Peto MacCallum Ltd.
CONSULTING ENGINEERS

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL SUBDIVISION
108, 116,122 HARVIE ROAD
BARRIE, ONTARIO

for

ASA DEVELOPMENT INC.

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

February 1, 2021

PML Ref.: 20BF059
Report: 2

Mr. Abdullah Guirguis, P.Eng.
ASA Development Inc.
10350 Yonge Street, Suite 305
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Dear Mr. Guirguis

Geotechnical Investigation
Proposed Residential Development
108, 116, 122 Harvie Road
Barrie, Ontario

Peto MacCallum Ltd. (PML) is pleased to present the results of the geotechnical investigation recently completed at the above noted project site. Authorization for the work described in this report was provided by Mr. A. Guirguis in the signed Engineering Services Agreement dated November 2, 2020.

A residential subdivision is proposed at the properties at 108, 116 and 122 Harvie Road, located on the north side of the road in Barrie. The existing houses will be demolished and the treed areas cleared prior to development. It is understood that the site grading will typically require less than 1 m of cut/fill. Basements for the houses are being considered. The site will have a network of paved roads to provide access and full municipal servicing will be provided.

The purpose of this investigation was to assess the subsurface conditions at the site, and based on this information, provide comments and geotechnical engineering recommendations for earthworks, building foundations and basements, site servicing, and pavement design.

A limited chemical testing program was carried out to check the geoenvironmental quality of a limited number of soil samples retrieved from the boreholes in order to provide comments regarding on-site re-use and/or off-site disposal/reuse of excess excavated soils.

A Phase One Environmental Site Assessment (ESA) was carried out concurrently for this project and the results are provided under separate cover in Report 1. Results of a Phase Two ESA will be provided in Report 3.

Nine boreholes were advanced and typically revealed topsoil over fill over a major sand deposit. Local layers of silty clay/clayey silt, silty sand and till were also revealed. Ground water was typically below depth of exploration.

Typical construction methodologies should suffice with consideration for areas of loose soil, where bearing resistances for structures will be reduced.

We trust the information in this report is sufficient for your present purpose. If you have any questions please do not hesitate to call our office.

Sincerely

Peto MacCallum Ltd.

Geoffrey R. White, P.Eng.
Director
Manager, Geotechnical Services

GRW:tc

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1. INTRODUCTION

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A Phase One Environmental Site Assessment (ESA) was carried out concurrently for this project and the results are provided under separate cover in Report 1. Results of a Phase Two ESA will be provided in Report 3.

The comments and recommendations provided in this report are based on the site conditions at the time of the investigation, and are applicable only to the proposed works as addressed in the report. Any changes in the proposed plans will require review by PML to re-assess the validity of the report, and may require modified recommendations, additional investigation and/or analysis.

This report is subject to the Statement of Limitations that is included in Appendix A and must be read in conjunction with the report.

2. INVESTIGATION PROCEDURES

The boreholes were drilled between December 18 and 22, 2020. Boreholes 1 to 9 were drilled to 4.8 to 6.7 m depth. Borehole 7A was drilled on January 12, 2021 and effectively extended Borehole 7 from 5.2 to 11.3 m depth for Phase Two ESA requirements (included for completeness). Borehole locations are shown on Drawing 2-1, appended.

PML laid out the boreholes in the field. The ground surface elevation at the borehole locations was obtained with a Sokkia SHC5000 Global Navigation Satellite System (GNSS). Vertical and horizontal accuracy of this unit are 0.1 and 0.5 m, respectively. All elevations in this report are geodetic and expressed in metres.

Co-ordination for clearances of underground utilities was provided by PML. The boreholes were drilled cognizant of the underground utilities.

The boreholes were advanced using continuous flight and hollow solid stem augers, powered by a track mounted CME-55 drill rig, equipped with an automatic hammer, supplied and operated by a specialist drilling contractor, working under the full-time supervision of a member of PML's engineering staff.

Where topsoil was encountered at the surface, the thickness was measured in hand dug divots.

Representative samples of the overburden were recovered at frequent depth intervals for identification purposes using a conventional 51 mm OD split spoon sampler. The sampler excludes particles larger than 38 mm. Standard penetration tests were carried out simultaneously with the sampling operations to assess the strength characteristics of the subsoil. The ground water conditions in the boreholes were assessed during drilling by visual examination of the soil samples, the sampler, and drill rods as the samples were retrieved, and measurement of the water level in the open boreholes, if any.

Monitoring wells, comprised of 50 mm diameter PVC pipe with a 1.5 m long screen at the bottom, filter sand, bentonite seal and stick-up/flush mounted protective casing, were installed in five of the boreholes to permit ground water level monitoring. The details of the monitoring well installations are shown on the applicable Log of Borehole sheets. It should be noted that the wells become the property of the Owner and will have to be decommissioned by the Owner in accordance with O.Reg. 903. PML would be pleased to assist, if requested. PML returned to the site about one or two weeks after the wells were installed to measure the water levels in the wells.

All recovered samples were returned to our laboratory for detailed examination and moisture content determinations. Grain size analyses were carried out on four samples of the major soil units. The laboratory test results are provided on Figures 1, 3 and 4, appended. Atterberg Limits tests were also carried out on one sample and results are plotted on Figure 2, appended.

3. SUBSURFACE CONDITIONS AND PHYSIOGRAPHY

3.1 Subsurface Conditions

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions, including topsoil thicknesses, soil classifications, inferred stratigraphy and thicknesses, Standard Penetration test N Values (N Values, blows per 300 mm penetration of the split spoon sampler), well installation details, ground water level observations, the results of laboratory moisture content determinations, and Atterberg Limits tests.

