brown SILTY SAND FILL saturated	3.0												
				SS	3A	100	N/A							
		177												
		176.4												
	Brown PEAT / ORGANICS trace rootlets saturated	4.4												
		176.2		SS	3B	100	N/A							
	Brown SILTY CLAY trace sand seams	4.6												
				SS	4	60	N/A							
		176												
		174.7												
	BOREHOLE TERMINATED	6.1												

Sample BH/MW-101 SS1 submitted for laboratory analysis for metals and inorganics, pH, EC, and SAR.

Sample BH/MW-101 SS2A submitted for laboratory analysis for PHC (F1-F4) and BTEX.

Upon Completion: Borehole remained open and water level 5.18± mbgs.
 Monitoring Well Installation: 3.2cm diameter schedule 40 pipe with 3.0m length #10 mil slotted screen, stick-up casing. No evidence of free flowing product.

Amec Foster Wheeler
Environment & Infrastructure
 3300 Merrittville Hwy, Unit 5
 Thorold, Ontario L2V 4Y6
 Tel: (905) 687-6616
 Fax: (905) 687-6620
 www.amecfw.com

∇ Groundwater depth encountered on completion of drilling: **5.2 m.**
 ∇ Groundwater depth observed on **01/20/2016** at a depth of: **3.1 m.**

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 : 36
 Page: 1 of 1

RECORD OF MONITORING WELL No. **BH/MW-102**

Project Number: **TG151118** Drilling Method: **100 mm Direct Push**
 Project Client: **GR (CAN) Investments Co. Ltd.** Drilling Machine: **Geoprobe 7822 DT**
 Project Name: **Phase Two Environmental Site Assessment** Date Started: **2 Dec 15** Date Completed: **2 Dec 15**
 Project Location: **Proposed Thundering Waters Subdivision** Logged by: **DN** Compiled by: **DN**
 Drilling Location: **4767866N; 654080E** Reviewed by: **PS** Revision No.: **0, 22/3/16**



**amec
foster
wheeler**

LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Local Ground Surface Elevation: 183.0 m										
100 mm TOPSOIL	SS	1A	100	N/A		182.9		20		Sample BH/MW-102 SS1A submitted for laboratory analysis for metals and inorganics, pH, EC, and SAR.
Brown SILTY CLAY FILL trace gravel dtpI						0.1 182.6 0.4		0.0		
Brown SILTY CLAY trace sand, gravel, shale pieces dtpI	SS	1B	78	N/A	1	182		20 0.0		
					2	181				
grey dtpI-apI	SS	2	57	N/A		180.7 2.3		10 0.0		
					3	180				
apl-wtpl						180.0 3.0				
	SS	3	12	N/A	4	179		0 2.0		Sample BH/MW-102 SS3 submitted for laboratory analysis for PHC (F1-F4) and BTEX.
					5	178				
	SS	4	12	N/A				1.0 230		
					6	177				
BOREHOLE TERMINATED						176.9 6.1				Upon Completion: Borehole remained open and dry. Monitoring Well Installation: 3.2cm diameter schedule 40 pipe with 3.0m length #10 mil slotted screen, stick-up casing. No evidence of free flowing product.

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 www.amecfw.com

∇ No freestanding groundwater measured in open borehole on completion of drilling.
 ∇ Groundwater depth observed on 01/20/2016 at a depth of: 3.7 m.

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 : 36

Page: 1 of 1

Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP101

Ground Surface Elevation: 181.52 m

UTM Co-ordinates: 653842 E, 4768127 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
	0.5	100 / 0	No odours or staining.	0-0.15	Brown Topsoil
	1.0	90 / 0		0.15-1.0	Fill: Brown Silty Clay with organics
	1.5	70 / 0		1.0-2.0	Fill: Brown Silty Clay, trace sand and medium gravel with small medium cobbles
	2.0	65 / 1			
TP101-5 (Metals & pH)	2.5	85 / 0		2-2.5	Fill: Grey Silty Sand.
	3.0	70 / 0		2.5-3.0	Grey Silty Clay trace fine gravel, wtpl

Upon completion: Testpit open and dry @3.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

..

Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP102

Ground Surface Elevation: 180.58 m

UTM Co-ordinates: 653854 E, 4768193 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP102-1 (Metals)	0.5	--	No odours or staining.	0-0.0.5	Brown Silty Clay Topsoil
	1.0	--		0.5-1.0	Fill: Brown Silty Clay with organics, dtpl
	1.5	--		1.0-1.5	Brown Silty Clay with grey seams and trace fine/medium gravel, dtpl/apl

Upon completion: Testpit open and dry @1.5m.

TESTPIT LOG: TP103

Ground Surface Elevation: 181.87 m

UTM Co-ordinates: 653712 E, 4768090 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP103-1 (Metals)	0.5	75 / 0	No odours or staining.	0-0.15	Fill: Brown Silty Clay Topsoil over brown Silty Clay, trace organics, dtpl
	1.0	30 / 0		0.15-1.5	Brown Silty Clay , trace fine gravel with grey seams, dtpl/apl
	1.5	35 / 0			

Upon completion: Testpit open and dry @1.5m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

..

Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP104

Ground Surface Elevation: 180.75 m

UTM Co-ordinates: 653702 E, 4767932 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP104-1 (Metals)	0.5	95 / 0	No odours or staining.	0-0.1.5	Fill: Topsoil over brown Silty Clay with trace organics, trace fine gravel, dtpl
	1.0	90 / 1		1.5-2	Brown/Grey Silty Clay trace fine gravel, dtpl/apl
	1.5	75 / 1		2-2.5	Brown/Grey Silty Clay trace fine gravel, some greenish streaks at 2m, dtpl/apl
	2.0	95 / 1			
	2.5	80 / 0		2.5-3	Brown/Grey Silty Clay trace fine gravel, no streaks, dtpl/apl
	3.0	85 / 0			

Upon completion: Testpit open and dry @3.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

..

Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP105

Ground Surface Elevation: 182.36 m

UTM Co-ordinates: 653746 E, 4767997 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP105-1 (Metals)	0.5	125 / 0	No odours or staining.	0-2.0	Fill: Brown Silty Clay with medium gravel and rounded cobbles, dtpl/apl
	1.0	130 / 0		2.0-3.0	Brown Silty Clay with trace fine/medium gravel, dtpl/apl
	1.5	85 / 0			
	2.0	80 / 0			
	2.5	70 / 0			
	3.0	80 / 0			

Upon completion: Testpit open and dry @3.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

..

Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP106

Ground Surface Elevation: 183.38 m

UTM Co-ordinates: 653925 E, 4768000 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP106-1 (Metals)	0.5	45 / 0	No odours or staining.	0-0.3	Topsoil
	1.0	50 / 0		0.3-1.0	Fill: Brown Silty Clay with organics over brown Silty Clay with fine/medium gravel with organics, dtpl
	1.5	55 / 0		1.0-2.0	Brown/Grey Silty Clay trace fine gravel, dtpl
	2.0	20 / 0			

Upon completion: Testpit open and dry @2.0m.

TESTPIT LOG: TP107

Ground Surface Elevation: 181.50 m

UTM Co-ordinates: 653900 E, 4767883 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP107-1 (Metals)	0.5	95 / 0	No odours or staining.	0-1.0	Fill: Silty Clay with fine/medium gravel, trace organics, rounded cobbles
	1.0	75 / 0		1.0-2.0	Brown Silty Clay trace fine/medium gravel
	1.5	80 / 0			
	2.0	75 / 0			

Upon completion: Testpit open and dry @2.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP108

Ground Surface Elevation: 181.62 m

UTM Co-ordinates: 653989 E, 4767858 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP108-1 (Metals)	0.5	160 / 0	No odours or staining.	0-0.3	Topsoil
	1.0	175 / 0		0.3-2.0	Brown Silty Clay trace fine gravel, dtpl
	1.5	145 / 0			
	2.0	140 / 0			

Upon completion: Testpit open and dry @2.0m.

TESTPIT LOG: TP109

Ground Surface Elevation: 180.65 m

UTM Co-ordinates: 654015 E, 4767792 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
	0.5	80 / 0	No odours or staining.	0-0.3	Fill: Brown Topsoil over brown Silty Clay with trace organics, trace fine/medium gravel
TP109-2 (Metals)	1.0	90 / 0		0.3-1.0	Brown Silty Clay , brown,, some aquatic shells between 0.5-1.0 m
	1.5	60 / 0		1.0-2.0	Brown Silty Clay , trace fine/medium sand, dtpl
	2.0	45 / 0			

Upon completion: Testpit open and dry @2.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

..

TESTPIT LOG: TP110

Ground Surface Elevation: 180.65 m

UTM Co-ordinates: 654109 E, 4767748 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP110-1C (Metals & PAHs)	0.5	75 / 0	No odours or staining.	0-0.3	Fill: Topsoil, brown
	1.0	30 / 0		0.3-1.0	Fill: Silty Clay, brown, with trace medium sand, dtpl, some aquatic shells between 0.5-1.0 m
	1.5	35 / 0		1.0-2.0	Brown Silty Clay , trace fine/medium sand, dtpl
	2.0	5 / 0			

Upon completion: Testpit open and dry @2.0m.

TESTPIT LOG: TP111

Ground Surface Elevation: 181.81 m

UTM Co-ordinates: 654121 E, 4767832 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP111-1 (Metals)	0.5	0 / 0	No odours or staining.	0-0.3	Topsoil
	1.0	50 / 0		0.3-2.0	Brown Silty Clay , trace fine/medium gravel, dtpl/apl
	1.5	45 / 0			
	2.0	20 / 0			

Upon completion: Testpit open and dry @2.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP112

Ground Surface Elevation: 183.40 m

UTM Co-ordinates: 654039 E, 4767903 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
	0.5	50 / 1	No odours or staining.	0-0.3	Fill: Brown Topsoil over Silty Clay with trace sand and gravel with cobbles, dtpl/apl
TP112-2D (Metals, PAHs, Hg & Cr VI) DUPG (PAHs, Hg & Cr VI)	1.0	35 / 0		0.3-2.5	Fill: Silty Clay with trace sand and gravel with cobbles, dtpl/apl
	1.5	45 / 0		2.5-3.0	Grey/Brown Silty Clay trace fine gravel, dtpl/apl
	2.0	50 / 0			
	2.5	40 / 0			
	3.0	35 / 0			

Upon completion: Testpit open and dry @3.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP113

Ground Surface Elevation: 179.73 m

UTM Co-ordinates: 653712 E, 4767808 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP113-1 (Metals)	0.5	110 / 0	No odours or staining.	0-3.5	Fill: Brown, Silty Clay, some sand with medium loose gravel, large cobbles throughout, moist
	1.0	170 / 0			
	1.5	155 / 0			
	2.0	75 / 1			
	2.5	155 / 0			
	3.0	85 / 1			
TP113-7 (Metals, VOCs, PHCs, Hg, Cr VI & PAHs)	3.5	140 / 1		3.5-4.0	Grey Silty Clay dark organic layer
	4.0	75 / 0			

Upon completion: Testpit open with water in bottom @4.0m. (Hole is caving)

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP114

Ground Surface Elevation: 180.26 m

UTM Co-ordinates: 654758 E, 4768071 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP114-1 & DUPA (Metals, pH, EC & SAR)	0.5	80 / 0	Gradual Moisture Increase w/Depth	0-1.5	Fill: Brown Silty Clay, trace organics, dtpl
	1.0	85 / 0			
	1.5	80 / 0		1.5-4.0	Fill: Brown Silty Clay, trace organics, trace fine gravel
	2.0	130 / 1			
	2.5	110 / 0			
	3.0	90 / 0			
	3.5	90 / 1			
	4.0	95 / 0			

Upon completion: Testpit open and dry @4.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP115

Ground Surface Elevation: 181.68 m

UTM Co-ordinates: 654835 E, 4768145 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP115-1 (Metals)	0.5	80 / 0	Gradual Moisture Increase w/Depth	0-1.0	Fill: Brown Silty clay, trace organics, trace fine gravel, dtpl
	1.0	110 / 0		1.0-4.0	Fill: Brown/Grey Silty clay, trace organics, trace fine gravel, dtpl
	1.5	100 / 0			
	2.0	95 / 1			
	2.5	80 / 0			
	3.0	120 / 0			
	3.5	95 / 0			
	4.0	95 / 1			

Upon completion: Testpit open and dry @4.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP116

Ground Surface Elevation: 182.05 m

UTM Co-ordinates: 654756 E, 4768169 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
	0.5	195 / 1	Slight Moisture	0-4.0	Fill: Brown Silty Clay with trace organics, and trace fine/medium gravel, dtpl
TP116-2 (Metals)	1.0	200 / 0			
	1.5	150 / 1			
	2.0	110 / 0			
	2.5	135 / 0			
	3.0	95 / 0			
	3.5	90 / 0			
	4.0	85 / 0			

Upon completion: Testpit open and dry @4.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP117

Ground Surface Elevation: 176.78 m

UTM Co-ordinates: 654717 E, 4768075 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
	0.5	125 / 1	No odours or staining.	0-1.5	Fill: Brown Silty Clay with trace organics, trace fine/medium gravel, dtpl
	1.0	135 / 1			
TP117-3 & DUPC (Metals, pH, EC & SAR)	1.5	175 / 0		1.5-2.5	Fill: Brown Silty Clay, fissured with some grey seams
	2.0	135 / 1			
	2.5	115 / 1			
	3.0	100 / 1			
	3.5	135 / 0			
	4.0	85 / 0			
				2.5-4.0	Brown/Grey Silty Clay , trace fine gravel, dtpl

Upon completion: Testpit open and dry @4.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP118

Ground Surface Elevation: 173.20 m

UTM Co-ordinates: 654729 E, 4767983 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP118-1 (Metals)	0.5	200 / 0	No odours or staining.	0-0.20	Topsoil over brown Silty Clay, trace fine gravel, dtpl
	1.0	190 / 0		0.20-3.0	Brown Silty Clay trace fine gravel
	1.5	95 / 0			
	2.0	60 / 1			
	2.5	115 / 1			
	3.0	190 / 1			

Upon completion: Testpit open and dry @3.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP119

Ground Surface Elevation: 180.03 m

UTM Co-ordinates: 653842 E, 4767813 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP119-1C (Metals)	0.5	55 / 1	No odours or staining.	0-2.0	Fill: Brown Silty Clay with sand and gravel, and rounded cobbles, dtpl/apl
	1.0	30 / 1			
	1.5	30 / 2			
	2.0	60 / 0		2.0-3.5	Fill: Brown Silty Sand, saturated
	2.5	25 / 0			
	3.0	45 / 1			
	3.5	90 / 1		3.5-4.0	Brown/Green Silty Clay with trace sand and organics
TP119-8D (PHCs & BTEX) TP119-8C (Metals, pH, EC, SAR, Hg & Cr VI)	4.0	70 / 0			

Upon completion: Caving @ 4.0m (Terminated)

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP120

Ground Surface Elevation: 180.19 m

UTM Co-ordinates: 653852 E, 4767840 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP120-1 (Metals)	0.5	60 / 1	No odours or staining.	0-0.30	Topsoil with organics, dtpl
	1.0	85 / 0		0.30-1.5	Brown Silty Clay trace fine gravel, dtpl
	1.5	80 / 0			

Upon completion: Testpit open and dry @1.5m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Phase Two Environmental Site Assessment
 Site Location: Thundering Waters, Niagara Falls, Ontario
 Job Number: TG151118
 Date: December 8, 9 & 18, 2015



TESTPIT LOG: TP121

Ground Surface Elevation: 179.24 m

UTM Co-ordinates: 653878 E, 4767855 N

Sample			Comments (odour, staining, moisture, etc.)	Stratigraphy	
Number & Lab Analyses	Depth (mbgs)	COV/TOV (ppm)		Depth (mbgs)	Material Description
TP121-1 (Metals)	0.5	175 / 0	No odours or staining.	0-2.5	Fill: Silty Clay, trace fine/medium gravel, organics, dtpl
	1.0	135 / 0			
	1.5	135 / 0			
	2.0	--			
TP121-5 (Metals, PHCs, BTEX, PAHs, Hg & Cr VI)	2.5	220 / 0		2.5-3.0	Silty Clay with occasional organic layer, dtpl/apl
	3.0	230 / 0			

Upon completion: Testpit open and dry @3.0m.

Testpits excavated with CAT 420F Backhoe

Originated & compiled by: MS
 Checked By: PS

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million

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Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP201

(654015, 4767794)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP201-2 (metals)	1.0	No odours or staining	-	0-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP201-3 (metals)	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Possible Native, DTPL

Upon completion: Open and dry at 1.5 mbgs.

TESTPIT LOG: TP202

(654015, 4767797)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP202-2 + Dup AA (metals)	1.0	No odours or staining	-	0-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL/APL
TP202-3 (metals)	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.5 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP203

(654018, 4767796)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP203-2 (metals)	1.0	No odours or staining	-	0-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP203-3 (metals)	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, Mottled, DTPL

Upon completion: Open and dry at 1.5 mbgs.

TESTPIT LOG: TP204

(654011, 4767797)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP204-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Fine Gravel, DTPL
TP204-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP205

(654010, 4767789)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP205-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP205-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Possible Native, Fissured, DTPL

Upon completion: Open and dry at 1.0 mbgs.

TESTPIT LOG: TP206

(654020, 4767788)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP206-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Fine Gravel, DTPL
TP206-2 (metals)	1.0	No odours or staining.	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP207

(653801, 4768142)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
-	-	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Sand, Trace Organics, DTPL
Composite TP207 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine Gravel, Trace Organics, DTPL
	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.5 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP208

(653799, 4768142)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
Composite TP208 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Some Medium Rounded Gravel, Medium Rounded Cobbles
	1.0	No odours or staining		0.5-1.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Some Medium Rounded Gravel, Medium Rounded Cobbles
	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Some Medium Rounded Gravel, Medium Rounded Cobbles
TP208-4 + Dup AC (metals)	2.0	No odours or staining	-	1.5-2.0	Brown/Grey, Silty Clay/Clayey Silt, Possible Native, APL/WTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP209

(653795, 4768140)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
Composite TP209 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Medium/Large Rounded Cobbles
	1.0	No odours or staining		0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Medium/Large Rounded Cobbles
	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Medium/Large Rounded Cobbles
TP209-4 (metals)	2.0	No odours or staining	-	1.5-2.0	Brown/Grey, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, APL/WTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP210

(653799, 4768145)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
Composite TP210 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine Gravel, Trace Organics, DTPL
	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.5 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP211

(653804, 4768143)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP211-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine Gravel, Trace Organics, DTPL
TP211-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown Clayey Silt, Possible Native, Fissured, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP212

(653800, 4768135)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
Composite TP212 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Medium Rounded Cobbles
	1.0	No odours or staining		0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Medium/Large Rounded Cobbles
	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Sand, Medium/Large Rounded Cobbles
TP212-4 (metals)	2.0	No odours or staining	-	1.5-2.0	Brown/Grey, Silty Clay/Clayey Silt, Possible Native, APL/WTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP213

(653715, 4768089)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP213-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP213-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, Mottled, DTPL

Upon completion: Open and dry at 1.0 mbgs.

TESTPIT LOG: TP214

(653713, 4768092)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP214-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP214-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP215

(653711, 4768094)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
Composite TP215 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Rounded Gravel, Trace Organics, DTPL
	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Rounded Gravel, Trace Organics, DTPL
TP215-3 (metals)	1.5	No odours or staining	-	1.0-1.5	Brown, Silty Clay/Clayey Silt, Possible Native, Mottled, DTPL

Upon completion: Open and dry at 1.5 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP216

(653718, 4768092)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP216-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine/Medium Gravel, Trace Organics, DTPL
TP216-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

TESTPIT LOG: TP217

(653716, 4768085)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP217-1 (metals)	0.5	No odours or staining	-	0-0.5	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine/Medium Gravel, Trace Organics, DTPL
TP217-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine/Medium Gravel, Trace Organics, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 21, 2016



TESTPIT LOG: TP218

(653708, 4768088)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP218-1 (metals)	0.5	No odours or staining	-	0-0.5	Reddish Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine/Medium Gravel, Trace Organics, DTPL
TP218-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine/Medium Gravel, Trace Organics, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP219

(654715, 4768010)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP219-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP219-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

TESTPIT LOG: TP220

(654716, 4768015)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP220-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP220-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP221

(654715, 4768007)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP221-1 (metals)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Slag Material, DTPL
TP221-2 (metals)	1.0	No odours, some black seams	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Some Black Seams, DTPL

Upon completion: Open and dry at 1.0 mbgs.

TESTPIT LOG: TP222

(654716, 4768004)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP222-1 (metals)	0.5	No odours or staining	-	0-0.5	Reddish Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine Gravel, Trace Organics, Fissured, DTPL
TP222-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP223

(654722, 4768009)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP223-1 (metals)	0.5	No odours or staining	-	0-0.5	Reddish Brown, Silty Clay/Clayey Silt, Fill Material, Trace Fine Gravel, Trace Organics, Fissured, DTPL
TP223-2 (metals)	1.0	No odours or staining	-	0.5-1.0	Reddish Brown, Silty Clay/Clayey Silt, Possible Native, Fissured, DTPL

Upon completion: Open and dry at 1.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP224

(654714, 4768078)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP224-1 (electrical conductivity)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP224-2 (electrical conductivity)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
-	-	No odours or staining	-	1.0-1.5	Brown/Grey/Red, Silty Clay/Clayey Silt, Fill Material, Trace Fine Granular, Trace Organics, DTPL
TP224-4 (electrical conductivity)	2.0	No odours or staining	-	1.5-2.0	Grey/Red, Silty Clay, Possible Native, Trace Granular, Trace Organics, DTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP225

(654717, 4768081)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP225-1 (electrical conductivity)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, APL/WTPL
TP225-2 (electrical conductivity)	1.0	No odours or staining	-	0.5-1.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, Trace Granular, APL/WTPL
TP225-4 (electrical conductivity)-	2.0	No odours or staining	-	1.5-2.0	Brown, Silty Clay/Clayey Silt, Possible Native, Trace Organics, Trace Granular, APL/WTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP226

(654712, 4768075)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP226-1 (electrical conductivity)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP226-2 (electrical conductivity)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, White Seams, Trace Organics, Trace Fine Gravel, DTPL
TP226-4 (electrical conductivity)-	2.0	No odours or staining	-	1.0-2.0	Brown, Silty Clay/Clayey Silt, Fill Material, White/Black Seams, Trace Organics, Trace Fine Gravel, DTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP227

(654712, 4768073)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP227-1 (electrical conductivity)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, White Seams, Trace Organics, DTPL
TP227-2 (electrical conductivity)	1.0	No odours or staining	-	0.5-2.0	Brown, Silty Clay/Clayey Silt, Fill Material, White Seams, Trace Organics, DTPL
TP227-3 (electrical conductivity)	1.5	No odours or staining	-		

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP228

(654714 , 4768078)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP228-1 + Dup A3 (electrical conductivity)	0.5	No odours or staining	-	0-0.5	Brown, Silty Clay/Clayey Silt, Fill Material, Fissured, Trace Organics, DTPL
TP228-2 (electrical conductivity)	1.0	No odours or staining	-	0.5-1.0	Brown, Silty Clay/Clayey Silt, Fill Material, White Seams, Trace Organics, DTPL
TP228-4 (electrical conductivity)	2.0	No odours or staining	-	1.0-2.0	Brown, Silty Clay/Clayey Silt, Fill Material, Black Seams, Trace Organics, DTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

Delineation Testpitting & Ground Water Sampling Program
 Site Location: Thundering Waters Development, Dorchester Road, Niagara Falls, Ontario
 Job Number: TG161164
 Date: Dec 22, 2016



TESTPIT LOG: TP229

(654719, 4768075)

Sample Number	Depth (mbgs)	Comments (odour, staining, etc.)	COV/TOV (ppm)	Stratigraphy	
				Depth (mbgs)	Material Description
TP229-1 (electrical conductivity)	0.5	No odours or staining	-	0-0.5	Reddish Brown/Grey, Silty Clay/Clayey Silt, Fill Material, Trace Fine Gravel, Trace Organics, DTPL
TP229-2 (electrical conductivity)	1.0	No odours or staining	-	0.5-1.0	Brown/Grey, Silty Clay/Clayey Silt, Fill Material, Trace Organics, DTPL
TP229-4 (electrical conductivity)	2.0	No odours or staining	-	1.0-2.0	Brown/Grey, Silty Clay/Clayey Silt, Possible Native, DTPL

Upon completion: Open and dry at 2.0 mbgs.

Equipment: Hitachi Zaxis 160 LC Excavator

Originated by: MS/KH
 Compiled By: MS
 Checked By: KP

Notes: "mbgs" means metres below ground surface. "COV" means Combustible Organic Vapour, "TOV" means Total Organic Vapour, "ppm" means parts per million. "PHCs" means fractionized Petroleum Hydrocarbons in the F1 to F4 ranges. "BTEX" means benzene, toluene, ethylbenzene and xylenes. "DTPL" means Drier Than Plastic Limit. "APL" means At Plastic Limit. "WTPL" means Wetter Than Plastic Limit.

RECORD OF MONITORING WELL No. **BH/MW-421**

Project Number: **TPB184078** Drilling Method: **150 mm Solid Stem Augers**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jun 21, 19** Date Completed: **Jun 21, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **SH** Compiled by: **SH**
 Drilling Location: **4767960N; 654125E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 179.0 m										
Lithology Plot 180 mm TOPSOIL Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets soft to firm wtpl 178.9 0.2 175.7 3.4 Brown SILTY CLAY/CLAYEY SILT trace gravel hard to soft dtpl to wtpl turns grey at ~ 9.1 mbgs 162.6 16.5 END OF BOREHOLE	SS	1	46	2	1	178	○	0.0		Soil Sample BH/MW-421-5 at 3.1-3.5 mbgs submitted for laboratory analysis of PHCs and BTEX.
	SS	2	71	3			○	0.0		
	SS	3	42	4			○	0.0		
	SS	4	67	5			○	0.0		
	SS	5	75	13			○	0.0		
	SS	6	67	60			○	0.0		
	SS	7	100	17			○	0.0		
	SS	8	100	12			○	0.0		
	SS	9	100	4			○	0.0		
	VT	1						0.0		
	SS	10	96	6			○	0.0		
	VT	2						0.0		
	SS	11	100	4			○	0.0		
	VT	2						0.0		

Wood Environment & Infrastructure Solutions
 Unit 5-3300 Merrittville Highway
 Thorold, Ontario L2V 4Y6
 Tel: (905) 687-6616
 Fax: (905) 687-6620
 www.woodplc.com

No freestanding groundwater measured in open borehole on completion of drilling.
 Cave in depth after removal of augers: 14.9 m.
 Groundwater depth observed on Jun 30, 19 at a depth of: 0.8 m.

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 : 100
Page: 1 of 1

RECORD OF MONITORING WELL No. **BH/MW-431**

Project Number: **TPB184078** Drilling Method: **150 mm Solid Stem Augers**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jun 24, 19** Date Completed: **Jun 24, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **SH** Compiled by: **SH**
 Drilling Location: **4768050N; 654447E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 176.4 m										
Lithology Plot 50 mm TOPSOIL Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets soft to firm to soft wtpl 173.1 Brown/Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel stiff to soft dtpl to wtpl 3.4 turns grey at ~ 12.2 mbgs 160.6 END OF BOREHOLE 15.8	SS	1	58	3	176	0	2.10		Soil Sample BH-431-1 at 0.1-0.8 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-431-5 at 3.0-3.7 mbgs submitted for laboratory analysis of BTEX and PHC(F1-F2)	Monitoring Well Installation: 3cm diameter schedule 40 pipe with 1.5m length #10 mil slotted screen, stickup casing of 0.95 mags.
	SS	2	67	5	175	0	4.0			
	SS	3	42	5	174	0	2.2			
	SS	4	83	3	173	0	2.0			
	SS	5	75	9	172	0	1.0			
	SS	6	100	12	171	0	2.0			
	SS	7	100	5	170	0	1.0			
	SS	8	100	8	169	0	1.0			
	SS	9	100	7	168	0	0.0			
	SS	10	100	3	167	0	1.0			
	VT	1			166	0	0.0			
SS	11	100	3	165	0	1.0				

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

∇ Groundwater depth observed on Jun 30, 19 at a depth of: 0.8 m.

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.

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RECORD OF MONITORING WELL No. **BH/MW-438**

Project Number: **TPB184078** Drilling Method: **150 mm Solid Stem Augers**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jun 21, 19** Date Completed: **Jun 21, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **DN** Compiled by: **SH**
 Drilling Location: **4768204N; 654725E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing	DCPT	Combustible Organic Vapour (ppm)	Combustible Organic Vapour (%LEL)	Total Organic Vapour (ppm)		
Geodetic Ground Surface Elevation: 177.6 m														
150 mm TOPSOIL	SS	1	83	5	177	177.0	○	●	10	0.0				Soil Sample BH-438-1 at 0.1-0.8 mbgs submitted for laboratory analysis of PAHs and Metals. Soil Sample BH-438-2 at 0.8-1.5 mbgs submitted for laboratory analysis of PHCs (F1-F4), BTEX, and Metals.
Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets soft apl	SS	2	79	11	176	176.0	○	●	10	0.0				
	SS	3	92	15	175	175.0	○	●	10	0.0				
	SS	4	83	10	174	174.0	○	●	10	0.0				
Brown/Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel stiff to soft dtpl to wtpl	SS	5	100	10	173	173.0	○	●	10	0.0				
	SS	6	92	6	172	172.0	○	●	10	0.0				
	SS	7	83	10	171	171.0	○	●	10	0.0				
	SS	8	100	4	170	170.0	○	●	10	0.0				
	SS	9	63	3	169	169.0	○	●	10	0.0				
	SS	10			168	168.0	○	●	10	0.0				
	SS	11	83	3	167	167.0	○	●	10	0.0				
	SS	12	67	5	166	166.0	○	●	10	0.0				
turns grey at ~ 15.2 mbgs firm	SS	13	58	11	165	165.0	○	●	10	0.0				
	SS	14	50	11	162	162.0	○	●	10	0.0				
END OF BOREHOLE					158	158.0	○	●	20	0.0				
					157.2	157.2								
					20.4	20.4								Monitoring Well Installation: 3cm diameter schedule 40 pipe with 1.5m length #10 mil slotted screen, stickup casing 1.1 mags.

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∇ Groundwater depth encountered on completion of drilling: 7.6 m.

∇ Groundwater depth observed on Jun 30, 19 at a depth of: 1.5 m.

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.

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RECORD OF MONITORING WELL No. **BH/MW-440**

Project Number: **TPB184078** Drilling Method: **150 mm Solid Stem Augers**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Sep 11, 18** Date Completed: **Sep 11, 18**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **SH** Compiled by: **SH**
 Drilling Location: **4768122N; 654805E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 179.8 m										
Lithology Plot 25 mm TOPSOIL Reddish Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets stiff dtpl 179.9 177.2 2.6 Brown SILTY CLAY/CLAYEY SILT trace gravel and trace to none grey fissures very stiff to firm dtpl to wtpl 159.5 20.3 END OF BOREHOLE	SS	1	100	12	1	179	○		Soil Sample BH-440-3C at 1.5-2.0 mbgs submitted for laboratory analysis of Metals and EC. PPT =450 kPa PPT =25 kPa PPT =50 kPa PPT - Pocket Penetrometer Test (kPa) Monitoring Well Installation: 3cm diameter schedule 40 pipe with 1.5m length #10 mil slotted screen, stickup casing 1.0 mags.	
	SS	2	100	13	2	178	○			
	SS	3	100	10	3	177	○			
	SS	4	100	13	4	176	○			
	SS	5	100	15	5	175	○			
	SS	6	100	28	6	174	○			
	SS	7	100	13	7	173	○			
	SS	8	100	19	8	172	○			
	SS	9	100	18	9	171	○			
	SS	10	100	7	10	170	○			
	SS	11	100	7	11	169	○			
	SS	12	100	8	12	168	○			
	SS	13	100	9	13	167	○			
	SS	14	100	11	14	166	○			

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∇ No freestanding groundwater measured in open borehole on completion of drilling.
 ∇ Groundwater depth observed on Jul 4, 19 at a depth of: 3.5 m.

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.

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RECORD OF MONITORING WELL No. **BH/MW-441**

Project Number: **TPB184078** Drilling Method: **150 mm Solid Stem Augers**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jun 21, 19** Date Completed: **Jun 21, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **DN** Compiled by: **SH**
 Drilling Location: **4768012N; 654668E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 179.4 m										
100 mm TOPSOIL	SS	1	33	1	179.3		10			Soil Sample BH-441-1 at 0.1-0.8 mbgs submitted for laboratory analysis of PHCs (F1-F4) + BTEX. Soil Sample BH-441-2 at 0.8-1.2 mbgs submitted for laboratory analysis of Metals.
Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets soft apl	SS	2	42	4	178.8		10			
	SS	3	50	3	178.3		20			
	SS	4	38	4	177.8		20			
	SS	5	75	9	177.3		10			
Brown/Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel stiff to soft dtpl to wtpl	SS	6	38	13	176.8		10			
					176.3		10			
	SS	7	100	10	175.8		10			
					175.3		10			
	SS	8	100	11	174.8		10			
					174.3		10			
	SS	9	100	6	173.8		10			
					173.3		10			
					172.8		10			
					172.3		10			
					171.8		10			
					171.3		10			
					170.8		10			
					170.3		10			
					169.8		10			
					169.3		10			
					168.8		10			
					168.3		10			
					167.8		10			
					167.3		10			
					166.8		10			
					166.3		10			
					165.8		10			
					165.3		10			
					164.8		10			
turns grey at ~ 15.2 mbgs firm	SS	11	83	5	164.3		10			
					163.8		10			
					163.3		10			
					162.8		10			
					162.3		10			
					161.8		10			
					161.3		10			
					160.8		10			
					160.3		10			
	SS	12	63	6	159.8		10			
					159.3		10			
					158.8		10			
					158.3		10			
					157.8		10			
					157.3		10			
					156.8		10			
					156.3		10			
					155.8		10			
					155.3		10			
					154.8		10			
					154.3		10			
					153.8		10			
					153.3		10			
					152.8		10			
					152.3		10			
					151.8		10			
					151.3		10			
					150.8		10			
					150.3		10			
END OF BOREHOLE					159.0					
					20.4					

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▽ Groundwater depth encountered on completion of drilling: 9.1 m.
 ▼ Groundwater depth observed on Jun 30, 19 at a depth of: 6.1 m.

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.

Monitoring Well Installation: 3cm diameter schedule 40 pipe with 1.5m length #10 mil slotted screen, stickup casing of 0.8 mags.

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RECORD OF MONITORING WELL No. **BH/MW-446**

Project Number: **TPB184078** Drilling Method: **50 mm Direct Push**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jul 9, 19** Date Completed: **Jul 9, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **SH** Compiled by: **SH**
 Drilling Location: **4768176N; 653779E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



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) △ Total Organic Vapour (ppm)	100	200			300
	Geodetic Ground Surface Elevation: 178.8 m 255 mm TOPSOIL													
	Brown Silty Clay/Clayey Silt FILL trace gravel and trace rootlets dtpl 178.6 0.3	SS	1	80		178	1	○ 0 ● 10.0						Soil Sample BH446-1D at 0.2 mbgs submitted for laboratory analysis of Metals, OCs, PHCs (F1-F4), BTEX, and PAHs.
	Brown SILTY CLAY/CLAYEY SILT trace gravel dtpl to apl 177.7 1.1					177	2	○ 0 ● 20.0						
	turns reddish brown at ~ 3.1 mbgs wtpl					176	3	○ 0 ● 0.0						
	175 4	SS	3	70		175	4	○ 0 ● 0.0						
	END OF BOREHOLE 174.2 4.6													Monitoring Well Installation: 3cm diameter schedule 40 pipe with 1.5m length #10 mil slotted screen, stickup casing.

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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.

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RECORD OF MONITORING WELL No. **BH/MW-447**

Project Number: **TPB184078** Drilling Method: **50 mm Direct Push**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jul 9, 19** Date Completed: **Jul 9, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **SH** Compiled by: **SH**
 Drilling Location: **4768488N; 654148E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



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)	△ Total Organic Vapour (ppm)		
	Geodetic Ground Surface Elevation: 178.4 m 280 mm TOPSOIL							20 40 60 80			100 200 300 400		
	Brown SILTY CLAY/CLAYEY SILT trace gravel dtp1 178.2 0.3	SS	1	80		1	178	○ 0 ● 10.0					Soil Sample BH447-1D at 0.2 mbgs submitted for laboratory analysis of Metals, OCs, PHCs (F1-F4), BTEX, and PAHs.
	turns reddish brown at ~ 3.1 mbgs	SS	2	100		2	177	○ 0 ● 20.0					
		SS	3	100		3	176	○ 0 ● 10.0					
	END OF BOREHOLE 173.9 4.6					4	174						

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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.