Due to the soil sampling procedures and the limited size of samples, the depth/elevation demarcations on the borehole logs must be viewed as “transitional” zones, and cannot be construed as exact geologic boundaries between layers. PML should be retained to assist in defining the geological boundaries in the field during construction, if required.

Topsoil was encountered at the ground surface, overlying fill and a major native sand for the majority of the site. Local layers of silty clay/clayey silt, silty sand and till were also noted. A description of the distribution of the subsurface conditions encountered is provided below.

3.1.1 Soil

Topsoil was present at the surface of all boreholes, ranging from 50 to 460 mm in thickness.

The boreholes were drilled in previously cleared areas and fill was present below the topsoil in Boreholes 3 to 9, extending to 1.4 to 2.1 m depth (elevation 302.8 to 307.5). The fill was variable, comprising sand, silty sand, sandy silt and silty clay. The material had variable compaction with N Values of 1 to 18. The material was moist/frozen with moisture contents of 4 to 20%.

Local silty sand layers were present below the topsoil and/or fill in Boreholes 1 and 3, extending to 0.7 m depth (elevation 304.9) and 2.1 m depth (elevation 302.1), respectively. The material was very loose to loose with N Values of 2 and 5. Moisture contents were 13 and 16% (moist).

A layered silty clay to clayey silt unit was encountered beneath the silty sand in Borehole 1 being penetrated at 2.0 m depth (elevation 302.7). A sample of the material was submitted for grain size analysis, and the results are presented on Figure 2-1, appended. Accompanying Atterberg Limits testing results (presented on Figure 2-2, appended) showed the material to have a plastic limit of 15%, and a liquid limit of 34%. The unit was firm (N Value of 8). The material was typically about plastic limit to wetter than plastic limit with moisture contents ranging from 23 to 28%.

Boreholes 7 to 9 encountered a till layer below the fill to 2.1 m depth (elevation 305.8 to 306.8), locally the 5.2 m depth of exploration. The till matrix comprised silty sand or silt and sand. Cobbles and boulders were noted during drilling. Two samples of the material were submitted for grainsize analysis and the results are provided on Figure 2-3. The till was compact (N Values of 12 and 14 in Boreholes 8 and 9) and very dense (N Values greater than 50 in Borehole 7). The till was moist with moisture contents of 10% or less.

A major native sand deposit was revealed in all boreholes, except Borehole 7, underlying the upper soil layers and extending to the 4.8 to 11.3 m depth of exploration. A sample of the material was submitted for grainsize analysis and the results are provided on Figure 2-4, attached. The sand was very loose to very dense with N Values from 1 to greater than 50. The material was moist with moisture contents typical less than 10%. Locally in Borehole 7A the sand became wet below about 8.0 to 9.0 m depth with moisture contents of about 20%.

3.1.2 Ground Water

The first water strike (ground water first encountered during drilling), the ground water/wet cave levels measured in the boreholes upon completion of augering, and ground water level measured in the wells on January 7, 2021 (locally January 20, 2021 Borehole 7A) are summarized in the table below, on a borehole by borehole basis.

BOREHOLE	FIRST STRIKE DURING DRILLING DEPTH (m) / ELEVATION	UPON COMPLETION OF AUGERING DEPTH (m) / ELEVATION	WATER LEVEL IN WELL January 7 / 20, 2021 DEPTH (m) / ELEVATION
1	1.8 / 303.8	No Water	--
2	No Water	No Water	--
3	No Water	No Water	No Water
4	0.9 / 303.5	No Water	--
5	No Water	No Water	No Water
6	No Water	No Water	No Water
7	No Water	No Water	No Water
7A	9.2 / 298.5	8.6 / 299.1	8.6 / 299.1
8	No Water	No Water	--
9	0.9 / 308.0	No Water	--

Ground water is typically below the depth of exploration, locally being about 8.6 m below grade (elevation 299.1).

Ground water levels will fluctuate seasonally, and in response to variations in precipitation.

4. GEOTECHNCIAL ENGINEERING CONSIDERATIONS

A residential subdivision is proposed at the properties at 108, 116 and 122 Harvie Road, located on the north side of the road in Barrie. The existing houses will be demolished and the treed areas cleared prior to development. It is understood that the site grading will typically require less than 1.0 m of cut/fill. Basements for the houses are being considered. The site will have a network of paved roads to provide access and full municipal servicing will be provided.

Based on the borehole results, loose to very loose soils were encountered in the upper 2.0 to 3.0 m, in about three or four of the boreholes. Only a reduced bearing resistance is available in these areas without soil improvement. The ground water was at depth and the incorporation of basements may serve to penetrate the fill and very loose to loose soil to allow footings to be established on more competent soil. Alternatively, soil improvement such as reworking as engineered fill or possibly Rapid Impact Compaction (RIC) can be utilized to improve the overall bearing resistance of the soils.

4.1 Site Grading and Engineered Fill

Grading has not yet been finalized, however, as noted above, proposed grades are understood to typically be about 1.0 m +/- within existing grades. Some boreholes did note loose to very loose soil in the upper 2.0 to 3.0 m that will need reworking to support structure.

The existing topsoil and fill are not suitable to support footings or floor slabs due to concerns with settlement. In this regard, it is recommended that existing topsoil and fill be removed and replaced with engineered fill to allow floor slabs to be supported on engineered fill and footings on engineered fill and/or native soil. It is also recommended that the native upper very loose to loose soil be removed and reworked as engineered fill.