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RECORD OF MONITORING WELL No. **BH/MW-448**

Project Number: **TPB184078** Drilling Method: **50 mm Direct Push**
 Project Client: **GR (CAN) Investments Co. Ltd** Drilling Machine: **Track Mounted Drill**
 Project Name: **Riverfront Community** Date Started: **Jul 9, 19** Date Completed: **Jul 9, 19**
 Project Location: **Chippawa Pkwy, Niagara Falls** Logged by: **SH** Compiled by: **SH**
 Drilling Location: **4768717N; 654411E** Reviewed by: **TR** Revision No.: **1, 10/8/19**



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) △ Total Organic Vapour (ppm)							
		Geodetic Ground Surface Elevation: 179.8 m 405 mm TOPSOIL							20	40	60	80	100	200	300	400	
	179.4 Brown Silty Clay/Clayey Silt FILL trace gravel and trace rootlets apl	SS	1	80		179						5		△	100.0		Soil Sample BH448-1D at 0.2 mbgs submitted for laboratory analysis of Metals, OCs, and PAHs.
	178.9 Brown SILTY CLAY/CLAYEY SILT trace gravel dtpI					1											Soil Sample BH448-2D at 1.1 mbgs submitted for laboratory analysis of PHCs (F1-F4) and BTEX.
	turns reddish brown at ~ 3.1 mbgs					2											
		SS	2	100		3						0		△	10.0		
						4											
		SS	3	100		3						0		△	0.0		
	175.2 END OF BOREHOLE 4.6					4											Monitoring Well Installation: 3cm diameter schedule 40 pipe with 1.5m length #10 mil slotted screen, stickup casing.

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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.

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RECORD OF BOREHOLE No. **BH-401**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767933N; 653545E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Sep 10, 18** Date Completed: **Sep 10, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



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) △ Total Organic Vapour (ppm)							
		Geodetic Ground Surface Elevation: 176.7 m							20	40	60	80	100	200	300	400	
	125 mm GRANULAR						176.5										
	Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets firm to very stiff dtpl	SS	1	92	5		176.1	○									Soil Sample BH-401-1D at 0.3mbgs submitted for laboratory analysis of PHCs(F1-F4)/BTEX.
		SS	2	94	17	1	176.0	○									Soil Sample Composite BH-401-1C at 0.1-0.8mbgs submitted to laboratory analysis of Metals.
	Brown to Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures stiff dtpl to apl	SS	3	100	14		175.3	○									
		SS	4	100	13	2	174.9	○									PPT = 450 kPa
		SS	5	100	16	3	174.5	○									PPT = 400 kPa
		SS	6	100	14	4	172.1	○									PPT = 350 kPa
	END OF BOREHOLE					5	171.6										PPT - Pocket Penetrometer Test (kPa)

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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.

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RECORD OF BOREHOLE No. **BH-402**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767965N; 653830E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 27, 18** Date Completed: **Aug 27, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 180.8 m										
Lithology Plot	50 mm GRANULAR Brown to Reddish Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets firm to stiff dtpl	SS	1	100	7	180.7	○			Soil Sample Composite BH-402-1C at 0.1-0.8 mbgs submitted for laboratory analysis of Metals, EC, SAR, and pH. PPT = 300 kPa PPT = 100 kPa PPT = 50 kPa
		SS	2	100	11	180	○			
	1.4	Reddish Brown to Brown Silty Clay/Clayey Silt POSSIBLE FILL trace gravel firm to soft dtpl to apl to wtpl	SS	3	100	6	179.4	○		
		SS	4	100	5	179	○			
		SS	5	100	3	178	○			
						177				
	4.0	Mottled Brown to Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures very stiff to firm to soft dtpl to wtpl	SS	6	100	26	176.7	○		
						176				
						175				
						174				
		turns greyish brown at ~ 7.6 mbgs	SS	7	100	25	174	○		
						173				
						172				
		turns grey at ~ 9.1 mbgs	SS	8	100	7	173	○		
					171					
		VT	1			171				
					170					
		SS	10	100	2	170	○			
					169					
					168					
		SS	11	100	3	168	○			
					167					
					166.8					
					13.9					

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∇ Groundwater depth encountered on completion of drilling: 18.3 m.

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.

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RECORD OF BOREHOLE No. **BH-402**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767965N; 653830E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 27, 18** Date Completed: **Aug 27, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



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)		
									20 40 60 80		100 200 300 400		
	Reddish Brown SILT trace clay loose moist	SS	12	100	5	15	166						
							165						
							164						
	Greyish Brown SILTY CLAY/CLAYEY SILT trace gravel soft to firm w/pl to mw/pl	SS	13	100	4	17	163						
							162						
							161						
							160						
							159						
							158						
							157						
	Reddish Brown SILTY SAND/SANDY SILT trace clay and gravel very dense moist	SS	14	100	5	18	156						
		VT	2			19	155						
							154						
	Interbedded layer of Reddish Brown Silty Clay/Clayey Silt some gravel apl	SS	15	100	50	20	153						
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RECORD OF BOREHOLE No. **BH-404**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768114N; 653877E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 30, 18** Date Completed: **Aug 30, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 181.1 m										
Lithology Plot 50 mm TOPSOIL 180.1 Brown to Reddish Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets very stiff to stiff dtpl turns brown at ~ 2.29 mbgs trace sand 100 mm sandy silt seam at ~ 2.6 mbgs 178.2 Brown to Greyish Brown SILTY CLAY/CLAYEY SILT trace gravel firm to stiff to very stiff aptl to dtpl turns red at ~ 7.6 mbgs turns brown at ~ 9.1 mbgs trace grey fissures stiff to firm dtpl to wtpl turns reddish grey at ~ 12.2 mbgs no grey fissures wtpl turns grey at ~ 15.2 mbgs END OF BOREHOLE 165.0 16.2	SS	1	21	15	1	180	○			Soil Sample Composite BH-404 at 0.1-2.9 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-404-4D at 2.4 mbgs submitted for laboratory analysis of PHCS (F1 - F4)/BTEX. Soil Sample BH-404-4C at 2.3-2.9 mbgs submitted for laboratory analysis of Metals. PPT =150 kPa PPT =450 kPa PPT - Pocket Penetrometer Test (kPa)
	SS	2	33	18	2	179	○			
	SS	3	50	13	3	178	○			
	SS	4	94	9	4	177	○			
	SS	5	67	6	5	176	○			
	SS	6	100	6	6	175	○			
	SS	7	100	10	7	174	○			
	SS	8	100	28	8	173	○			
	SS	9	100	13	9	172	○			
	SS	10	100	6	10	171	○			
	SS	11	100	4	11	170	○			
	SS	12	100	6	12	169	○			
VT	1			16	165	○				

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∇ Groundwater depth encountered on completion of drilling: 7.6 m.

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 : 100
 Page: 1 of 1

RECORD OF BOREHOLE No. **BH-405**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768096N; 653934E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Sep 3, 18** Date Completed: **Sep 3, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Geodetic Ground Surface Elevation: 178.9 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT				* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)					
	50 mm TOPSOIL	178.9	SS	1	88	6		178	○									
	Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets firm apl	177.6	SS	2	100	6		178	○									
	Reddish Brown to Greyish Brown Silty Clay/Clayey Silt POSSIBLE FILL trace gravel firm to soft apl to wtpl	174	SS	3	94	6		177	○									
			SS	4	100	5		176	○									
			SS	5	100	5		175	○									
			SS	6	100	3		174	○									
	Brown SILTY CLAY/CLAYEY SILT trace gravel and trace to none grey fissures stiff to firm dtpl to wtpl to mwtp	173.4	SS	7	100	12		173	○									
	trace reddish brown and yellowish brown seams for SS-8		SS	8	100	16		172	○									
			SS	9	100	12		171	○									
			SS	10	100	7		170	○									
			SS	11	100	6		169	○									
	turns grey at ~ 12.2 mbgs		SS	12	100	16		168	○									
			SS	13	100	5		167	○									
			SS	14	100	5		166	○									
	Reddish Brown SILT trace gravel and clay compact moist	163.4						165	○									
	Greyish grey SILTY CLAY/CLAYEY SILT trace gravel firm wtpl	161.9						164	○									
		17.0	SS	13	100	5		163	○									
			VT	1				162	○									
			SS	14	100	5		161	○									
	END OF BOREHOLE	158.7						160	○									
		20.3						159	○									

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∇ Groundwater depth encountered on completion of drilling: **8.5 m.**

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.

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RECORD OF BOREHOLE No. **BH-406**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768234N; 653901E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Sep 4, 18** Date Completed: **Sep 5, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT				* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)					
	Geodetic Ground Surface Elevation: 178.9 m																
	100 mm TOPSOIL	SS	1	79	12		178.9										
	Reddish Brown to Brown Silty Clay/Clayey Silt FILL some gravel stiff to firm dtpl to apl	SS	2	100	8	1	178										
		SS	3	100	5	2	177										
		SS	4	100	11	3	176										
	Mottled Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures very stiff to soft dtpl to wtpl	SS	5	89	19	4	175										
	turns reddish brown at ~ 4.9 mbgs	SS	6	100	16	5	174										
		SS	7	100	15	6	173										
		SS	8	100	11	7	172										
	turns grey at ~ 9.1 mbgs	SS	9	100	4	8	171										
		VT	1			9	170										
		SS	10	100	2	10	169										
		SS	11	100	4	11	168										
						12	167										
		SS	11	100	4	13	166										

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∇ Groundwater depth encountered on completion of drilling: **8.5 m.**

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.

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RECORD OF BOREHOLE No. **BH-406**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768234N; 653901E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Sep 4, 18** Date Completed: **Sep 5, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	20	40	60	80	Penetration Testing				* Combustible Organic Vapour (ppm)					
										○ SPT ● DCPT				* Combustible Organic Vapour (%LEL)				△ Total Organic Vapour (ppm)	
[Reddish Brown SILT pattern]	Reddish Brown SILT trace sand and clay loose to compact moist					15	164												
		SS	12	100	4	16	163												
						17	162												
[Reddish Brown SILTY CLAY/CLAYEY SILT pattern]	Reddish Brown SILTY CLAY/CLAYEY SILT some to trace gravel hard to very stiff dtpI					18	161												
		SS	13	83	56	19	160												
						20	159												
[Reddish Brown SANDY SILT pattern]	Reddish Brown SANDY SILT trace gravel and clay compact to dense moist					21	158												
		SS	14	94	22	22	157												
						23	156												
[Reddish Brown SANDY SILT pattern]	Reddish Brown SANDY SILT trace gravel and clay compact to dense moist					24	155												
		SS	15	67	12	25	154												
						26	153												
	END OF BOREHOLE					26	152.5												

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.

RECORD OF BOREHOLE No. **BH-407**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768162N; 654020E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 12, 19** Date Completed: **Jun 12, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 178.9 m										
Lithology Plot 100 mm TOPSOIL Brown Silty Clay/Clayey Silt FILL trace gravel and sand soft to firm apl to wtpl 178.7 0.1 178 177 176 175 174 173 172 171 170 169.1 9.8 END OF BOREHOLE	SS	1	50	2	0	178.7	○	* 0.0		Soil Sample BH-407-4 at 2.2-2.9 m bgs submitted for laboratory analysis of Metals.
	SS	2	79	6	1	178	○	* 0.0		
	SS	3	58	4	2	177	○	* 0.0		
	SS	4	42	6	3	176	○	* 0.0		
	SS	5	54	16	4	175	○	* 0.0		
	SS	6	79	19	5	174	○	* 0.0		
	SS	7	75	16	6	173	○	* 0.0		
	SS	8	100	12	8	171	○	* 0.0		
	SS	9	100	8	9	170	○	* 0.0		

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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.

RECORD OF BOREHOLE No. **BH-408**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768039N; 653944E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 29, 18** Date Completed: **Aug 30, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT	* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Geodetic Ground Surface Elevation: 180.5 m										
	25 mm TOPSOIL	SS	1	79	10	180	○				
	Brown to Reddish Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets stiff dtpl	SS	2	100	11	179.1	○				
	Reddish Brown Silty Clay/Clayey Silt POSSIBLE FILL trace gravel and grey fissures firm apl	SS	3	100	6	179	○				
		SS	4	100	4	178	○				
		VT	1			177	○				
		SS	5	100	5	177	○				
	turns brown at ~ 4.6 mbgs					176	○				
		SS	6	100	4	176	○				
	Grey to Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel very stiff to firm dtpl to apl to wtpl	SS	7	100	28	175	○				PPT = 275 Kpa
						174	○				
						173	○				
		SS	8	100	19	173	○				
						172	○				
		SS	9	100	15	171	○				PPT = 300 Kpa
	yellowish brown seams in SS-10					170	○				
		SS	10	100	8	170	○				PPT = 150 Kpa
						169	○				
	turns grey to reddish grey at ~ 12.2 mbgs	SS	11	100	4	168	○				
		VT	2			168	○				
						167	○				
						166	○				
		SS	12	100	6	165	○				
	END OF BOREHOLE					164.8					
						15.7					PPT = Pocket Penertormeter Test

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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 : 100

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RECORD OF BOREHOLE No. **BH-410**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767849N; 653894E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 21, 18** Date Completed: **Aug 21, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 178.8 m										
Lithology Plot	180 mm TOPSOIL	178.6								
	Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets stiff to firm dtpI to apl	0.2	SS	1	100	8	○	* 0.0		Soil Sample BH410-1 at 0.3 mbgs submitted for laboratory analysis of PAHs and PHCs(F1-F4)/BTEX. Soil Sample BH-410-2 at 0.8-1.2 mbgs submitted to laboratory analysis of Metals. PPT = 200 kPa
			SS	2	100	12	○	* 0.0		
			SS	3	100	5	○	* 0.0		
			SS	4	100	4	○	* 0.0		
			SS	5	100	2	○	* 0.0		
			SS	6	83	5	○	* 0.0		
			SS	7	100	38	○	* 0.0		
			SS	8	100	5	○	* 0.0		
			SS	9	100	8	○	* 0.0		
			SS	10	100	5	○	* 0.0		
		VT	1				* 0.0			
END OF BOREHOLE										

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∇ Groundwater depth encountered on completion of drilling: 5.5 m.

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.

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RECORD OF BOREHOLE No. **BH-413**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767984N; 654021E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 27, 18** Date Completed: **Aug 27, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 179.8 m										
100 mm TOPSOIL	SS	1	46	9	179.7					
Brown Silty Clay/Clayey Silt FILL trace to some gravel and rootlets firm to stiff to firm dtpl to apl	SS	2	67	12	179	○				Soil Sample BH413-2C at 0.8-1.5 mbgs submitted for laboratory analysis of Metals. PPT = 275 kPa PPT = 400 kPa PPT = 125 kPa
	SS	3	100	4	178	○				
	SS	4	100	5	177.3	○				
Greyish Brown to Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures stiff to firm dtpl to apl to wtpl	SS	5	100	12	177	○				
					176					
	SS	6	100	20	175	○				
					174					
turns reddish brown at ~ 6.1 mbgs	SS	7	100	13	173	○				
					172					
	SS	8	100	14	172	○				
					171					
turns brown at ~ 9.1 mbgs	SS	9	100	8	171	○				
					170					
					169					
turns greyish brown at ~ 10.7 mbgs	SS	10	100	6	169	○				
	VT	1			168					
					167					
	SS	11	100	5	167	○				
					166					
					165					
	SS	12	100	6	164.1	○				
END OF BOREHOLE					15.7					PPT = Pocket Penertormeter Test

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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 : 100

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RECORD OF BOREHOLE No. **BH-414**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768369N; 654121E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 12, 19** Date Completed: **Jun 12, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 178.2 m										
Lithology Plot Brown Silty Clay/Clayey Silt FILL some sand and trace gravel firm apl Brown SILTY CLAY/CLAYEY SILT trace gravel hard to stiff dtpl to apl turns reddish brown at ~ 3.8 mbgs Reddish Brown SILT trace clay dense moist Grey SILTY CLAY/CLAYEY SILT trace gravel soft wtpl END OF BOREHOLE	SS	1	54	9	178.0	178.0	○	* 0.0		Soil Sample BH-414-2 at 0.8-1.2 mbgs submitted for laboratory analysis of Metals.
	SS	2	63	35	177.0	177.0	○	* 0.0		
	SS	3	63	73	176.0	176.0	○	* 0.0		
	SS	4	42	18	175.0	175.0	○	* 0.0		
	SS	5	75	14	174.0	174.0	○	* 0.0		
	SS	6	42	19	173.0	173.0	○	* 0.0		
	SS	7	46	36	172.0	172.0	○	* 0.0		
	SS	8	100	3	171.0	171.0	○	* 0.0		
	SS	9	88	3	169.0	169.0	○	* 0.0		

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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.

RECORD OF BOREHOLE No. **BH-415**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768187N; 654093E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 12, 19** Date Completed: **Jun 12, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Geodetic Ground Surface Elevation: 178.1 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	SPT			DCPT	Total Organic Vapour (ppm)				
	100 mm TOPSOIL	178.0	SS	1	25	6												
	Brown Silty Clay/Clayey Silt FILL trace gravel stiff apl	0.1					1	177										
			SS	2	38	11												
			SS	3	46	8												
	becomes very soft and wtpl between ~ 2.2 and 3.7 mbgs						2	176										
			SS	4	100	1												
			SS	5	100	0												
			SS	6	42	9												
							5	173										
							6	172										
	Brown SILTY CLAY/CLAYEY SILT trace gravel hard to very stiff to soft dtpl to wtpl	172.4	SS	7	71	67												
		5.6					7	171										
			SS	8	92	28												
							8	170										
			SS	9	100	2												
							9	169										
	END OF BOREHOLE	168.3																
		9.8																

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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.

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RECORD OF BOREHOLE No. **BH-416**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768156N; 654168E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 11, 19** Date Completed: **Jun 11, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Geodetic Ground Surface Elevation: 178.0 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	SPT			DCPT	* Combustible Organic Vapour (ppm)				
	100 mm TOPSOIL	177.9	SS	1	83	4												
	Brown Silty Clay/Clayey Silt FILL trace gravel soft to very soft apl to wtpl	0.1					1	177										
			SS	2	58	2												
			SS	3	71	1		2	176									
	90 mm seam of grey silty clay/clayey silt at ~ 2.8 mbgs trace organics																	
			SS	4	100	0		3	175									
			SS	5	88	9												
	Brown SILTY CLAY/CLAYEY SILT trace gravel very stiff to stiff to soft dtpl to wtpl	174.3					4	174										
		3.6																
			SS	6	100	15		5	173									
			SS	7	71	21		6	172									
			SS	8	100	9		7	171									
			SS	9	100	3		8	170									
			SS	9	100	3		9	169									
	END OF BOREHOLE	168.2																
		9.8																

Soil Sample BH-416-2 at 0.8-2.1 mbgs submitted for laboratory analysis of Metals.

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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.

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RECORD OF BOREHOLE No. **BH-417**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768101N; 654098E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 13, 19** Date Completed: **Jun 13, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 177.9 m										
100 mm TOPSOIL										
Brown Silty Clay/Clayey Silt FILL trace gravel and sand firm to stiff to firm apl to wtpl	SS	1	67	5	1	177	○			
	SS	2	46	8	2	176	○			
	SS	3	63	14	3	175	○			
	SS	4	58	6	4	174	○			
	SS	5	79	4	5	173	○			Soil Sample BH-417-5 at 3.0-3.7 mbgs submitted for laboratory analysis of Metals.
	SS	6	54	4	6	172	○			
Brown SILTY CLAY/CLAYEY SILT trace gravel very stiff to stiff to firm dtpl to wtpl	SS	7	88	26	7	171	○			
	SS	8	100	10	8	170	○			
	SS	9	100	6	9	169	○			
	SS	10	67	4	10	168	○			
	SS	11	54	12	11	167	○			
	SS	12			12	166	○			
	SS	13			13	165	○			
	SS	14			14	164	○			
Reddish Brown SILT trace clay compact wet	SS	15			15	163	○			
END OF BOREHOLE										

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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.

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RECORD OF BOREHOLE No. **BH-418**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767868N; 654073E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 24, 18** Date Completed: **Aug 24, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 182.4 m										
Lithology Plot 50 mm TOPSOIL Brown Silty Clay/Clayey Silt FILL trace to some gravel and rootlets stiff to very stiff dtpl 180.3 181.0 1.4 Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures firm to very stiff wtpl to dtpl 50 mm silty sand seam at ~ 4.9 mbgs trace grey fissures turns reddish brown at ~ 9.1 mbgs turns greyish brown to brown at ~ 12.2 mbgs reddish brown layers no grey fissures firm wtpl turns greyish brown at ~ 15.24 mbgs 166.2 16.2 END OF BOREHOLE	SS	1	63	8	182	○			Soil Sample BH418-3C at 1.5-2.1 mbgs submitted for laboratory analysis of Metals, EC, SAR and pH. PPT = 125 Kpa PPT = 400 Kpa PPT = 200 Kpa PPT = Pocket Penertormeter Test	
	SS	2	50	26	1	○				
	SS	3	17	8	2	○				
	SS	4	100	4	3	○				
	SS	5	100	5	4	○				
	SS	6	100	8	5	○				
	SS	7	83	4	6	○				
	SS	8	100	28	8	○				
	SS	9	100	24	9	○				
	SS	10	100	20	11	○				
	SS	11	100	8	12	○				
	VT	1			16	○				

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☐ No freestanding groundwater measured in open borehole on completion of drilling. ☑ Cave in depth after removal of augers: 13.7 m.

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 : 94
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RECORD OF BOREHOLE No. **BH-419**

Project Number: TPB184078
 Project Client: GR (CAN) Investments Co. Ltd
 Project Name: Riverfront Community
 Project Location: Chippawa Pkwy, Niagara Falls
 Drilling Location: 4767767N; 653989E

Drilling Method: 150 mm Solid Stem Augers
 Drilling Machine: Track Mounted Drill
 Date Started: Aug 24, 18 Date Completed: Aug 27, 18
 Logged by: SH Compiled by: SH
 Reviewed by: TR Revision No.: 1, 10/8/19



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						
		Reddish Brown SILTY SANDY/SANDY SILT trace gravel dense moist					20.0	158						
		SS	4	78	39		21	157	○					
							22	156						
	Greyish Brown SILTY CLAY/CLAYEY SILT trace to some sand occasional silt seams very stiff wtpl					155.9	155							
		SS	5	78	15		23	154	○					
	Brown to Reddish Brown SILTY SANDY/SANDY SILT some gravel and trace clay very dense moist					153.6	153							
		SS	6	72	62		24	153	○					
	END OF BOREHOLE					25.4								
						26.4								

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.

RECORD OF BOREHOLE No. **BH-420**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768002N; 654061E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 17, 19** Date Completed: **Jun 17, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING Penetration Testing ○ SPT ● DCPT	SOIL SCREENING * Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)						
Geodetic Ground Surface Elevation: 178.9 m										
Lithology Plot 125 mm TOPSOIL Brown Silty Clay/Clayey Silt FILL trace to some gravel and trace and rootlets soft apl to wtpl 178.9 Grey to Greyish Brown SILTY CLAY/CLAYEY SILT trace gravel and rootlets firm apl to wtpl 171.8 7.2 turns brown at ~ 15.2 mbgs turns reddish grey at ~ 18.3 mbgs 250 mm silt seam at ~ 18.5 mbgs 158.5 END OF BOREHOLE 20.4	SS	1	46	2	0	178	○	01		Soil Sample BH-420.5 at 3.1-3.7 mbgs submitted for laboratory analysis of Metals and pH.
	SS	2	58	3	1	178	○	02		
	SS	3	54	2	2	177	○	02		
	SS	4	58	4	3	176	○	01		
	SS	5	63	2	4	175	○	00		
	SS	6	38	2	5	174	○	00		
	SS	7	8	3	6	173	○	00		
	SS	8	42	4	7	172	○	00		
	SS	9	58	8	8	171	○	00		
	SS	10	67	4	9	170	○	00		
	SS	11	71	5	10	169	○	00		
	SS	12	83	38	11	168	○	00		
	VT	1			12	167	○	00		
SS	13	100	7	13	166	○	00			
SS	14			14	165	○	00			
SS	15			15	164	○	00			
SS	16			16	163	○	00			
SS	17			17	162	○	00			
SS	18			18	161	○	00			
SS	19			19	160	○	00			
SS	20			20	159	○	00			

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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.

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RECORD OF BOREHOLE No. **BH-422**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767763N; 654103E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Aug 22, 18** Date Completed: **Aug 23, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)						
Geodetic Ground Surface Elevation: 181.2 m										
Lithology Plot Brown Silty Clay/Clayey Silt FILL some gravel stiff dtpl 179.8 1.4 Greyish Brown SILTY CLAY/CLAYEY SILT trace gravel firm to very stiff apl to dtpl turns reddish between ~ 9.1 and 10.7 mbgs wtpl soft 160.9 20.3 END OF BOREHOLE	SS	1	75	9	1	180	○			Soil Sample BH422-1C at 0.1-0.7 mbgs submitted for laboratory analysis of Metals. LL- 32.6, PL- 20.4, PI- 12.2 PPT = 150 kPa PPT = Pocket Penertormeter Test
	SS	2	100	12	2	179	○			
	SS	3	100	7	3	178	○			
	SS	4	94	4	4	177	○			
	SS	5	100	7	5	176	○			
	SS	6	100	6	6	175	○			
	SS	7	89	4	7	174	○			
	VT	1			8	173	○			
	SS	8	100	16	9	172	○			
	SS	9	100	24	10	171	○			
	SS	10	100	3	11	170	○			
	SS	11	100	3	12	169	○			
	SS	12	100	5	13	168	○			
	SS	13	100	3	14	167	○			
SS	14	100	3	15	166	○				
SS	15	100	3	16	165	○				
SS	16	100	3	17	164	○				
SS	17	100	3	18	163	○				
SS	18	100	3	19	162	○				
SS	19	100	3	20	161	○				

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∇ Groundwater depth encountered on completion of drilling: 11.6 m.

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.

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RECORD OF BOREHOLE No. **BH-425**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768037N; 654181E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 18, 19** Date Completed: **Jun 18, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 178.2 m										
100 mm TOPSOIL	SS	1	71	3	178	○	0.0		Soil Sample BH-425-1 at 0.1-0.8 mbgs submitted for laboratory analysis of Metals.	
Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets firm wtpl	SS	2	42	9	177	○	0.0			
	SS	3	71	5	176	○	0.0			
	SS	4	79	4	175	○	0.0			
	SS	5	67	4	174	○	0.0			
	SS	6	75	2	173	○	0.0			
	VT	1			173					
	SS	7	79	8	172	○	0.0			
	SS	8	71	2	170	○	0.0			
	SS	9	96	3	169	○	0.0			
	VT	2			168					
	SS	10	100	3	166	○	2.0			
	SS	11	100	4	163	○	1.0			
	VT	3			162					
END OF BOREHOLE					161.8					

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▽ Groundwater depth encountered on completion of drilling: **6.1 m.** ■ Cave in depth after removal of augers: **9.8 m.**

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.

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RECORD OF BOREHOLE No. **BH-426**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767979N; 654249E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 11, 19** Date Completed: **Jun 11, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



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) △ Total Organic Vapour (ppm)								
		Geodetic Ground Surface Elevation: 178.1 m							20	40	60	80	100	200	300	400		
	Brown Silty Clay/Clayey Silt FILL trace gravel and none to trace sand soft apl to wtpl	SS	1	42	4		177.7	○				*	0.0					
		SS	2	46	3	1	177.0	○				*	0.0					
	trace organics in SS-3	SS	3	67	5	2	176.0	○				*	0.0					
		SS	4	100	2		175.0	○				*	0.0					
		SS	5	79	4	3	175.0	○				*	0.0					
		SS	6	100	27	5	173.0	○	○			*	0.0					
		SS	7	63	44	6	172.0	○	○			*	0.0					
		SS	8	83	7	8	170.0	○	○			*	1.0					
		SS	9	100	8	9	169.0	○	○			*	0.0					
	END OF BOREHOLE						168.3											

Soil Sample BH-426-4 at 2.3-2.9 mbs submitted for laboratory analysis of Metals.

∇ 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.

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RECORD OF BOREHOLE No. **BH-427**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767834N; 654223E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 11, 19** Date Completed: **Jun 11, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Geodetic Ground Surface Elevation: 178.8 m										
Lithology Plot 50 mm TOPSOIL Brown Silt FILL trace sand and clay very loose moist Grey Silty Clay/Clayey Silt FILL trace gravel very soft wtpl turns brown between ~ 1.0 and 1.4 mbgs Brown to Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel very stiff dtpl turns grey at ~ 9.1 mbgs very soft wtpl	SS	1	54	3		178.7	○	* 0.0		Soil Sample BH-427-2 at 0.8-1.2 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-427-3 at 1.5-2.1 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-427-4 at 2.3-2.9 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-427-8 at 7.6-8.2 mbgs submitted for laboratory analysis of pH.
	SS	2	50	2	1	178.1	○	* 0.0		
	SS	3	33	1	2	177.7	○	* 0.0		
	SS	4	42	1	3	177.1	○	* 0.0		
	SS	5	29	1	4	176.4	○	* 0.0		
	SS	6	75	4	5	174.5	○	* 5.0		
	SS	7	88	23	6	172.2	○	* 0.0		
	SS	8	100	20	8	171.1	○	* 0.0		
	SS	9	100	1	9	169.0	○	* 0.0		
END OF BOREHOLE 9.8										

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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.

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RECORD OF BOREHOLE No. **BH-428**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767762N; 654242E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 10, 19** Date Completed: **Jun 10, 19**
 Logged by: **CM** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



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) △ Total Organic Vapour (ppm)							
		Geodetic Ground Surface Elevation: 178.2 m							20	40	60	80	100	200	300	400	
	Brown Silty Clay/Clayey Silt FILL trace gravel and sand firm to very soft apl to wtpl 75 mm seam of gravel with asphalt at ~ 0.8 mbgs	SS	1	54	5		178	○				*	0			Soil Sample BH-428-1 at 0.1-0.8 mbgs submitted for laboratory analysis of Metals, EC, SAR, pH.	
							177	○				*	0				
							176	○				*	0				
	some organics in SS-4						175	○				*	0				
							174	○				*	0				
							173	○				*	0				
	turns grey at ~ 4.6 mbgs						172	○				*	0				
							171	○				*	0				
							170	○				*	0				
	Brown SILTY CLAY/CLAYEY SILT trace gravel firm apl to wtpl						169	○				*	0				
	173.1 5.1						172	○				*	0				
							171	○				*	0				
							170	○				*	0				
	turns grey at ~ 9.4 mbgs						169	○				*	0				
	168.4 9.8						168.4	○				*	0				
	END OF BOREHOLE						168.4	○				*	0				

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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.

RECORD OF BOREHOLE No. **BH-429**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768161N; 654427E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 25, 19** Date Completed: **Jun 25, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Profile	SOIL SAMPLING	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
		Penetration Testing									
DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	SPT	DCPT	Combustible Organic Vapour (ppm)	Combustible Organic Vapour (%LEL)	Total Organic Vapour (ppm)
Geodetic Ground Surface Elevation: 178.0 m											
150 mm TOPSOIL	SS	1	42	5		177.9			2		0.0
Brown Silty Clay/Clayey Silt FILL trace gravel firm to very stiff apl to dtpl	SS	2	58	6	1	177	○	●	2		0.0
	SS	3	79	16	2	176	○	●	3		0.0
	SS	4	100	13	3	175	○	●	3		0.0
Brown to Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel stiff to soft dtpl to wtpl	SS	5	100	8	4	174	○	●	5		0.0
	SS	6	83	9	5	173	○	●	5		0.0
	SS	7	71	12	6	172	○	●	4		0.0
	SS	8	100	2	7	171	○	●	4		0.0
turns grey at ~ 7.6 mbgs	VT	1			8	170	○	●	4		0.0
	SS	9	96	3	9	169	○	●	3		0.0
					10	168					
					11	167					
350 mm seam of red silt at ~ 12.3 mbgs	SS	10	83	5	12	166	○	●	2		0.0
					13	165					
					14	164					
	SS	11	100	4	15	163	○	●	1		0.0
					16	162					
					17	161					
					18	160					

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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.

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RECORD OF BOREHOLE No. **BH-429**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768161N; 654427E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 25, 19** Date Completed: **Jun 25, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT				* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)					
							20	40	60	80	100	200	300	400			
	Brown to Reddish Brown SILTY CLAY/CLAYEY SILT trace gravel stiff to soft dtpl to wtpl	SS	12	100	6	19	159							5 * 0.0			
	Grey CLAYEY SILT some gravel loose moist					20	158										
	Brown SILTY SAND trace gravel compact saturated	SS	13	75	19	21	157							1 * 0.0			
	Brown SILTY CLAY/CLAYEY SILT trace gravel stiff wtpl	SS	14	100	41	22	156							1 * 0.0			
	END OF BOREHOLE					23	155										
						24	154										

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.

RECORD OF BOREHOLE No. **BH-430**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768102N; 654396E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 24, 19** Date Completed: **Jun 24, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



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)		
		Geodetic Ground Surface Elevation: 178.0 m							20 40 60 80		100 200 300 400		
	100 mm TOPSOIL 177.9	SS	1	54	5								
	Brown Silty Clay/Clayey Silt FILL trace gravel firm apl 176.5	SS	2	58	6	1	177						
	Brown SILTY CLAY/CLAYEY SILT trace gravel very stiff to stiff to soft dtpl to wtpl 1.4	SS	3	100	17	2	176						
		SS	4	100	16	3	175						
		SS	5	83	10	4	174						
		SS	6	100	7	5	173						
		SS	7	100	9	6	172						
		SS	8	100	8	7	171						
	turns grey at ~ 9.1 mbgs	SS	9	100	3	8	170						
		SS	10	100	4	9	169						
		SS	11	100	7	10	168						
	firm	SS	12	100	4	11	167						
		SS	13	100	4	12	166						
		SS	14	100	4	13	165						
		SS	15	100	7	14	164						
		SS	16	100	7	15	163						
	END OF BOREHOLE 161.5	VT	1			16	162						
	16.5												

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∇ No freestanding groundwater measured in open borehole on completion of drilling. ■ Cave in depth after removal of augers: 14.3 m.

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 : 100
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RECORD OF BOREHOLE No. **BH-432**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767997N; 654412E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 26, 19** Date Completed: **Jun 26, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)						
Geodetic Ground Surface Elevation: 177.1 m										
Lithology Plot	100 mm TOPSOIL	SS	1	29	2	176.9				Soil Sample BH-432-1 at 0.1-0.8 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-432-2 at 0.8-1.5 mbgs submitted for laboratory analysis of Metals. Soil Sample BH-432-3 at 1.5-2.1 mbgs submitted for laboratory analysis of Metals.
	Brown Silty Clay/Clayey Silt FILL trace gravel and trace to none sand and rootlets soft to very soft apl to wtpl	SS	2	100	3	176				
		SS	3	83	2	175				
		SS	4	63	2	174				
		SS	5	67	1	173				
		SS	6	71	1	172				
		SS	7	75	12	171				
		SS	8	100	11	170				
		SS	9	100	7	169				
						168				
						167				
						166				
						165				
						164				
					163					
					162					
					161					
					160					
					159					
					158					
					157					
					156					
					155					
					154					
					153					
					152					
					151.5					
					25.6					
	END OF BOREHOLE									

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▽ Groundwater depth encountered on completion of drilling: 7.0 m. ■ Cave in depth after removal of augers: 14.6 m.

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.

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RECORD OF BOREHOLE No. **BH-434**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768010N; 654523E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 24, 19** Date Completed: **Jun 24, 19**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT			* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)
Geodetic Ground Surface Elevation: 176.3 m											
Lithology Plot 125 mm TOPSOIL Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets soft apl Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures very stiff to stiff to firm dtpl to wtpl turns reddish brown at ~ 2.0 mbgs 205 mm silt seam at ~ 5.0 mbgs turns grey at ~ 6.1 mbgs SS-9: stiff turns reddish grey at ~ 12.2 mbgs 160.4 15.8	SS	1	58	3	176	0	2.0	10		Soil Sample BH-434-1 at 0.1-0.8 mbgs submitted for laboratory analysis of Metals.	
	SS	2	71	11	175	○	1.0	20			
	SS	3	100	19	174	○	1.0	5			
	SS	4	100	15	173	○	2.0	0			
	SS	5	88	11	172	○	1.0	0			
	SS	6	100	15	171	○	1.0	0			
	SS	7	83	6	170	○	1.0	0			
	SS	8	100	5	169	○	2.0	0			
	VT	1			168			2.0			0
	SS	9	71	15	167	○	1.0	0			
	SS	10	71	7	164	○	1.0	0			
SS	11	92	4	161	○	2.0	0				
END OF BOREHOLE											

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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.

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RECORD OF BOREHOLE No. **BH-436**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767958N; 654594E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 18, 19** Date Completed: **Jun 18, 19**
 Logged by: **DN** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing		* Combustible Organic Vapour (ppm)									
								○ SPT	● DCPT	* Combustible Organic Vapour (%LEL)									
								20	40	60	80	△ Total Organic Vapour (ppm)							
								100	200	300	400								
	Brown to Grey SILTY CLAY/CLAYEY SILT trace gravel firm wtpl					160													
		SS	11	100	7	159		○				*	0						
	155 mm wet silt seam at ~ 18.6 mbgs	SS	12	58	8	158		○				*	0						
							157												
						156													
						155													
	Brown SILT trace clay dense wet					154.0 20.1													
		SS	13	100	27	153		○				*	0						
						152													
						151													
	Brown to Grey SILTY CLAY/CLAYEY SILT trace gravel and silt seams stiff apl					151.0 23.2													
		SS	14	75	13	150		○				*	0						
						149.2													
	END OF BOREHOLE					25.0													

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.