Reference is made to Appendix B for guidelines for engineered fill construction. The following general highlights are provided:

- Strip existing topsoil, fill, loose to very loose soil and other deleterious materials down to competent native soil. The excavated soil should be segregated and stockpiled for reuse or disposal based on geotechnical review;

- Proofroll exposed subgrade using a heavy roller to targeted 100% Standard Proctor maximum dry density (SPmdd) in house/building areas and 95% SPmdd in pavement and service pipe areas, under geotechnical review;

- Following geotechnical review and approval of the subgrade, spread approved material in maximum 200 mm thick lifts and uniformly compacted to 100% SPmdd in building areas. Beyond the building limits compaction of engineered fill to 95% SPmdd is sufficient. If wet subgrade conditions are present the use of Granular B Type II may be required for the first lift or two of engineered fill;

- Organics, topsoil, oversized material (over 150 mm in diameter) or otherwise deleterious materials are not suitable for reuse as engineered fill. The existing fill and typical sand soil at the site is generally considered suitable for reuse, subject to geotechnical review during construction. Imported material, if required should comprise OPSS Granular B or OPSS SSM. Other sources of imported material should be reviewed by our office to ensure suitability;

- The engineered fill pad must extend at least 1 m beyond the structure to be supported, then outwards and downwards at no steeper than 45° to the horizontal to meet the underlying approved native subgrade. In this regard, strict survey control and detailed documentation of the lateral and vertical extent of the engineered fill limits should be carried out to ensure that the engineered fill pad fully incorporates the structure to be supported;

- Engineered fill construction must be carried out under full-time field review by PML, to approve sub-excavation and subgrade preparation, backfill materials, placement and compaction procedures, and to verify that the specified compaction standards are achieved throughout.

4.2 Foundations

Grading has not yet been finalized, however, proposed grades are understood to be typically within 1 m of the existing grades.

Footings would be founded about 0.5 to 1.5 m below grade for slab-on-grade houses and 2.0 to 4.0 m below existing grade where basements are incorporated.

The available bearing capacity on the native soils, on a borehole by borehole basis is provided below:

BOREHOLE	DEPTH (m) / ELEVATION	ANTICIPATED SUBGRADE SOIL TYPE	GEOTECHNICAL BEARING RESISTANCE AT SLS (kPa)	FACTORED BEARING RESISTANCE AT ULS (kPa)
1	0.7 / 304.9	Silty Clay/Clayey Silt	70	105
	3.0 / 302.7	Sand	200	300
2	0.5 / 204.7	Sand	25	37
	2.2 / 203.0	Sand	200	300
3	1.5 / 302.7	Silty Sand/Sand	50	75
	3.0 / 301.2	Sand	120	180
4	1.5 / 302.9	Sand	25	37
5	1.5 / 304.6	Sand	200	300
6	1.5 / 304.0	Sand	200	300
7	2.1 / 305.5	Till	200	300
8	1.5 / 306.4	Till	150	225
	2.1 / 305.8	Sand	200	300
9	1.5 / 307.4	Till/Sand	100	150

- SLS - Serviceability Limit State
- ULS - Ultimate Limit State

Locally where the bearing resistance is low the soil can be removed and replaced as engineered fill as discussed above. Footings supported by a minimum thickness of 1.5 m of engineered fill can be designed for a geotechnical bearing resistance of 100 kPa at SLS and a factored bearing resistance of 150 kPa at ULS.

The geotechnical bearing resistance at SLS is based on 25 mm or settlement in the bearing stratum with differential settlement not exceeding 75% of the value.

Footings subject to frost action should be provided with a minimum 1.2 m of earth cover or equivalent insulation.

Prior to placement of structural concrete, all founding surfaces should be reviewed by PML to verify the design bearing capacity is available, or to reassess the design parameters based on the actual conditions revealed in the excavation.

An alternative to removal and reworking the very loose to loose upper sand is Rapid Impact Compaction (RIC). The site conditions, sand with trace to some sand and absence of ground water, appear to make it a favourable candidate for this procedure. In concept, the site can be cut to grade and/or just stripped of topsoil. The RIC procedure would then be applied. Any fill required to raise grades further can be carried out as engineered fill. This option would reduce the requirement for excavation of very loose to loose soil in the upper 2.0 to 3.5 m. Specialty contractors will need to be consulted for details. Vibration monitoring and pre-condition surveys are recommended for nearby residences or other areas of concern with this methodology.

4.2.1 Seismic Design

Based on the soil profile (N Values) revealed in the boreholes, Site Classification D is applicable for Seismic Site Response as set out in Table 4.1.8.4.A of the Ontario Building Code (2012). Based on the type and relative density of the soil cover at the site there is a low to moderate potential for liquefaction of soils to occur.

4.3 Floor Slab-on-Grade

Floor slab-on-grade construction is feasible on engineered fill, constructed as discussed earlier, or native soil.

A minimum 200 mm thick base layer of crushed stone (nominal 20 mm size) is recommended directly beneath the floor slab. Where a vapour sensitive floor finish is to be used then the use of polyethylene sheeting or similar means should be incorporation as a vapour barrier.

Exterior grades should be established to promote surface drainage away from the proposed buildings.

4.4 Basements

It is understood that basements are being considered. The general absence of ground water in the upper 3.0 m is favourable for basements. Also, the increased depth of footings would aid in penetrating the fill and upper loose to very loose soil, and have footings founded on more competent soil.

Perimeter walls must be designed to resist the unbalanced horizontal earth pressure imposed by the backfill adjacent to the walls. The lateral earth pressure, P, may be computed using the following equation and assuming a triangular pressure distribution:

$$P = K(\gamma h + q) + C_p$$

Where

P	=	lateral pressure at depth h (m) below ground surface (kPa)
K	=	lateral earth pressure coefficient of granular backfill = 0.5
h	=	depth below grade (m) at which lateral pressure is calculated
γ	=	unit weight of compacted granular backfill = 21.0 kN/m3
q	=	surcharge loads (kPa)
C_p	=	compaction pressure

The above equation assumes that drainage measures will be incorporated to prevent the buildup of hydrostatic pressure. In this regard, foundation wall backfill should comprise free draining

granular material conforming to OPSS Granular B in conjunction with a weeping tile system. The weeping tiles should be protected by a properly designed granular filter or geotextile to prevent migration of fines into the system. The drainage pipe should be placed on a positive grade and lead to a frost-free outlet. The basement walls should be damp proofed. Alternatively, the native sand can be utilized with a proprietary drainage board product.

Basement wall backfill should be placed in thin lifts compacted to a minimum 95% SPmdd. Over compaction close to the walls should be avoided as this could generate excessive pressure on the walls.

Basement floor slab construction is feasible on native soils. A minimum 200 mm thick base layer of crushed stone (nominal 19 mm size) is recommended directly under the slab. Underfloor drains are not considered necessary where the lowest floor slab is more than 1.0 m above the ground water table. A polyethylene sheet vapour barrier is recommended as a vapour barrier.

Exterior grades should be established to promote surface drainage away from the buildings.

Reference is made to appended Figure 2-5, for general recommendations regarding drainage and backfill requirements for basement walls and floor slabs.

4.5 Site Servicing

Design details were not finalized at the time of this report. For purposes of this report, inverts are assumed to be as much as 3.0 m below existing grade.

4.5.1 Trench Excavation and Ground Water Control

Trench excavation and ground water control are described later in the report under Excavation and Ground Water Control.

4.5.2 Pipe Bedding

Native soil is generally expected at invert levels, which is considered satisfactory for pipe support. Where existing fill or other deleterious material is encountered at the design invert level, such

material should be sub-excavated and replaced with an increased thickness of bedding material, subject to geotechnical field review and approval.

OPSS bedding and cover thickness and compaction standards are recommended. Bedding and cover material should comprise OPSS Granular A.

4.5.3 Trench Backfill

Backfill in trenches should comprise select inorganic soil and be placed in maximum 200 mm thick loose lifts compacted to at least 95% SPmdd to minimize post construction settlement in the backfill. Topsoil, organic, excessively wet, frozen, oversized (greater than 150 mm in diameter), or otherwise deleterious material should not be incorporated as trench backfill. The moisture content of the trench backfill should be within 2% of the optimum moisture content in order to achieve the specified compaction and be close to optimum moisture content in the upper 1.0 m to prevent subgrade instability issues. Ideally the backfill should comprise excavated site soil, in order to minimize differential frost heave.

The excavated soil will comprise topsoil, fill, native sand and the local silty sand clayey silt/silty clay and till units. Excavated inorganic site soil should generally be acceptable for reuse as trench backfill, subject to moisture content control (wet material will need to be dried out or mixed with drier soil in order to be suitable for reuse), removal of organics/deleterious material and geotechnical review during construction.

Earthworks operations should be inspected by PML to verify subgrade preparation, backfill materials, placement and compaction efforts and ensure the specified degree of compaction is achieved throughout.

4.6 Excavation and Ground Water Control

It is anticipated that excavation for the building foundations/engineered fill will extend as deep as 4.0 m. Excavation for site servicing is anticipated to 3.0 m below existing grade. Below topsoil and fill, excavation will encounter the native sand and local units of silty sand, silty clay/clayey silt and till. Where till is encountered, cobbles and boulders and hard digging should be expected.

Subject to the ground water control as discussed below, the site soils encountered at the site should be considered as Type 3 soil requiring excavation sidewalls to be constructed at no steeper than one horizontal to one vertical (1H:1V) from the base of the excavation in accordance with the Occupational Health and Safety Act.

Excavation side slopes will need to be continuously examined and reviewed for evidence of instability, particularly following periods of heavy rain or thawing. When required, remedial action must be taken to ensure the continued stability of the excavation slope and the safety of the workers.

The ground water was typically below the depth of excavation and conventional sump pumping techniques should be sufficient for ground water control.

It is recommended the work be scheduled following periods of prolonged dry weather, and when the ground water table is usually at its lowest, in order to minimize the quantity of water to be handled.

Water taking in Ontario is governed by the Ontario Water Resources Act (OWRA) and the Water Takings and Transfer Regulation O. Reg. 387/04. Section 34 of the OWRA requires anyone taking more than 50,000 L/d to notify the MECP. This requirement applies to all withdrawals, whether for consumption, temporary construction dewatering, or permanent drainage improvements. Where it is assessed than more than 50,000 L/d but less than 400,000 L/d of ground water taking is required, the Owner can register online via the Environmental Activity and Sector Registry (EASR) system. Where it is assessed that more than 400,000 L/d of ground water taking is required then a Category 3 Permit-To-Take-Water (PTTW) is required.

Based on the conditions revealed in the boreholes and anticipated excavation depths noted above, a PTTW or registry on the EASR is not anticipated. Once details of the site have been finalized they should be reviewed by PML to confirm requirements.

It is recommended that a test dig be conducted to permit prospective contractors an opportunity to observe and examine the conditions likely to be encountered, in order that they may assess for themselves the excavation and ground water control requirements.