RECORD OF BOREHOLE No. **BH-439**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768110N; 654692E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Sep 12, 18** Date Completed: **Sep 12, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT				* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)					
		Geodetic Ground Surface Elevation: 177.2 m							20	40	60	80	100	200	300	400	
	50 mm TOPSOIL 177.1	SS	1	58	9												
	Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets stiff dtpl 176.2 1.0	SS	2	100	24	1	176										Soil Sample BH-439-2C at 0.8-1.2 mbgs submitted for laboratory analysis of Metals and EC
	Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures very stiff to stiff to firm apl to wtpl	SS	3	100	28	2	175										PPT =450 kPa
		SS	4	100	15	3	174										
		SS	5	100	17	4	173										
		SS	6	100	12	5	172										PPT =250 kPa
		SS	7	100	7	6	171										
	turns grey at ~ 7.6 mbgs	SS	8	100	5	7	170										
		VT	1			8	169										
	SS-9: soft	SS	9	100	3	9	168										
						10	167										
		SS	10	100	6	11	166										
		SS	11	100	6	12	165										
						13	164										
						14	163										
		SS	12	100	8	15	162										
						16	161										
						17	160										
		SS	13	100	7	18	159										
						19	158										
	becomes stiff at ~ 19.8 mbgs	SS	14	100	11	20	157										
	END OF BOREHOLE 20.3																PPT - Pocket Penetrometer Test (kPa)

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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.

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RECORD OF BOREHOLE No. **BH-442**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768058N; 654812E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Jun 20, 19** Date Completed: **Jun 20, 19**
 Logged by: **DN** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT				* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)					
	Geodetic Ground Surface Elevation: 176.4 m																
	208 mm TOPSOIL Brown to Reddish Brown Silty Clay/Clayey Silt FILL trace gravel and rootlets firm to stiff dtpl	SS	1	50	7	176	176.2	○				*	0.0			Soil Sample BH-442-2 at 0.8-1.2 mbgs submitted for laboratory analysis of Metals, and EC. Soil Sample BH-442-3 at 1.5-2.1 mbgs submitted for laboratory analysis of Metals, and EC. Soil Sample BH-442-4 at 2.3-3.0 mbgs submitted for laboratory analysis of Metals, and EC. Soil Sample BH-442-5 at 3.0-3.7 mbgs submitted for laboratory analysis of pH.	
		SS	2	58	15	175	175.2	○				*	0.0				
		SS	3	83	13	174	174.4	○				*	0.0				
	Reddish Brown to Brown SILTY CLAY/CLAYEY SILT trace gravel stiff to hard dtpl to wtpl	SS	4	83	10	173	173.4	○				*	0.0				
		SS	5	100	42	172	172.4					*	0.0				
		SS	6	100	23	171	171.4	○				*	1.0				
		SS	7	100	10	170	170.4	○				*	1.0				
	turns grey at ~ 6.1 mbgs firm to soft	SS	8	100	3	169	169.4	○				*	0.0				
		SS	9	100	6	168	168.4	○				*	1.0				
		SS	10	100	3	167	167.4	○				*	2.0				
	END OF BOREHOLE	SS	11	100	4	166	166.4	○				*	3.0				
						165	165.4					*	0.0				
						164	164.4					*	0.0				
						163	163.4					*	0.0				
						162	162.4					*	0.0				
						161	161.4					*	0.0				
						160.5	160.5					*	2.0				

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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.

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RECORD OF BOREHOLE No. **BH-444**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767926N; 653615E**

Drilling Method: **150 mm Solid Stem Augers**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Sep 10, 18** Date Completed: **Sep 10, 18**
 Logged by: **SH** Compiled by: **SH**
 Reviewed by: **TR** Revision No.: **1, 10/8/19**



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) △ Total Organic Vapour (ppm)							
		Geodetic Ground Surface Elevation: 178.8 m							20	40	60	80	100	200	300	400	
	50 mm TOPSOIL 178.8																
	Brown Silty Clay/Clayey Silt FILL some sand and gravel firm apl	SS	1	58	8		178	○									
		SS	2	89	4	1	178	○									
		SS	3	67	4	2	177	○									
	Grey to Brown SILTY CLAY/CLAYEY SILT trace gravel and grey fissures very stiff to stiff dtpl to apl	SS	4	100	17		176	○									
		SS	5	56	16	3	176	○									
						4	175										
	turns reddish brown at ~ 4.6 mbgs	SS	6	100	13	5	174	○									PPT =250 kPa
						6	173										
		SS	7	100	9	7	172	○									
						8	171	○									
	END OF BOREHOLE 170.7 8.1																

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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.

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RECORD OF BOREHOLE No. **BH-501**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767982N; 653637E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 30, 20** Date Completed: **Nov 30, 20**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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: 181.0 m							20	40	60	80	100	200	300	400	
	Topsoil 180.9																
	Brown 0.1 Silty Clay/Clayey Silt FILL trace sand and gravel, with rootlets to 1.5 mbgs soft to firm/stiff dtpl to wtpl	SS	1	33	8												
						1	180										Soil sample BH-501-1C at 0.1 to 0.6 mbgs submitted for laboratory analysis of metals.
		SS	2	17	8												
		SS	3	58	6												
						2	179										Soil sample BH-501-2C at 0.8 to 1.3 mbgs submitted for laboratory analysis of metals.
		SS	4	100	3												
		SS	5	83	4												
						3	178										
	Grey from 3.6 to 3.7 mbgs Possible Original Topsoil 177.4																
	177.5 END OF BOREHOLE 3.7																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.

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RECORD OF BOREHOLE No. **BH-502**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767999N; 653692E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 30, 20** Date Completed: **Nov 30, 20**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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: 181.9 m							20 40 60 80		100 200 300 400			
	Topsoil 181.7													
	Brown Silty Clay/Clayey Silt FILL trace sand and gravel, with rootlets to 1.5 mbgs soft to firm dtpl to wtpl 0.1	SS	1	58	7			○					Soil sample BH-502-1C at 0.1 to 0.6 mbgs submitted for laboratory analysis of metals.	
						181								
		SS	2	83	6			○						Soil sample BH-502-2C at 0.8 to 1.3 mbgs submitted for laboratory analysis of metals.
		SS	3	75	5			○						
	Brown/grey from 2.3 mbgs													
		SS	4	75	4			○						
		SS	5	83	4			○						
	END OF BOREHOLE 178.2 3.7												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.

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RECORD OF BOREHOLE No. **BH-503**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768033N; 653655E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 30, 20** Date Completed: **Nov 30, 20**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Local Ground Surface Elevation: 179.2 m										
Topsoil 179.1										
Brown Silty Clay/Clayey Silt FILL trace sand, gravel and rootlets soft to firm dtpl										
	SS	1	67	7	179	○				Soil sample BH-503-1C at 0.1 to 0.6 mbgs submitted for laboratory analysis of metals.
	SS	2	83	7	178	○				
	SS	3	50	3	177	○			Soil sample BH-503-2C at 0.8 to 1.3 mbgs submitted for laboratory analysis of metals.	
Grey/black organic staining starting at 2.0 mbgs Possible Original Topsoil 177.0										
Brown Silty Clay/Clayey Silt NATIVE trace sand and gravel stiff to very stiff dtpl 177.0										
	SS	4	75	13	176	○				
	SS	5	83	22	175.6	○				
END OF BOREHOLE 175.6										
3.7										
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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RECORD OF BOREHOLE No. **BH-504**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768186N; 653808E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 26, 20** Date Completed: **Nov 26, 20**
 Logged by: **DN** Compiled by: **BH**
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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)		
		Local Ground Surface Elevation: 179.2 m							20 40 60 80		100 200 300 400		
	Topsoil												
	Brown Silty Clay FILL trace sand and gravel, with rootlets to 1.5 mbgs soft to stiff apl to wtpl	SS	1	58	7		179	○					Soil sample BH-504-1C at 0.2 to 0.6 mbgs submitted for laboratory analysis of metals.
		SS	2	75	11	1	178	○					
		SS	3	58	7	2	177	○					
	Brown/grey from 2.3 mbgs												Soil sample BH-504-2C at 0.8 to 1.3 mbgs submitted for laboratory analysis of metals.
		SS	4	75	3	3	176	○					
	END OF BOREHOLE												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.

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RECORD OF BOREHOLE No. **BH-505**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768202N; 653835E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 26, 20** Date Completed: **Nov 26, 20**
 Logged by: **DN** Compiled by: **BH**
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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: 179.0 m							20	40	60	80	100	200	300	400	
	Topsoil																
	Brown Silty Clay FILL some gravel to 0.7 mbgs, then trace gravel to 2.2 mbgs, trace sand from 1.5 to 2.2 mbgs, stiff to very soft apl to wpl	SS	1	0	10												
						1	178										Soil sample BH-505-1C at 0.15 to 0.6 mbgs submitted for laboratory analysis of metals.
		SS	2	67	6												
						2	177										Soil sample BH-505-2C at 0.8 to 1.3 mbgs submitted for laboratory analysis of metals.
	Grey from 3.1 mbgs	SS	3	75	6												
						3	176										
		SS	4	67	4												
		SS	5	50	1												
	END OF BOREHOLE																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.

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RECORD OF BOREHOLE No. **BH-506**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767852N; 354169E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 26, 20** Date Completed: **Nov 26, 20**
 Logged by: **DN** Compiled by: **BH**
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Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Local Ground Surface Elevation: 180.0 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	* Combustible Organic Vapour (ppm)			* Combustible Organic Vapour (%LEL)			Δ Total Organic Vapour (ppm)			
								○ SPT	● DCPT	20	40	60	80	100	200	300	400		
	Topsoil	179.8																	
	Brown Silty Clay/Clayey Silt FILL trace rootlets to 1.5 mbgs, some to trace sand, trace gravel soft to firm dtpl to wtpl	0.2	SS	1	42	4													
							1	179											
							2	178											
							3	177											
							4	176											
	Grey to brown/reddish brown Silty Clay/Clayey Silt NATIVE trace sand firm to very stiff dtpl/apl	175.8																	
		4.1																	
							5	175											
							6	174											
	END OF BOREHOLE	173.3																	
		6.7																	

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∇ Groundwater depth encountered on completion of drilling: **6.1 m.**

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.

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RECORD OF BOREHOLE No. **BH-507**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767802N; 654194E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 26, 20** Date Completed: **Nov 26, 20**
 Logged by: **DN** Compiled by: **BH**
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Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Local Ground Surface Elevation: 179.1 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	SPT			DCPT	* Combustible Organic Vapour (ppm)				
	TOPSOIL	178.9																
	Brown Silty Sand/Sandy Silt FILL loose moist	0.2	SS	1	79	5		178.9	○			*						
	Brown/grey Silty Clay/Clayey Silt FILL some trace sand some rootlets from 0.7 to 2.2 mbgs trace gravel from 3.0 to 4.1 mbgs very soft to soft wtpl	0.7	SS	2	75	2	1	178.3	○			*					Soil sample BH-507-1C at 0.15 to 0.6 mbgs submitted for laboratory analysis of metals.	
			SS	3	100	0	2	177.6	○			*						
			SS	4	75	2			○			*						
			SS	5	75	1	3	176.6	○			*						
							4	175.6									Soil sample BH-507-5C 3.1 to 3.7 mbgs submitted for laboratory analysis of metals.	
	Grey to brown Silty Clay/Clayey Silt NATIVE Possible original topsoil at 4.6 mbgs some sand to trace gravel soft to hard apl /wtpl to dtpl	4.6	SS	6	50	4	5	174.0	○			*						
							6	173.4				*						
	END OF BOREHOLE	6.7															Upon Completion: Borehole remained open with water entering to 6.1 mbgs.	

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∇ Groundwater depth encountered on completion of drilling: **6.1 m.**

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.

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RECORD OF BOREHOLE No. BH-508

Project Number: TPB184078
 Project Client: GR (CAN) Investments Co. Ltd
 Project Name: Riverfront Community
 Project Location: Chippawa Pkwy, Niagara Falls
 Drilling Location: 4767900N; 654188E

Drilling Method: 150 mm Solid Stem Augering
 Drilling Machine: Track Mounted Drill
 Date Started: Nov 26, 20 Date Completed: Nov 26, 20
 Logged by: DN Compiled by: BH
 Reviewed by: KP Revision No.: 1, 6/16/21



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)			
									20	40	60	80	100	200	300	400	
																	Upon Completion: Borehole remained open and dry.

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.

RECORD OF BOREHOLE No. **BH-509**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767871N; 654210E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Nov 26, 20** Date Completed: **Nov 26, 20**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				SOIL SCREENING				INSTRUMENTATION INSTALLATION	COMMENTS		
	DESCRIPTION	Local Ground Surface Elevation: 179.0 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	* Combustible Organic Vapour (ppm)			* Combustible Organic Vapour (%LEL)			Δ Total Organic Vapour (ppm)				
									○ SPT	● DCPT	20	40	60	80	100	200	300	400		
	TOPSOIL	178.8																		
	Brown Silty Sand/Sandy Silt FILL trace rootlets loose moist	0.2	SS	1	83	4			○											
							1	178												
	Brown Silty Clay/Clayey Silt FILL some sand soft to very soft w/pl	177.6	SS	2	83	6			○											
		1.4					2	177												
	Brown Clayey Silt FILL some sand soft to very soft w/pl	176.0	SS	3	75	2			○											
		3.0					3	176												
	Brown Silty Clay FILL possible original topsoil some organics very soft d/pl	175.4	SS	4	75	1			○											
		3.6					4	175												
	Brown Silty Clay NATIVE trace sand and gravel very stiff d/pl	174.9	SS	5	75	0			○											
		4.1					4	175												
							5	174												
	END OF BOREHOLE	173.8																		
		5.2																		

Soil sample BH-509-1C at 0.15 to 0.6 mbgs submitted for laboratory analysis of metals.

Soil sample BH-509-5C at 3.1 to 3.7 mbgs submitted for laboratory analysis of metals.

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∇ Groundwater depth encountered on completion of drilling: **4.6 m.**

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.

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RECORD OF BOREHOLE No. **BH-509**

Project Number: TPB184078
 Project Client: GR (CAN) Investments Co. Ltd
 Project Name: Riverfront Community
 Project Location: Chippawa Pkwy, Niagara Falls
 Drilling Location: 4767871N; 654210E

Drilling Method: 150 mm Solid Stem Augering
 Drilling Machine: Track Mounted Drill
 Date Started: Nov 26, 20 Date Completed: Nov 26, 20
 Logged by: DN Compiled by: BH
 Reviewed by: KP Revision No.: 1, 6/16/21



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)			
									20	40	60	80	100	200	300	400	
																	Upon Completion: Borehole remained open with water entering to 4.6 mbgs.

RECORD OF BOREHOLE No. **BH-510**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768173N; 654423E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 18, 21** Date Completed: **Mar 18, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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)		
		Local Ground Surface Elevation: TOPSOIL							20 40 60 80		100 200 300 400		
	Brown Silty Clay/Clayey Silt FILL very stiff dpl					0.2							
	Brown to Reddish Brown Silty Clay/Clayey Silt NATIVE trace sand stiff to very stiff dpl	SS	1	75	17	1.5		○					Soil sample BH-510-1C at 1.5 to 2.1 mbgs submitted for laboratory analysis of metals.
		SS	2	100	15	2.3		○					Soil sample BH-510-2C and Dup-B at 2.3 to 2.9 mbgs submitted for laboratory analysis of metals.
		SS	3	100	15	3.0		○					
		SS	4	100	16	4.0		○					
	END OF BOREHOLE					4.4							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.

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RECORD OF BOREHOLE No. **BH-511**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768118N; 654421E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 18, 21** Date Completed: **Mar 18, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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)		
		Local Ground Surface Elevation: TOPSOIL							20 40 60 80		100 200 300 400		
	Brown Silty Clay/Clayey Silt FILL trace sand, gravel and rootlets very stiff dtp					0.2							
	Brown Silty Clay/Clayey Silt NATIVE trace gravel stiff to very stiff dtp	SS	1	75	22	1.5		○					Soil sample BH-511-1C at 1.5 to 2.1 mbgs submitted for laboratory analysis of metals.
	Brown Silty Clay/Clayey Silt NATIVE trace gravel stiff to very stiff dtp	SS	2	83	24	2.1		○					Soil sample BH-511-3C at 3.1 to 3.7 mbgs submitted for laboratory analysis of metals.
	Brown Silty Clay/Clayey Silt NATIVE trace gravel stiff to very stiff dtp	SS	3	100	17	3.1		○					Soil sample BH-511-3C at 3.1 to 3.7 mbgs submitted for laboratory analysis of metals.
	Brown Silty Clay/Clayey Silt NATIVE trace gravel stiff to very stiff dtp	SS	4	100	12	3.7		○					Soil sample BH-511-3C at 3.1 to 3.7 mbgs submitted for laboratory analysis of metals.
	END OF BOREHOLE					4.4							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.

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RECORD OF BOREHOLE No. **BH-513**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768025N; 654435E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 19, 21** Date Completed: **Mar 19, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT	* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation: TOPSOIL						20 40 60 80	100 200 300 400			
	Brown Silty Clay/Clayey Silt FILL trace rootlets from 0.15 to 0.6 mbgs firm to very stiff dtpI	SS	1	75	6	0.2					
		SS	2	92	6	1					
		SS	3	100	10	2					Soil sample BH-513-2C at 0.8 to 1.4 mbgs submitted for laboratory analysis of metals.
		SS	4	83	17	3					Soil sample BH-513-3C at 1.5 to 2.1 mbgs submitted for laboratory analysis of metals.
	Brown Silty Clay/Clayey Silt NATIVE trace gravel very stiff dtpI	SS	5	100	18	3.0					
		SS	6	100	21	4					Soil sample BH-513-5C at 3.8 to 4.4 mbgs submitted for laboratory analysis of metals.
	END OF BOREHOLE					4.4					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. **BH-514**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768005N; 654462E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 19, 21** Date Completed: **Mar 19, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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: TOPSOIL							20	40	60	80	100	200	300	400	
	Brown Silty Clay/Clayey Silt FILL stiff to firm dtpl	SS	1	75	8	0.2											
	Brown Silty Clay/Clayey Silt NATIVE trace gravel very stiff to stiff dtpl	SS	2	100	7	1											
	Brown Silty Clay/Clayey Silt NATIVE trace gravel very stiff to stiff dtpl	SS	3	83	5	2											
	Brown Silty Clay/Clayey Silt NATIVE trace gravel very stiff to stiff dtpl	SS	4	100	21	3											
	Brown Silty Clay/Clayey Silt NATIVE trace gravel very stiff to stiff dtpl	SS	5	100	16	4											
	Brown Silty Clay/Clayey Silt NATIVE trace gravel very stiff to stiff dtpl	SS	6	100	14	4											
	END OF BOREHOLE					4.4											

Soil sample BH-514-2C at 0.8 to 1.4 mbgs submitted for laboratory analysis of metals.