4.7 Pavement Design and Construction

For new pavement, based on the existing conditions and assumption that grades will generally be within 1.0 m of existing grades, it is anticipated that the pavement subgrade will predominantly comprise engineered fill or the sand to sandy silt soils near the surface. Based on an assumed moderate frost susceptibility of the subgrade soil, the following pavement structure thicknesses are recommended and should be reviewed when grading/subgrade soils are finalized/know.

MATERIAL	LIGHT DUTY	HEAVY DUTY (FIRE ROUTE)
Asphalt (mm)	90	120
Granular A Base Course (mm)	150	150
Granular B Subbase Course (mm)	350	500
Total Thickness (mm)	590	770

Engineered fill is anticipated below the new pavement and where confirmed, subgrade preparation is not required where engineered fill is below new pavement areas. In general, where engineered fill is not present as the subgrade, it is recommended that following rough grading to the subgrade level, subgrade preparation should include proofrolling and compacting the exposed subgrade with a heavy vibratory compactor to 95% SPmdd under geotechnical review. Any unstable zones identified during this process should be sub-excavated and replaced with similar material and compacted to 95% SPmdd, subject to geotechnical field review.

The pavement design considers the construction will be carried out during the dry time of the year and the subgrade is stable and not heaving under construction traffic. If wet or unstable subgrade conditions are encountered, additional sub-excavation, additional granular subbase, the use of Granular B Type II and/or the use of geogrid may be required, subject to geotechnical review during construction.

Imported material for the granular base and subbase should conform to OPSS gradation specifications for Granular A and Granular B, and should be compacted to 100% SPmdd. Asphalt should be compacted in accordance with OPSS 310.

For the pavement to function properly, it is essential that provisions be made for water to drain out of and not collect in the base material. The incorporation of subdrains is recommended in conjunction with crowning of the final subgrade to promote drainage towards the pavement edge. Subdrains should be installed at least 300 mm below the subgrade level. Refer to OPSD 216 Series for details regarding pipe, filter fabric or filter sock, bedding and cover material. Maintenance hole/catchbasins should be backfilled with free draining Granular B. The above measures will help drain the pavement structure as well as alleviate the problems of differential frost movement between the catchbasins and pavement.

4.8 Geotechnical Review and Construction Inspection and Testing

It is recommended that the final design drawings be submitted to PML for geotechnical review for compatibility with site conditions and recommendations of this report.

Earthworks operations should be carried out under the supervision of PML to approve subgrade preparation, backfill materials, placement and compaction procedures and check the specified degree of compaction is achieved throughout.

Prior to placement of structural concrete, all founding surfaces must be inspected by PML to verify the design bearing capacity is available, or to reassess the design parameters based on the actual conditions.

The comments and recommendations provided in the report are based on information revealed in the boreholes. Conditions away from and between boreholes may vary. Geotechnical review during construction should be ongoing to confirm the subsurface conditions are substantially similar to those encountered in the boreholes, which may otherwise require modification to the original recommendations.

5. GEOENVIRONMENTAL CONSIDERATIONS

5.1 General

A limited chemical testing program was carried out to check the geoenvironmental quality of the soil at selected sampling locations in order to provide comments regarding on site reuse or off-site disposal options for excess excavated soil.

Soil impairment that has not been identified by the limited chemical testing program may exist at the site. The limited chemical testing program does not constitute an Environmental Site Assessment as defined under the Environmental Protection Act and O. Reg. 153/04, as amended.

5.2 Chemical Testing Protocols

As part of the geoenvironmental procedural protocol, all recovered soil samples were examined for visual and olfactory evidence of potential contamination. It is noted that none of the samples displayed visual or olfactory evidence of contamination.

After field examination, selected geoenvironmental soil samples were placed in laboratory air tight glass containers and stored in an insulated cooler for transportation to our laboratory for detailed visual examination.

Soil samples were submitted for chemical analysis to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory. The chemical analyses conducted were in accordance with the O. Reg. 153/04, as amended Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act dated March 9, 2004, amended as of July 1, 2011.

For general environmental quality characterization, soil samples were tested for the following analyte groups:

- Metals and Inorganics;
- Organochlorine Pesticides.

The following soil samples were submitted for testing:

Borehole 1 SS2 (clay/silt – 0.8 to 1.4 m)
Borehole 2 SS2 (sand – 0.8 to 1.4 m)
Borehole 4 SS2 (fill – 0.8 to 1.4 m)
Borehole 6 SS2 (fill – 0.8 to 1.4 m)
Borehole 8 SS2 (fill – 0.8 to 1.4 m)

5.3 Site Condition Standards

The Ontario MECP has developed a set of Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) and O. Reg. 153/04, as amended. The standards consist of nine tables (Table 1 through Table 9) that provide criteria for maximum concentrations of various contaminants. In general, the applicable O. Reg. 153/04, as amended, SCSs depend on the site location, land use, soil texture, bedrock depth and the applicable potable or non-potable ground water condition at the investigation site.

In order to determine the Site Sensitivity, Sections 41 and 43.1 of O. Reg. 153/04, as amended, were evaluated by PML as shown in the following table:

CRITERIA	RESULT
Current Property Use	Residential
Potable vs. Non-Potable Ground Water	Potable [i]
Proximity of Areas of Natural Significance	> 30 m
Proximity to a Water Body	> 30 m
Shallow Soil Condition	No
Land Use	Residential/Parkland/Institutional (RPI)
Applicable Site Condition Standard	Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for RPI Land Use (Table 2 RPI)

Notes: i) MECP interactive Water Well Record (WWR) mapping indicates water supply wells on the site and within 100 m of the site.