Soil sample BH-514-4C at 2.3 to 2.9 mbgs submitted for laboratory analysis of metals.

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.

RECORD OF BOREHOLE No. **BH-515**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767975N; 654574E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 19, 21** Date Completed: **Mar 19, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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)		
		Local Ground Surface Elevation: TOPSOIL							20 40 60 80		100 200 300 400		
	Straigh drill to 1.5 mbgs					0.2							
	Brown Silty Clay/Clayey Silt FILL trace sand very stiff dtpl	SS	1	75	22	1.5			○				
		SS	2	100	25				○				
	Brown Silty Clay/Clayey Silt NATIVE trace gravel stiff dtpl to apl	SS	3	100	9	3.0			○				Soil sample BH-515-2C at 2.3 to 2.9 mbgs submitted for laboratory analysis of metals.
		SS	4	100	12				○				Soil sample BH-515-3C at 3.1 to 3.7 mbgs submitted for laboratory analysis of metals.
		SS	5	175	15				○				Soil sample BH-515-4C at 3.8 to 4.4 mbgs submitted for laboratory analysis of metals.
	END OF BOREHOLE					5.2							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.

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RECORD OF BOREHOLE No. **BH-517**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4767942N; 654641E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 19, 21** Date Completed: **Mar 19, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT	* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation: TOPSOIL										
	Straigh drill to 1.5 mbgs	0.2									
	Brown Silty Clay/Clayey Silt FILL very stiff dtpl	1.5	SS	1	58	20	○				Soil sample BH-517-1C at 1.5 to 2.1 mbgs submitted for laboratory analysis of metals.
	Brown Silty Clay/Clayey Silt NATIVE trace sand and gravel firm to stiff dtpl to apl	3.0	SS	2	83	16	○				Soil sample BH-517-2C at 2.3 to 2.9 mbgs submitted for laboratory analysis of metals.
			SS	3	100	13	○				
			SS	4	50	20	○				
			SS	5	83	11	○				
	END OF BOREHOLE	5.2									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.

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RECORD OF BOREHOLE No. **BH-518**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768052N; 654669E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 18, 21** Date Completed: **Mar 18, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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)		
		Local Ground Surface Elevation: TOPSOIL with organics							20 40 60 80		100 200 300 400		
	Grey Silty Clay/Clayey Silt FILL some organics trace gravel soft to stiff apl to wtpl to dtpl					0.6							
		SS	1	58	6			○					
		SS	2	67	4			○					
		SS	3	67	5			○					
	Turns brown/grey at 3.8 mbgs												
		SS	4	75	12			○					
		SS	5	79	30			○					
		SS	6	100	23			○					
	END OF BOREHOLE					5.9							

Soil sample BH-518-2C and Dup-C at 2.3 to 2.9 mbgs submitted for laboratory analysis of EC.

Soil sample BH-518-3C at 3.1 to 3.7 mbgs submitted for laboratory analysis of EC.

Soil sample BH-518-6C at 5.3 to 5.9 mbgs submitted for laboratory analysis of EC.

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.

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RECORD OF BOREHOLE No. BH-519

Project Number: TPB184078
 Project Client: GR (CAN) Investments Co. Ltd
 Project Name: Riverfront Community
 Project Location: Chippawa Pkwy, Niagara Falls
 Drilling Location: 4768048N; 654756E

Drilling Method: 150 mm Solid Stem Augering
 Drilling Machine: Track Mounted Drill
 Date Started: Mar 18, 21 Date Completed: Mar 18, 21
 Logged by: DN Compiled by: BH
 Reviewed by: KP Revision No.: 1, 6/16/21



Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing ○ SPT ● DCPT	* Combustible Organic Vapour (ppm) ◆ Combustible Organic Vapour (%LEL) △ Total Organic Vapour (ppm)		
	Local Ground Surface Elevation: Straight drill to 3.0 mbgs					1					
	Brown Silty Clay/Clayey Silt FILL trace sand and rootlets stiff to very stiff dtpI	SS	1	75	12	3	○				Soil sample BH-519-1C at 3.1 to 3.7 mbgs submitted for laboratory analysis of EC.
		SS	2	75	25	4	○				
	Brown Silty Clay/Clayey Silt NATIVE trace sand and gravel fissured hard to stiff dtpI to apl	SS	3	83	31	5	○				Soil sample BH-519-3C at 4.6 to 5.2 mbgs submitted for laboratory analysis of EC.
		SS	4	100	18	6	○				
		SS	5	100	12	7	○				Soil sample BH-519-4C at 5.3 to 5.9 mbgs submitted for laboratory analysis of EC.
		SS	6	100	11	7	○				
		SS	7	100	10	8	○				
	END OF BOREHOLE					8.2					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.

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RECORD OF BOREHOLE No. **BH-520**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768134N; 654758E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 18, 21** Date Completed: **Mar 18, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



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: Straight drill to 3.0 mbgs					1							
	Brown Silty Clay/Clayey Silt FILL trace sand, some organics stiff dtpl to apl	SS	1	58	12	3		○						Soil sample BH-520-1C at 3.1 to 3.7 mbgs submitted for laboratory analysis of EC.
		SS	2	67	9	4		○						
		SS	3	58	13	5		○						
	Brown Silty Clay/Clayey Silt NATIVE trace sand and gravel, trace organics from 5.3 to 6.0 mbgs very stiff dtpl	SS	4	83	23	5.3		○					Soil sample BH-520-4C at 5.3 to 5.9 mbgs submitted for laboratory analysis of EC.	
		SS	5	75	30	6		○						
		SS	6	83	20	7		○					Soil sample BH-520-5C at 6.1 to 6.7 mbgs submitted for laboratory analysis of EC.	
		SS	7	100	18	8		○						
	END OF BOREHOLE					8.2							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.

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RECORD OF BOREHOLE No. **BH-521**

Project Number: **TPB184078**
 Project Client: **GR (CAN) Investments Co. Ltd**
 Project Name: **Riverfront Community**
 Project Location: **Chippawa Pkwy, Niagara Falls**
 Drilling Location: **4768120N; 654685E**

Drilling Method: **150 mm Solid Stem Augering**
 Drilling Machine: **Track Mounted Drill**
 Date Started: **Mar 18, 21** Date Completed: **Mar 18, 21**
 Logged by: **DN** Compiled by: **BH**
 Reviewed by: **KP** Revision No.: **1, 6/16/21**



LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	SOIL SCREENING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value	Penetration Testing ○ SPT ● DCPT		
Local Ground Surface Elevation: TOPSOIL							20 40 60 80	100 200 300 400		
	SS	1	58	4		○				
	SS	2	58	20	1	○				
	SS	3	83	18	2	○				Soil sample BH-521-2C at 0.8 to 1.3 mbgs submitted for laboratory analysis of EC.
	SS	4	100	22	3	○				Soil sample BH-521-3C at 1.5 to 2.1 mbgs submitted for laboratory analysis of EC.
	SS	5		18		○				
END OF BOREHOLE					3.7					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.

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APPENDIX B

SAMPLING AND ANALYSIS PLAN

Memo

To: Field Staff
From: Patrick Shriner, P.Geo., QP_{ESA}
cc: Deanna Mazachowsky and Kelly Patterson
Date: December 1, 2015 and March 2021
Re. **Phase Two ESA Sampling and Quality Assurance Plan,
Riverfront Community, Niagara Falls**

Scope of Sampling Program

The proposed number of boreholes, monitoring wells, testpits and the rationale for the location of each was determined by Wood. The soil/fill and ground water samples are to be analyzed for one or more of the following potential contaminants of concern (COCs): PAHs, PHCs, VOCs including BTEX and various metal and/or inorganic parameters (EC, SAR and pH). The sample depths and parameters to be analyzed will be determined based on observations during the soil and ground water sampling programs and reviewed with the QP_{ESA} prior to submission. Field observations may indicate a need for additional numbers or types of samples, e.g., vertical and horizontal delineation. If such field observations are made, contact Patrick Shriner (905-687-6616) and report the observations.

Any deviations from the planned scope of work and the rationale for the deviation(s) are to be approved by Patrick Shriner and are to be recorded in the field notes.

Sampling Rationale and Procedures

Sampling locations have been assessed on the basis of areas of potential environmental concern (APECs) identified during the Phase One ESA.

The following Wood Operating Procedures (SOPs) are to be followed during the Project and are incorporated herein by reference:

- SOP No. 1 - Equipment Calibration and Maintenance, Rev. No. 0, October 8, 2013;

- SOP No. 2 - Equipment Decontamination, Rev. No. 0, October 8, 2013;
- SOP No. 3 – Sample Location Inspection and Monitoring, Rev.0, October 8, 2013;
- SOP No. 4 – Measurement of Field Parameters, Rev.0, October 8, 2013;
- SOP No. 8 - Subsurface Soil Sampling, Rev. No. 0, October 8, 2013;
- SOP No. 10 – Soil Vapour Headspace Screening, Rev. No. 0, October 8, 2013;
- SOP No. 13 – Borehole Drilling and Soil Sampling, Rev. No. 0, October 8, 2013;
- SOP No. 14 – Monitoring Well Design and Construction, Rev. No. 0. October 8, 2013;
- SOP No. 16 – Ground Water and Liquid Level Monitoring, Rev. No. 0, October 8, 2013;
- SOP No. 17 – Ground Water Purging and Sampling, Rev. No. 0, October 8, 2013;
- SOP No. 18 – Ground Water Low Flow Sampling, Rev. No. 0, October 8, 2013;
- SOP No. 19 - Handling of Volatile Samples, Rev. No. 0, October 8, 2013;
- SOP No. 20 - Chain of Custody Completion, Rev. No. 0, October 8, 2013; and
- SOP No. 21 – Aquifer Response Testing, Bail/Slug Testing, Rev. No. 0, October 8, 2013.

Specifications regarding sampling procedures, well installations, field note-taking, instrument calibration, field measurements, surveying, collection of blind duplicate samples, etc., are provided in the SOPs. The remainder of this Section provides a brief summary of sampling procedures that are to be followed, which does not supersede the requirements of the SOPs with the exception of changes in sample handling/collection practices required under the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 2004, amended as of 01 July 2011*, in order to document site-specific information (e.g., contact persons).

Soil/fill and ground water samples are to be collected as per *O. Reg. 153/04*. Soil samples are to be collected at standard sampling locations throughout the full vertical extent of each borehole. Ground water samples are to be collected after the well has been both developed and purged.

Soil samples shall be submitted for analysis of parameters outlined above, as well as on the basis of the presence of fill material, visual or olfactory evidence of contamination, field screening results [hydrocarbons and VOCs (BTEX)], proximity to the apparent water table (LNAPLs) or the vicinity of the interface with a lower confining layer (DNAPLs). In the absence of any other indicators of impact, soil samples to be analyzed shall be collected from fill materials with the exception that

samples for VOCs (BTEX) may be collected from the vicinity of the water table or a lower confining layer and samples for PHC F1 – F4 may be collected from the vicinity of the water table. Any deviation from the sampling plan is to be approved by Patrick Shriner.

Samples are to be submitted for analysis with the Chain of Custody clearly marked "O. Reg. 153/04" and with Table 1 and RSC selected as the applicable criteria. *Soil samples to be analyzed for VOCs must be analyzed as per the revised Analytical Protocol which indicates field preservation in methanol.*

Monitoring wells are to be installed with the screen extending approximately 1 m below the apparent water table (unless this would penetrate a confining layer in a potential DNAPL environment) and a minimum of 0.5 m above the high water table. If there is no indication of where the high water level is (e.g., a change from brown to grey), use an assumed value of 1 m (this is used in O. Reg. 511/09).

Quality Assurance Program

The SOPs cited previously specify decontamination procedures, protocols for the collection of duplicate samples, the use of blank samples and instrument calibration checks, etc.

In the case of this Project, no non-dedicated sampling equipment, other than drilling equipment, is to be used.

Field duplicates will be collected at a ratio of 10 samples to 1 duplicate in soil and ground water samples and submitted for analysis for each analytical group/parameter in all media for which that testing is carried out at each site. One trip blank shall accompany all shipments of ground water samples submitted for analysis.



Patrick Shriner, P.Geol.
Associate Geoscientist

patrick.shriner@woodplc.com

Deviations from Sampling and Analysis Plan:

- Wood collected two (2) additional groundwater samples from the existing wells on the Phase Two Property which were installed by Wood in 2006.
- Twenty-nine delineation testpits were completed in December 2016 and resampling of MW202 in January 2017.
- Additional boreholes and monitoring wells were installed in 2018 and 2019 for delineation.
- Nineteen delineation boreholes were completed in 2020 and 2021.

APPENDIX C

RESIDUE MANAGEMENT





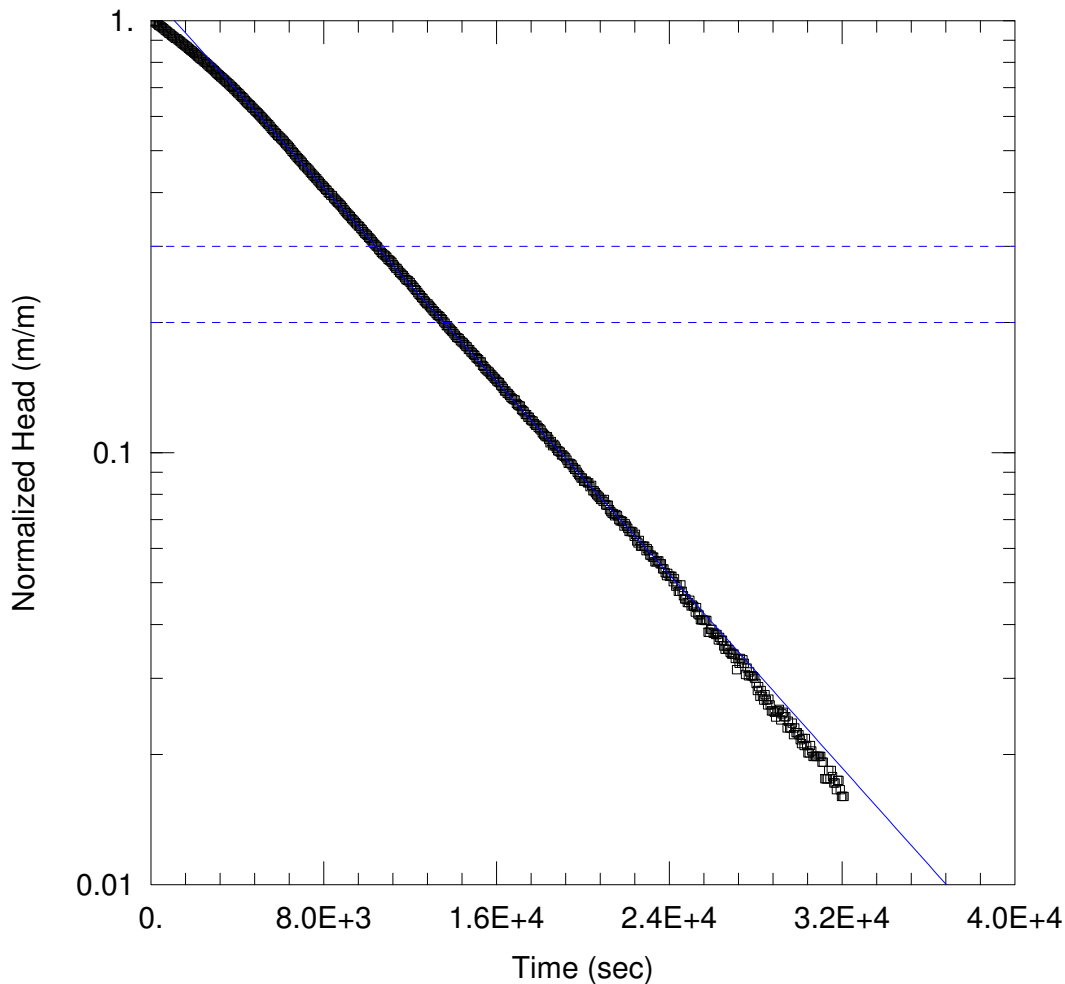
Residue Management

The soil cuttings for the project were spread within the vicinity of each borehole.

Liquid wastes generated during the investigation (well development and purge water) were stored in sealed 205 L drums. The containers will be disposed by an MECP-licensed waste hauler upon completion of the Phase Two ESA.