5.4 Analytical Findings and Conclusions

The Certificates of Analyses for Chemical Testing are included in Appendix C.

5.4.1 On-Site Reuse

In summary, the concentration of the tested parameters in the submitted soil samples from the boreholes were either not detected (below the method detection limit) or were within the Table 2 RPI SCS.

The results indicate that the soils can remain on the site subject to geotechnical requirements.

It should be noted that the soil conditions between and beyond the sampled locations may differ from those encountered during this assignment. PML should be contacted if impacted soil conditions become apparent during future development to further assess and appropriately handle the materials, if any, and evaluate whether modifications to the conclusions documented in this report are necessary.

This assessment is subject to the Statement of Limitations that is included with this report (Appendix A) which must be read in conjunction with the report.

5.4.2 Off-Site Reuse/Disposal

A preliminary assessment for off-site reuse/disposal was completed, however, it is noted that the new O.Reg. 406/19 guidelines for the management of excess soil will require a more extensive soil investigation if soil is be removed from site.

Comparing the results to O.Reg. 153/04, as amended, and O.Reg. 406/19, there are seventeen tables outlining SCSs (Tables 1 to 9 and Tables 2.1 to 9.1) for evaluating Environmental Soil Characteristics. These tables are further divided based on land use. The chemical testing results from this project were compared to the various SCSs to evaluate where the excess excavated soil can be transported. Our assessment was limited to Tables 1 to 3 and Tables 2.1 to 3.1, the most common SCSs. If a potential receiving site has SCSs other the tables utilized, then PML should be consulted to ensure that the results meet the applicable SCSs of the proposed receiving site.

Based on the limited chemical testing results, excess excavated soil may be disposed of off-site at a receiving site where the SCSs comply with any one of the following O.Reg. 153/04, as amended, and/or O.Reg. 406/19 criteria;

- Small volume excess soil (<350 m³) soil quality standards refer to O.Reg. 153/04, as amended, coarse textured soil standards:
  - Table 1 RPI/ICC;
  - Table 2 RPI/ICC;
  - Table 3 RPI/ICC.
- Large volume excess soil (>350 m³) soil quality standards refer to O.Reg. 406/19 Tables 2.1 to 9.1 as wells as O.Reg. 153/04, as amended, Table 1:
  - Table 1 RPI/ICC;
  - Table 2.1 RPI/ICC;
  - Table 3.1 RPI/ICC.

Alternatively, excess excavated soil can be taken to a landfill facility, however, additional testing for Toxicity Characteristic Leaching Procedure (TCLP) will be required, in accordance with Ontario Regulation 347, Schedule 4, as amended, to Ontario Regulation 558/00, dated March 2001.

When transporting excavated site soil to another site the following are recommended:

- The soil characterization and excess soil destination assessment reports, including all applicable chemical testing results, should be provided to the receiving site authority for approval;
- A tracking system must be implemented by the source site Qualified Person (QP) such that transportation and placement of the surplus soil is monitored to check the material is appropriately placed at the pre-approved site;
- The receiving site(s) must be arranged and/or approved in advance of excavation such that a site-specific excess soil destination assessment report is completed for each site prior to fill movement;

- The excavation work should be conducted in accordance with a written Excess Soil Management Plan (ESMP) prepared by a qualified professional to ensure that all surplus excavated material is tested and managed appropriately, and that imported fill material is of suitable quality and meets the SCSs applicable to the receiving site. Reuse of surplus excavated soil on-site is also subject to acceptance for reuse by the geotechnical consultant at the time of construction based on geotechnical considerations;
- Additional sampling and chemical testing shall be carried out during construction to verify the chemical quality of the excess soil to assess the appropriate management/disposal options for the actual soil to leave the site. The frequency of additional testing depends on the volume of soil to be transported and it is noted that additional leachate testing will be required to meet O.Reg. 406/19 requirements, where the volume of soil is to be transferred off site is greater than 350 m^3.

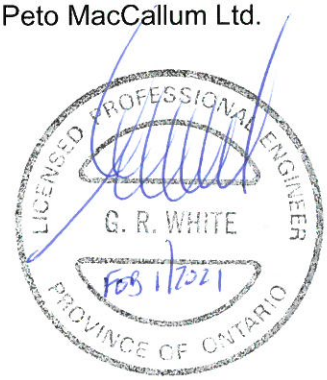
This assessment is subject to the Statement of Limitations that is included with this report (Appendix A) which must be read in conjunction with the report

6. CLOSURE

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to call our office.

Sincerely

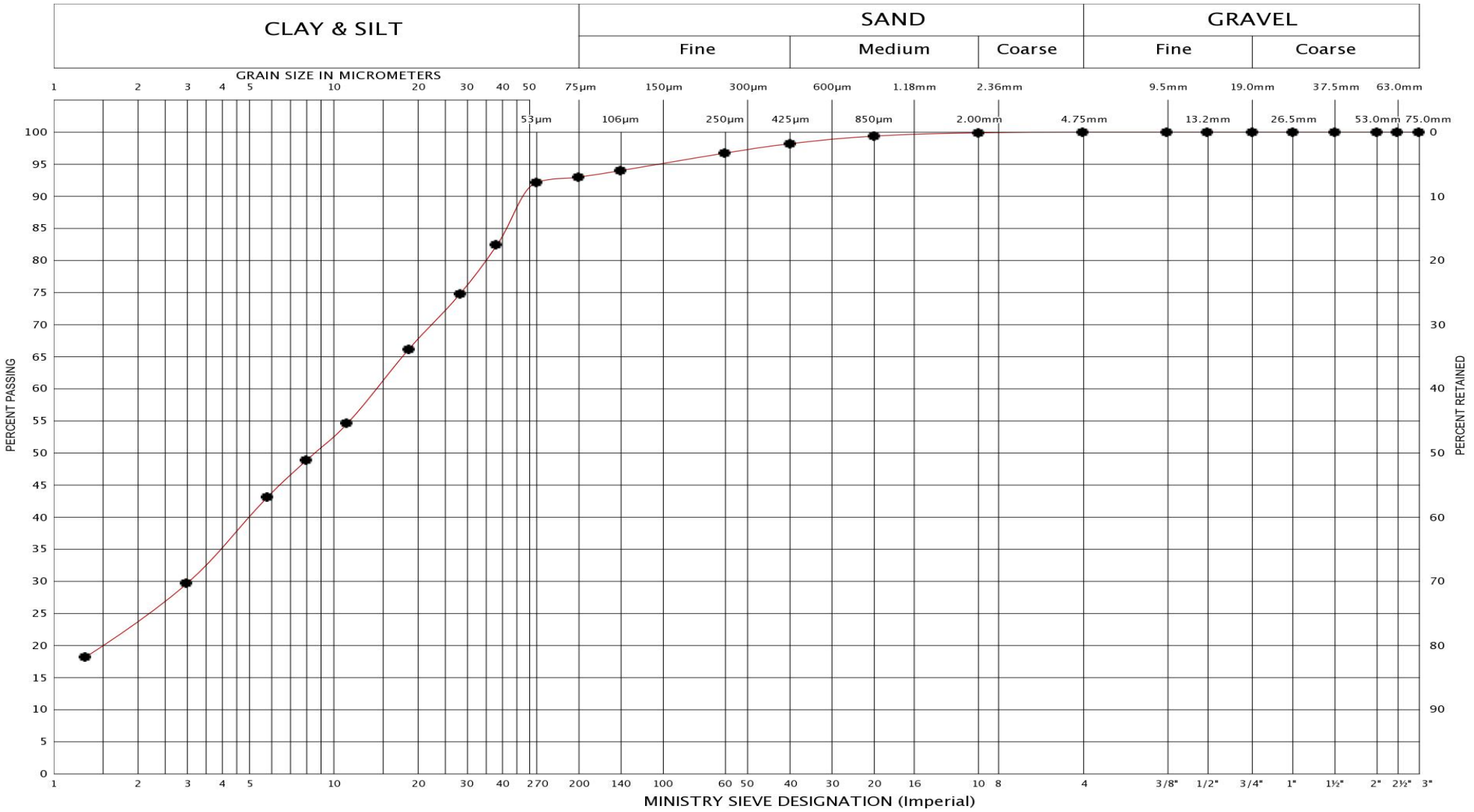
Peto MacCallum Ltd.



Geoffrey R. White, P.Eng.
Director
Manager, Geotechnical Services

GRW:tc

UNIFIED SOIL CLASSIFICATION SYSTEM



LEGEND	BH	1
	SAMPLE	3
	SYMBOL	●

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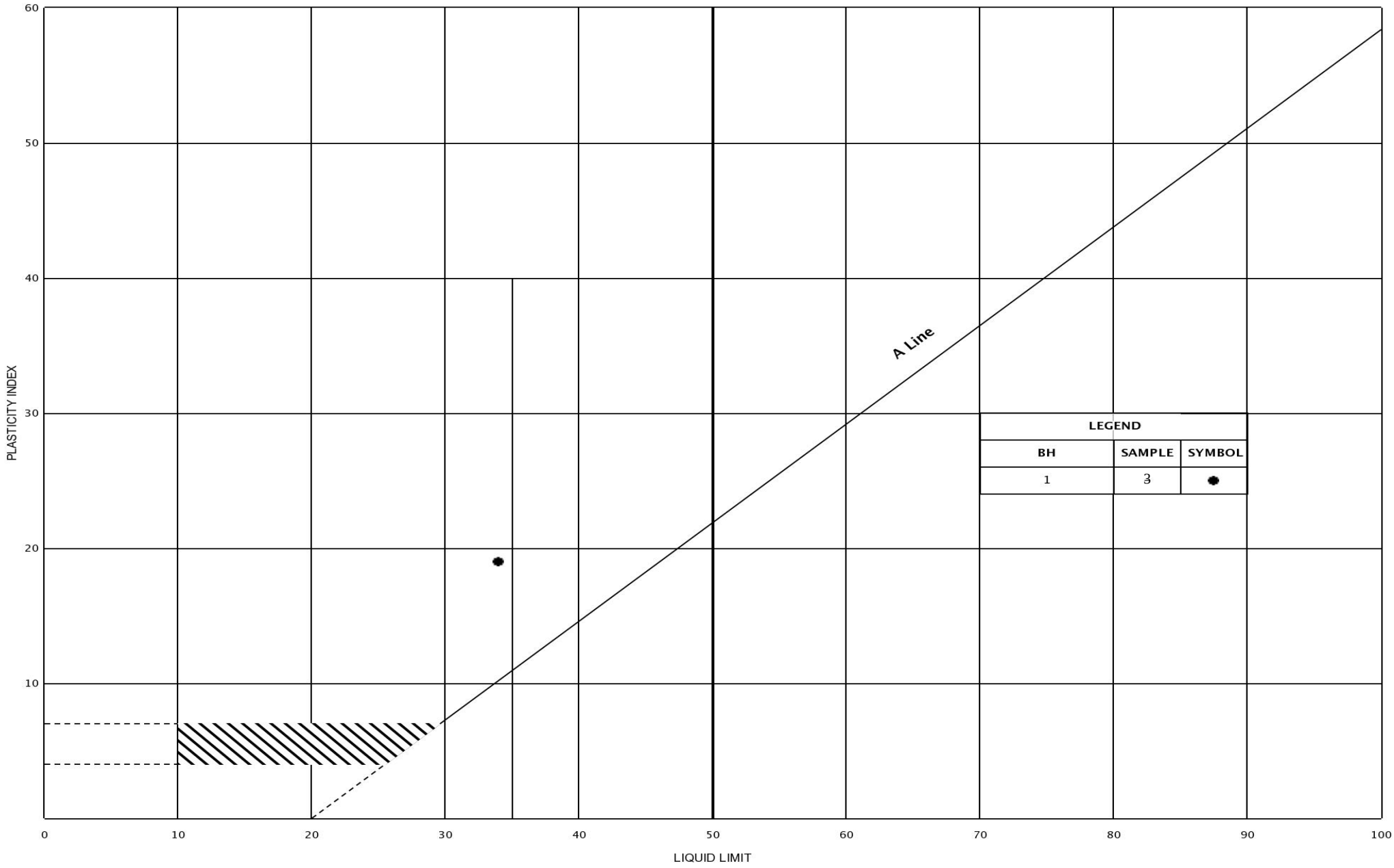
GRAIN SIZE DISTRIBUTION