APPENDIX D

HYDRAULIC CONDUCTIVITY RESULTS



WELL TEST ANALYSIS

Data Set: P:\...\BHMW-101.aqt
Date: 03/22/16

Time: 09:50:57

PROJECT INFORMATION

Company: Amec Foster Wheeler
Client: GR (CAN) Investments Co., Ltd
Project: TG151118
Location: Niagara Falls, ON
Test Well: BH/MW-101
Test Date: February 2 - 3, 2016

AQUIFER DATA

Saturated Thickness: 4.8 m

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (BH/MW-101)

Initial Displacement: 3.36 m
Total Well Penetration Depth: 4.19 m
Casing Radius: 0.026 m

Static Water Column Height: 4.19 m
Screen Length: 3.05 m
Well Radius: 0.05 m

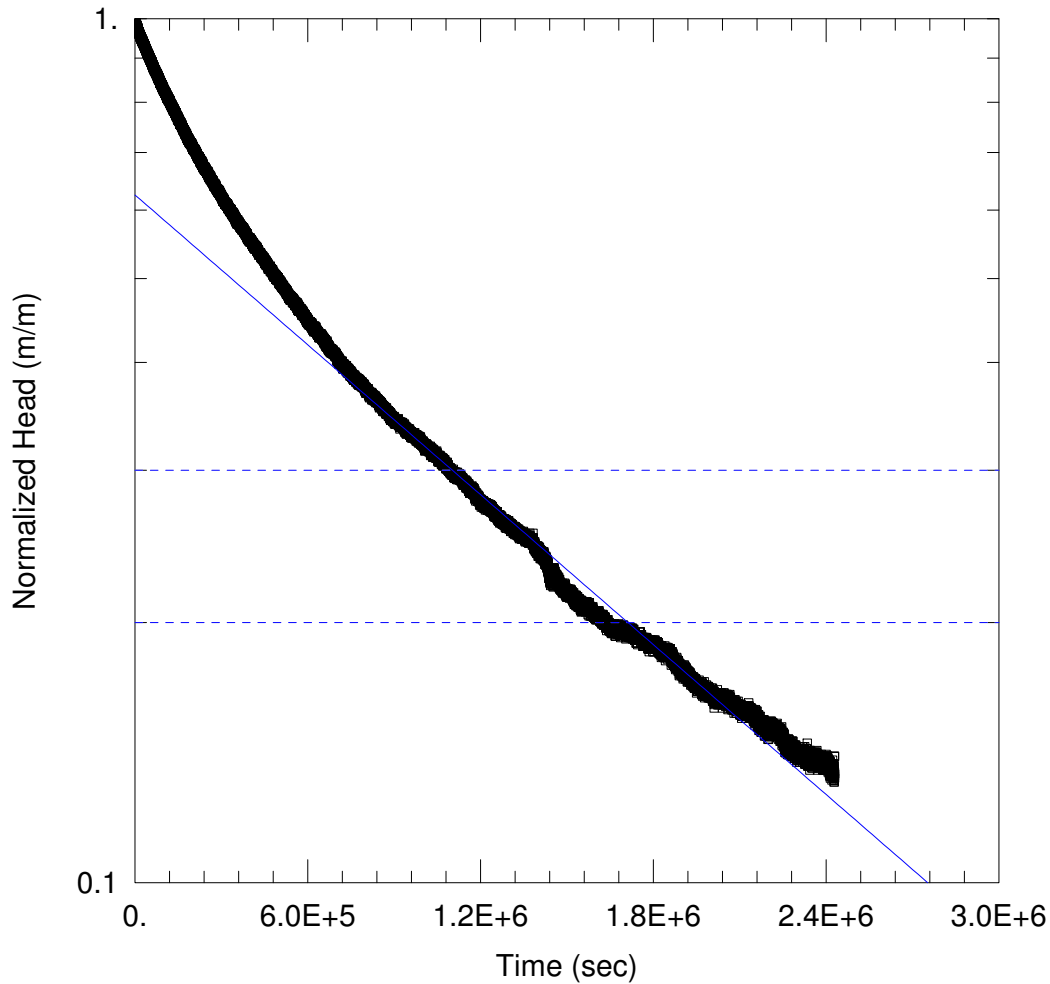
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 5.721E-8$ m/sec

$y_0 = 3.867$ m



WELL TEST ANALYSIS

Data Set: P:\...\BHMW-103.aqt
Date: 03/22/16

Time: 09:51:09

PROJECT INFORMATION

Company: Amec Foster Wheeler
Client: GR (CAN) Investments Co., Ltd
Project: TG151118
Location: Niagara Falls, ON
Test Well: BH/MW-103
Test Date: February 2 - March 1, 2016

AQUIFER DATA

Saturated Thickness: 2.81 m

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (BH/MW-103)

Initial Displacement: 1.4 m
Total Well Penetration Depth: 2.2 m
Casing Radius: 0.026 m

Static Water Column Height: 2.2 m
Screen Length: 2.2 m
Well Radius: 0.05 m

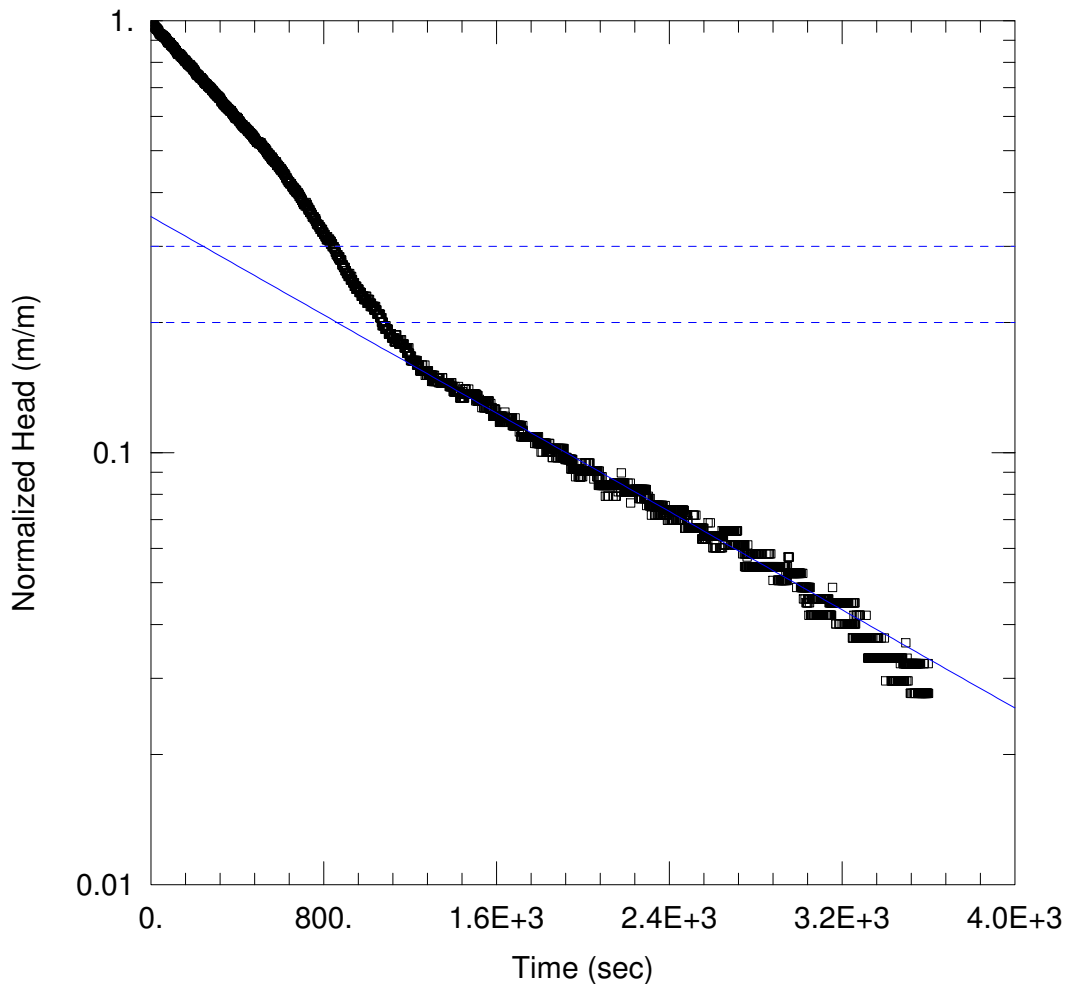
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.605E-10 m/sec

y0 = 0.875 m



WELL TEST ANALYSIS

Data Set: P:\...\BHMW-202.aqt
Date: 03/22/16

Time: 09:51:35

PROJECT INFORMATION

Company: Amec Foster Wheeler
Client: GR (CAN) Investments Co., Ltd
Project: TG151118
Location: Niagara Falls, ON
Test Well: BH/MW-202
Test Date: February 19, 2016

AQUIFER DATA

Saturated Thickness: 3.18 m

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (BH/MW-202)

Initial Displacement: 0.96 m
Total Well Penetration Depth: 3.18 m
Casing Radius: 0.0254 m

Static Water Column Height: 3.18 m
Screen Length: 1.6 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 4.84E-7$ m/sec

$y_0 = 0.3377$ m

APPENDIX E

LABORATORY CERTIFICATES OF ANALYSIS

SOIL AND GROUND WATER

AND

PREVIOUS DATA TABLES

Certificate of Analysis

Wood Environment & Infrastructure (Thorold)

110 Jame Street Suite 301
St. Catharines, ON L2R 7E8
Attn: Kelly Patterson

Client PO:

Project: TP184078.C010

Custody: 129913, 14, 15, 16, 17, 18

Report Date: 8-Dec-2020

Order Date: 2-Dec-2020

Order #: 2049348

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

Parcel ID	Client ID
2049348-01	BH 501-1C
2049348-02	BH 501-2C
2049348-03	BH 502-1C
2049348-04	BH 502-2C
2049348-05	BH 503-1C
2049348-06	BH 503-2C
2049348-07	BH 504-1C
2049348-08	BH 504-2C
2049348-09	BH 505-1C
2049348-10	BH 505-2C
2049348-11	BH 506-1C
2049348-12	BH 506-5C
2049348-13	BH 507-1C
2049348-14	BH 507-5C
2049348-15	BH 508-1C
2049348-16	BH 508-5C
2049348-17	BH 509-1C
2049348-18	BH 509-5C
2049348-19	Dup-500-A
2049348-20	BH-SPS-1

Approved By:



Alex Enfield, MSc
Lab Manager

Certificate of Analysis

Report Date: 08-Dec-2020

Client: **Wood Environment & Infrastructure (Thorold)**

Order Date: 2-Dec-2020

Client PO:

Project Description: **TP184078.C010**

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	4-Dec-20	4-Dec-20
Solids, %	Gravimetric, calculation	3-Dec-20	4-Dec-20

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Client ID:	BH 501-1C	BH 501-2C	BH 502-1C	BH 502-2C
Sample Date:	30-Nov-20	30-Nov-20	30-Nov-20	30-Nov-20
Sample ID:	2049348-01	2049348-02	2049348-03	2049348-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	81.3	83.1	82.7	83.0
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	4.0	4.3	6.9	3.8
Barium	1.0 ug/g dry	106	141	88.3	93.8
Beryllium	0.5 ug/g dry	0.6	0.6	0.6	0.6
Boron	5.0 ug/g dry	11.6	12.3	11.5	11.9
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	19.8	20.5	17.9	20.4
Cobalt	1.0 ug/g dry	9.7	10.8	7.6	9.8
Copper	5.0 ug/g dry	17.6	23.7	16.2	17.3
Lead	1.0 ug/g dry	8.3	7.9	5.8	7.5
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	22.3	22.9	18.8	21.1
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	27.3	28.4	25.2	28.3
Zinc	20.0 ug/g dry	55.5	71.0	40.2	43.1

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Client ID:	BH 503-1C	BH 503-2C	BH 504-1C	BH 504-2C
Sample Date:	30-Nov-20	30-Nov-20	26-Nov-20	26-Nov-20
Sample ID:	2049348-05	2049348-06	2049348-07	2049348-08
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	87.6	80.5	79.1	84.6
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	3.9	3.2	3.3	3.5
Barium	1.0 ug/g dry	96.1	341	74.0	77.0
Beryllium	0.5 ug/g dry	0.6	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	11.1	9.8	6.6	9.6
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	20.0	15.1	11.0	15.8
Cobalt	1.0 ug/g dry	10.6	9.1	6.0	8.1
Copper	5.0 ug/g dry	16.9	14.6	10.1	13.8
Lead	1.0 ug/g dry	8.4	8.5	4.4	5.7
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	21.8	17.0	12.6	17.4
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	27.3	22.6	15.9	22.3
Zinc	20.0 ug/g dry	44.2	47.2	31.2	40.1

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Client ID:	BH 505-1C	BH 505-2C	BH 506-1C	BH 506-5C
Sample Date:	26-Nov-20	26-Nov-20	26-Nov-20	26-Nov-20
Sample ID:	2049348-09	2049348-10	2049348-11	2049348-12
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	82.7	80.8	81.8	79.2
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	4.4	4.1	4.6	4.9
Barium	1.0 ug/g dry	89.4	125	126	94.7
Beryllium	0.5 ug/g dry	0.6	0.7	0.5	0.6
Boron	5.0 ug/g dry	12.5	13.5	9.7	12.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	20.2	23.0	17.4	19.9
Cobalt	1.0 ug/g dry	10.1	11.1	8.8	10.5
Copper	5.0 ug/g dry	18.8	18.0	17.6	18.0
Lead	1.0 ug/g dry	10.0	7.1	7.0	9.3
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	22.7	24.4	19.2	21.6
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	28.2	31.6	24.5	28.3
Zinc	20.0 ug/g dry	48.1	50.6	50.5	47.5

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Client ID:	BH 507-1C	BH 507-5C	BH 508-1C	BH 508-5C
Sample Date:	26-Nov-20	26-Nov-20	26-Nov-20	26-Nov-20
Sample ID:	2049348-13	2049348-14	2049348-15	2049348-16
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	82.2	79.4	85.5	80.2
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	2.3	3.1	4.6	3.2
Barium	1.0 ug/g dry	37.4	78.5	108	96.0
Beryllium	0.5 ug/g dry	<0.5	<0.5	0.7	<0.5
Boron	5.0 ug/g dry	<5.0	9.4	13.5	8.0
Cadmium	0.5 ug/g dry	<0.5	0.7	<0.5	<0.5
Chromium	5.0 ug/g dry	6.8	15.0	22.8	12.9
Cobalt	1.0 ug/g dry	3.9	7.5	11.1	6.9
Copper	5.0 ug/g dry	7.3	12.7	19.8	12.8
Lead	1.0 ug/g dry	3.7	6.8	11.6	6.5
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	7.9	16.0	23.7	13.8
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	11.2	20.8	31.3	19.7
Zinc	20.0 ug/g dry	27.4	155	81.2	45.0

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Client ID:	BH 509-1C	BH 509-5C	Dup-500-A	BH-SPS-1
Sample Date:	26-Nov-20	26-Nov-20	26-Nov-20	27-Nov-20
Sample ID:	2049348-17	2049348-18	2049348-19	2049348-20
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	81.4	81.6	79.2	81.6
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	3.5	3.6	4.9	4.3
Barium	1.0 ug/g dry	63.1	46.5	113	127
Beryllium	0.5 ug/g dry	<0.5	<0.5	0.8	0.9
Boron	5.0 ug/g dry	6.5	7.5	15.5	15.1
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	10.9	13.0	24.0	26.4
Cobalt	1.0 ug/g dry	5.9	7.1	11.6	12.5
Copper	5.0 ug/g dry	11.2	11.6	20.1	20.7
Lead	1.0 ug/g dry	5.7	4.7	10.2	9.4
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	12.8	14.8	25.8	29.6
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	17.0	19.1	33.4	35.3
Zinc	20.0 ug/g dry	45.7	35.8	58.5	60.2

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	9.5	1.0	ug/g dry	ND			NC	30	
Arsenic	4.5	1.0	ug/g dry	4.2			6.1	30	
Barium	117	1.0	ug/g dry	121			3.5	30	
Beryllium	1.0	0.5	ug/g dry	1.0			3.5	30	
Boron	16.8	5.0	ug/g dry	15.2			10.1	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium	28.0	5.0	ug/g dry	28.8			2.8	30	
Cobalt	12.5	1.0	ug/g dry	12.5			0.7	30	
Copper	21.2	5.0	ug/g dry	21.6			2.0	30	
Lead	9.8	1.0	ug/g dry	9.3			4.8	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	27.2	5.0	ug/g dry	28.8			5.9	30	
Selenium	1.2	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	1.1	1.0	ug/g dry	ND			NC	30	
Vanadium	38.3	10.0	ug/g dry	39.2			2.4	30	
Zinc	55.3	20.0	ug/g dry	60.8			9.5	30	
Physical Characteristics									
% Solids	95.5	0.1	% by Wt.	95.0			0.5	25	

Certificate of Analysis

Report Date: 08-Dec-2020

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 2-Dec-2020

Client PO:

Project Description: TP184078.C010

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	128	1.0	ug/g	ND	102	70-130			
Arsenic	126	1.0	ug/g	4.2	97.5	70-130			
Barium	235	1.0	ug/g	121	91.1	70-130			
Beryllium	113	0.5	ug/g	1.0	89.7	70-130			
Boron	123	5.0	ug/g	15.2	86.6	70-130			
Cadmium	117	0.5	ug/g	ND	93.3	70-130			
Chromium	144	5.0	ug/g	28.8	91.9	70-130			
Cobalt	126	1.0	ug/g	12.5	90.7	70-130			
Copper	135	5.0	ug/g	21.6	90.8	70-130			
Lead	124	1.0	ug/g	9.3	91.7	70-130			
Molybdenum	118	1.0	ug/g	ND	94.5	70-130			
Nickel	142	5.0	ug/g	28.8	90.9	70-130			
Selenium	121	1.0	ug/g	ND	96.8	70-130			
Silver	109	0.3	ug/g	ND	87.0	70-130			
Thallium	115	1.0	ug/g	ND	92.2	70-130			
Uranium	118	1.0	ug/g	ND	94.3	70-130			
Vanadium	156	10.0	ug/g	39.2	93.6	70-130			
Zinc	173	20.0	ug/g	60.8	89.8	70-130			

Certificate of Analysis

Report Date: 08-Dec-2020

Client: **Wood Environment & Infrastructure (Thorold)**

Order Date: 2-Dec-2020

Client PO:

Project Description: **TP184078.C010**

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.

NC: Not Calculated

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.

Certificate of Analysis

Wood Environment & Infrastructure (Thorold)

110 James Street Suite 301
St. Catharines, ON L2R 7E8
Attn: Kelly Patterson

Client PO:
Project: TPB184078.C010
Custody: 238+27, 127628, 127629, 127630, 127555, 129919

Report Date: 26-Mar-2021
Order Date: 22-Mar-2021

Order #: 2113114

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

Parcel ID	Client ID	Parcel ID	Client ID
2113114-01	BH510-1C	2113114-17	BH521-2C
2113114-02	BH510-2C	2113114-18	BH521-3C
2113114-03	BH511-1C	2113114-19	BH519-1C
2113114-04	BH511-3C	2113114-20	BH519-3C
2113114-05	BH513-2C	2113114-21	DUP-B
2113114-06	BH513-3C	2113114-22	DUP-C
2113114-07	BH513-5C	2113114-23	BH520-1C
2113114-08	BH515-2C	2113114-24	BH520-4C
2113114-09	BH515-3C		
2113114-11	BH514-2C		
2113114-12	BH514-4C		
2113114-13	BH517-1C		
2113114-14	BH517-3C		
2113114-15	BH518-2C		
2113114-16	BH518-5C		

Approved By:



Alex Enfield, MSc
Lab Manager

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 26-Mar-2021

Order Date: 22-Mar-2021

Project Description: TPB184078.C010

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Conductivity	MOE E3138 - probe @25 °C, water ext	25-Mar-21	25-Mar-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	24-Mar-21	24-Mar-21
Solids, %	Gravimetric, calculation	24-Mar-21	25-Mar-21

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

Report Date: 26-Mar-2021
 Order Date: 22-Mar-2021
Project Description: TPB184078.C010

Summary of Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances. Regulatory limits displayed in brackets, (), applies to medium and fine textured soils.

Criteria:

Client ID	Analyte	MDL / Units	Result	Reg 153/04 (2011)-Table 1 Residential/Industrial
BH515-3C	Barium	1.0 ug/g	239	220 ug/g
BH518-5C	Conductivity	5 uS/cm	644	0.57 mS/cm
BH519-1C	Conductivity	5 uS/cm	1380	0.57 mS/cm
BH519-3C	Conductivity	5 uS/cm	1210	0.57 mS/cm
DUP-C	Conductivity	5 uS/cm	579	0.57 mS/cm
BH520-1C	Conductivity	5 uS/cm	883	0.57 mS/cm
BH520-4C	Conductivity	5 uS/cm	2140	0.57 mS/cm

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Client ID:	BH510-1C	BH510-2C	BH511-1C	BH511-3C	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	18-Mar-2021	18-Mar-2021	18-Mar-2021	18-Mar-2021	
Sample ID:	2113114-01	2113114-02	2113114-03	2113114-04	
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	82.4	77.9	84.7	80.0	
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Metals

Element	MDL/Units	BH510-1C	BH510-2C	BH511-1C	BH511-3C	Criteria
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1.3 ug/g
Arsenic	1.0 ug/g	4.3	5.5	4.3	6.5	18 ug/g
Barium	1.0 ug/g	92.6	196	84.2	188	220 ug/g
Beryllium	0.5 ug/g	0.6	1.2	1.0	1.2	2.5 ug/g
Boron	5.0 ug/g	10.8	25.2	18.1	28.5	36 ug/g
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	1.2 ug/g
Chromium	5.0 ug/g	18.7	36.7	27.6	30.7	70 ug/g
Cobalt	1.0 ug/g	10.7	15.3	10.6	15.9	21 ug/g
Copper	5.0 ug/g	18.6	26.9	20.4	23.0	92 ug/g
Lead	1.0 ug/g	7.4	11.3	8.2	9.2	120 ug/g
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	2 ug/g
Nickel	5.0 ug/g	22.4	38.7	25.8	35.5	82 ug/g
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1.5 ug/g
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	0.5 ug/g
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g
Uranium	1.0 ug/g	<1.0	1.3	<1.0	<1.0	2.5 ug/g
Vanadium	10.0 ug/g	26.4	50.3	39.1	44.5	86 ug/g
Zinc	20.0 ug/g	40.1	76.0	50.7	69.1	290 ug/g

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Client ID:	BH513-2C	BH513-3C	BH513-5C	BH515-2C	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	19-Mar-2021	19-Mar-2021	19-Mar-2021	19-Mar-2021	
Sample ID:	2113114-05	2113114-06	2113114-07	2113114-08	
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	81.0	80.2	80.0	82.1	
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Metals

	MDL/Units	BH513-2C	BH513-3C	BH513-5C	BH515-2C	Criteria
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1.3 ug/g
Arsenic	1.0 ug/g	6.4	7.0	3.5	6.5	18 ug/g
Barium	1.0 ug/g	92.7	160	199	95.6	220 ug/g
Beryllium	0.5 ug/g	0.9	1.2	1.2	0.8	2.5 ug/g
Boron	5.0 ug/g	21.2	18.5	25.6	12.9	36 ug/g
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	1.2 ug/g
Chromium	5.0 ug/g	30.4	36.7	35.6	22.7	70 ug/g
Cobalt	1.0 ug/g	13.7	14.7	14.1	10.7	21 ug/g
Copper	5.0 ug/g	26.0	33.1	24.1	25.5	92 ug/g
Lead	1.0 ug/g	8.5	11.0	10.9	6.8	120 ug/g
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	2 ug/g
Nickel	5.0 ug/g	32.3	37.7	33.9	25.1	82 ug/g
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1.5 ug/g
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	0.5 ug/g
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g
Uranium	1.0 ug/g	<1.0	<1.0	1.1	<1.0	2.5 ug/g
Vanadium	10.0 ug/g	42.2	52.7	49.8	33.3	86 ug/g
Zinc	20.0 ug/g	66.0	71.9	69.1	51.1	290 ug/g

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Client ID:	BH515-3C	BH514-2C	BH514-4C	BH517-1C	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	19-Mar-2021	19-Mar-2021	19-Mar-2021	19-Mar-2021	
Sample ID:	2113114-09	2113114-11	2113114-12	2113114-13	
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	80.5	80.7	81.0	83.4	
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Metals

	MDL/Units	BH515-3C	BH514-2C	BH514-4C	BH517-1C	Criteria
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1.3 ug/g
Arsenic	1.0 ug/g	3.2	6.2	5.8	4.6	18 ug/g
Barium	1.0 ug/g	239	96.4	161	90.0	220 ug/g
Beryllium	0.5 ug/g	1.0	0.9	0.8	0.7	2.5 ug/g
Boron	5.0 ug/g	26.9	20.1	16.8	15.2	36 ug/g
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	1.2 ug/g
Chromium	5.0 ug/g	29.3	28.5	25.1	20.6	70 ug/g
Cobalt	1.0 ug/g	12.8	12.7	13.6	10.9	21 ug/g
Copper	5.0 ug/g	22.3	25.3	22.4	18.0	92 ug/g
Lead	1.0 ug/g	8.7	8.1	8.2	6.4	120 ug/g
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	2 ug/g
Nickel	5.0 ug/g	30.5	30.8	30.4	23.6	82 ug/g
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1.5 ug/g
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	0.5 ug/g
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	1 ug/g
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	2.5 ug/g
Vanadium	10.0 ug/g	42.0	39.8	36.7	29.8	86 ug/g
Zinc	20.0 ug/g	63.9	62.1	55.6	47.3	290 ug/g

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Client ID:	BH517-3C	BH518-2C	BH518-5C	BH521-2C	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	19-Mar-2021	18-Mar-2021	18-Mar-2021	18-Mar-2021	
Sample ID:	2113114-14	2113114-15	2113114-16	2113114-17	
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	80.5	66.8	80.3	82.4
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General Inorganics

Conductivity	5 uS/cm	-	343	644	495	0.57	mS/cm
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Metals

Antimony	1.0 ug/g	<1.0	-	-	-	1.3	ug/g
Arsenic	1.0 ug/g	5.8	-	-	-	18	ug/g
Barium	1.0 ug/g	117	-	-	-	220	ug/g
Beryllium	0.5 ug/g	0.7	-	-	-	2.5	ug/g
Boron	5.0 ug/g	13.0	-	-	-	36	ug/g
Cadmium	0.5 ug/g	<0.5	-	-	-	1.2	ug/g
Chromium	5.0 ug/g	25.0	-	-	-	70	ug/g
Cobalt	1.0 ug/g	11.3	-	-	-	21	ug/g
Copper	5.0 ug/g	21.7	-	-	-	92	ug/g
Lead	1.0 ug/g	7.4	-	-	-	120	ug/g
Molybdenum	1.0 ug/g	<1.0	-	-	-	2	ug/g
Nickel	5.0 ug/g	25.5	-	-	-	82	ug/g
Selenium	1.0 ug/g	<1.0	-	-	-	1.5	ug/g
Silver	0.3 ug/g	<0.3	-	-	-	0.5	ug/g
Thallium	1.0 ug/g	<1.0	-	-	-	1	ug/g
Uranium	1.0 ug/g	<1.0	-	-	-	2.5	ug/g
Vanadium	10.0 ug/g	33.3	-	-	-	86	ug/g
Zinc	20.0 ug/g	55.3	-	-	-	290	ug/g

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Client ID:	BH521-3C	BH519-1C	BH519-3C	DUP-B	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	18-Mar-2021	18-Mar-2021	18-Mar-2021	18-Mar-2021	
Sample ID:	2113114-18	2113114-19	2113114-20	2113114-21	
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	80.1	81.2	84.2	80.4	
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General Inorganics

Conductivity	5 uS/cm	526	1380	1210	-	0.57 mS/cm
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Metals

Antimony	1.0 ug/g	-	-	-	<1.0	1.3 ug/g
Arsenic	1.0 ug/g	-	-	-	4.7	18 ug/g
Barium	1.0 ug/g	-	-	-	110	220 ug/g
Beryllium	0.5 ug/g	-	-	-	0.9	2.5 ug/g
Boron	5.0 ug/g	-	-	-	16.5	36 ug/g
Cadmium	0.5 ug/g	-	-	-	<0.5	1.2 ug/g
Chromium	5.0 ug/g	-	-	-	25.8	70 ug/g
Cobalt	1.0 ug/g	-	-	-	11.7	21 ug/g
Copper	5.0 ug/g	-	-	-	22.5	92 ug/g
Lead	1.0 ug/g	-	-	-	10.6	120 ug/g
Molybdenum	1.0 ug/g	-	-	-	<1.0	2 ug/g
Nickel	5.0 ug/g	-	-	-	29.4	82 ug/g
Selenium	1.0 ug/g	-	-	-	<1.0	1.5 ug/g
Silver	0.3 ug/g	-	-	-	<0.3	0.5 ug/g
Thallium	1.0 ug/g	-	-	-	<1.0	1 ug/g
Uranium	1.0 ug/g	-	-	-	<1.0	2.5 ug/g
Vanadium	10.0 ug/g	-	-	-	34.5	86 ug/g
Zinc	20.0 ug/g	-	-	-	63.9	290 ug/g

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Client ID:	DUP-C	BH520-1C	BH520-4C	-	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	18-Mar-2021	18-Mar-2021	18-Mar-2021	-	
Sample ID:	2113114-22	2113114-23	2113114-24	-	
Matrix:	Soil	Soil	Soil	-	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	74.1	80.6	80.6	-
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General Inorganics

Conductivity	5 uS/cm	579	883	2140	-	0.57	mS/cm
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Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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General Inorganics

Conductivity	ND	5	uS/cm						
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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: 26-Mar-2021
 Order Date: 22-Mar-2021
 Project Description: TPB184078.C010

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	290	5	uS/cm	295			1.7	5	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	7.4	1.0	ug/g	7.8			4.5	30	
Barium	89.7	1.0	ug/g	101			11.5	30	
Beryllium	0.7	0.5	ug/g	0.7			4.1	30	
Boron	17.0	5.0	ug/g	17.4			2.3	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	20.8	5.0	ug/g	23.1			10.4	30	
Cobalt	8.1	1.0	ug/g	8.6			5.7	30	
Copper	16.3	5.0	ug/g	17.5			7.0	30	
Lead	11.5	1.0	ug/g	11.6			1.5	30	
Molybdenum	3.1	1.0	ug/g	2.9			5.1	30	
Nickel	23.1	5.0	ug/g	24.8			7.3	30	
Selenium	1.2	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	1.3	1.0	ug/g	1.2			9.7	30	
Vanadium	33.8	10.0	ug/g	38.1			11.8	30	
Zinc	45.8	20.0	ug/g	51.1			10.8	30	
Physical Characteristics									
% Solids	93.6	0.1	% by Wt.	93.2			0.4	25	

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	149	1.0	ug/g	ND	119	70-130			
Arsenic	152	1.0	ug/g	7.8	115	70-130			
Barium	245	1.0	ug/g	101	116	70-130			
Beryllium	132	0.5	ug/g	0.7	105	70-130			
Boron	146	5.0	ug/g	17.4	103	70-130			
Cadmium	136	0.5	ug/g	ND	109	70-130			
Chromium	157	5.0	ug/g	23.1	107	70-130			
Cobalt	140	1.0	ug/g	8.6	105	70-130			
Copper	151	5.0	ug/g	17.5	106	70-130			
Lead	141	1.0	ug/g	11.6	103	70-130			
Molybdenum	143	1.0	ug/g	2.9	112	70-130			
Nickel	160	5.0	ug/g	24.8	108	70-130			
Selenium	140	1.0	ug/g	ND	112	70-130			
Silver	132	0.3	ug/g	ND	106	70-130			
Thallium	132	1.0	ug/g	ND	105	70-130			
Uranium	140	1.0	ug/g	1.2	111	70-130			
Vanadium	174	10.0	ug/g	38.1	109	70-130			
Zinc	187	20.0	ug/g	51.1	108	70-130			

Certificate of Analysis

Report Date: 26-Mar-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 22-Mar-2021

Client PO:

Project Description: TPB184078.C010

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.

NC: Not Calculated

Soil/Solid results are reported on a dry weight basis unless otherwise indicated

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

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Wood Environment & Infrastructure (Thorold)

110 James Street Suite 301
St. Catharines, ON L2R 7E8
Attn: Kelly Patterson

Client PO:
Project: TPB184078.CO10
Custody:

Report Date: 22-Apr-2021
Order Date: 16-Apr-2021

Order #: 2116667

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

Parcel ID	Client ID	Parcel ID	Client ID
2116667-01	BH515-4C		
2116667-02	BH518-6C		
2116667-03	BH519-4C		
2116667-04	BH520-5C		

Approved By:



Alex Enfield, MSc
Lab Manager

Certificate of Analysis

Client: Wood Environment & Infrastructure (Thorold)

Client PO:

Report Date: 22-Apr-2021

Order Date: 16-Apr-2021

Project Description: TPB184078.CO10

Analysis Summary Table

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

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

Report Date: 22-Apr-2021
 Order Date: 16-Apr-2021
Project Description: TPB184078.CO10

Summary of Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances. Regulatory limits displayed in brackets, (), applies to medium and fine textured soils.

Criteria:

Client ID	Analyte	MDL / Units	Result	Reg 153/04 (2011)-Table 1 Residential/Industrial
BH518-6C	Conductivity	5 uS/cm	950 [1]	0.57 mS/cm
BH519-4C	Conductivity	5 uS/cm	1210 [1]	0.57 mS/cm
BH520-5C	Conductivity	5 uS/cm	1180 [1]	0.57 mS/cm

Certificate of Analysis

Report Date: 22-Apr-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 16-Apr-2021

Client PO:

Project Description: TPB184078.CO10

Client ID:	BH515-4C	BH518-6C	BH519-4C	BH520-5C	Criteria: Reg 153/04 (2011)-Table 1 Residential/Industrial
Sample Date:	19-Mar-2021	18-Mar-2021	18-Mar-2021	18-Mar-2021	
Sample ID:	2116667-01	2116667-02	2116667-03	2116667-04	
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	78.6	81.5	81.8	81.7	
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General Inorganics

Conductivity	5 uS/cm	-	950 [1]	1210 [1]	1180 [1]	0.57 mS/cm
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Metals

Antimony	1.0 ug/g	<1.0	-	-	-	1.3 ug/g
Arsenic	1.0 ug/g	5.2	-	-	-	18 ug/g
Barium	1.0 ug/g	165	-	-	-	220 ug/g
Beryllium	0.5 ug/g	1.1	-	-	-	2.5 ug/g
Boron	5.0 ug/g	24.5	-	-	-	36 ug/g
Cadmium	0.5 ug/g	<0.5	-	-	-	1.2 ug/g
Chromium	5.0 ug/g	30.2	-	-	-	70 ug/g
Cobalt	1.0 ug/g	15.6	-	-	-	21 ug/g
Copper	5.0 ug/g	24.2	-	-	-	92 ug/g
Lead	1.0 ug/g	10.5	-	-	-	120 ug/g
Molybdenum	1.0 ug/g	<1.0	-	-	-	2 ug/g
Nickel	5.0 ug/g	34.4	-	-	-	82 ug/g
Selenium	1.0 ug/g	<1.0	-	-	-	1.5 ug/g
Silver	0.3 ug/g	<0.3	-	-	-	0.5 ug/g
Thallium	1.0 ug/g	<1.0	-	-	-	1 ug/g
Uranium	1.0 ug/g	<1.0	-	-	-	2.5 ug/g
Vanadium	10.0 ug/g	41.6	-	-	-	86 ug/g
Zinc	20.0 ug/g	71.1	-	-	-	290 ug/g

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

Report Date: 22-Apr-2021
 Order Date: 16-Apr-2021
 Project Description: TPB184078.CO10

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	5.2	5.0	ug/g						QB-02
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-Apr-2021
 Order Date: 16-Apr-2021
 Project Description: TPB184078.CO10

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	244	5	uS/cm	240			1.3	5	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	7.1	1.0	ug/g	6.7			6.4	30	
Barium	44.7	1.0	ug/g	41.7			6.9	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	14.4	5.0	ug/g	11.4			23.5	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	8.5	5.0	ug/g	7.9			7.4	30	
Cobalt	4.7	1.0	ug/g	4.5			3.6	30	
Copper	26.0	5.0	ug/g	25.2			3.4	30	
Lead	50.3	1.0	ug/g	48.4			3.8	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	8.7	5.0	ug/g	8.7			0.7	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	16.0	10.0	ug/g	15.2			5.0	30	
Zinc	149	20.0	ug/g	145			3.2	30	
Physical Characteristics									
% Solids	78.2	0.1	% by Wt.	78.6			0.4	25	

Certificate of Analysis

Report Date: 22-Apr-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 16-Apr-2021

Client PO:

Project Description: TPB184078.CO10

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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Metals

Antimony	126	1.0	ug/g	ND	101	70-130			
Arsenic	139	1.0	ug/g	6.7	106	70-130			
Barium	172	1.0	ug/g	41.7	105	70-130			
Beryllium	115	0.5	ug/g	ND	91.9	70-130			
Boron	119	5.0	ug/g	11.4	86.0	70-130			
Cadmium	124	0.5	ug/g	ND	99.4	70-130			
Chromium	135	5.0	ug/g	7.9	101	70-130			
Cobalt	127	1.0	ug/g	4.5	97.9	70-130			
Copper	149	5.0	ug/g	25.2	99.2	70-130			
Lead	171	1.0	ug/g	48.4	98.4	70-130			
Molybdenum	130	1.0	ug/g	ND	104	70-130			
Nickel	134	5.0	ug/g	8.7	100	70-130			
Selenium	128	1.0	ug/g	ND	102	70-130			
Silver	125	0.3	ug/g	ND	99.6	70-130			
Thallium	122	1.0	ug/g	ND	98.0	70-130			
Uranium	127	1.0	ug/g	ND	101	70-130			
Vanadium	144	10.0	ug/g	15.2	103	70-130			
Zinc	273	20.0	ug/g	145	103	70-130			

Certificate of Analysis

Report Date: 22-Apr-2021

Client: Wood Environment & Infrastructure (Thorold)

Order Date: 16-Apr-2021

Client PO:

Project Description: TPB184078.CO10

Qualifier Notes:

Sample Qualifiers :

1 : Holding time had been exceeded upon receipt of the sample at the laboratory.

QC Qualifiers :

QB-02 : The method blank is above MDL but less than 3 X MDL and therefore does not have significant impact on sample results.

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.

NC: Not Calculated

Soil/Solid results are reported on a dry weight basis unless otherwise indicated

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

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



wood.

APPENDIX F

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 our Proposal dated October 16, 2015 and signed by the Client on November 15, 2015 and proposal dated December 2, 2016 and authorization to proceed, signed by the Client on December 3, 2016. A supplemental delineation investigation was carried out in accordance with Wood's proposal dated June 15, 2018 and email authorization to proceed, by the Client on June 15, 2018.
 - 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. Provided that the report is still reliable, and less than 12 months old, Wood will 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.