CLAYEY SILT, Trace Sand

FIG No.: 2-1

Project No.: 20BF059



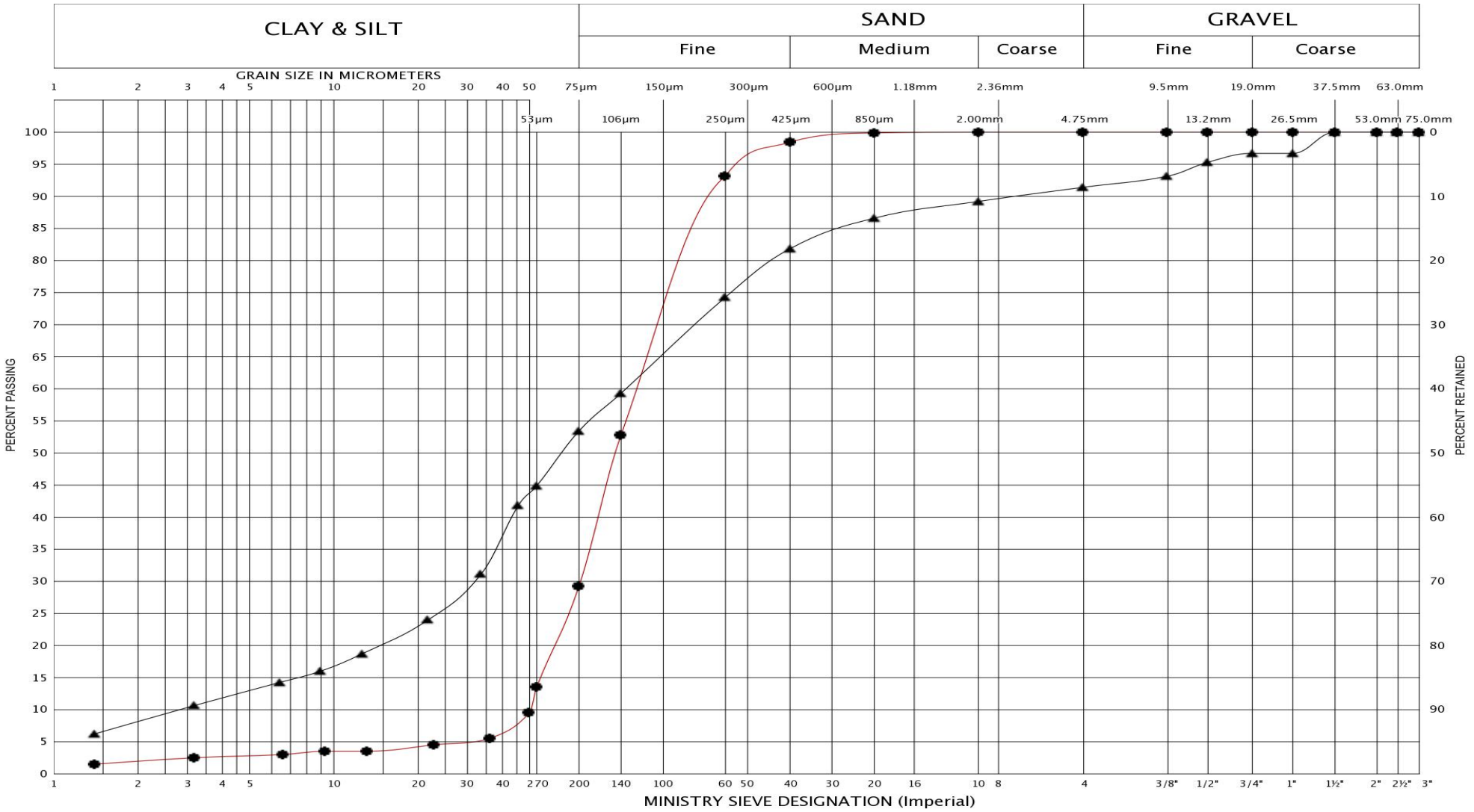
PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

PLASTICITY CHART

CLAYEY SILT, Trace Sand

FIG No.:	2-2
HWY.:	
Proj No.	20BF059

UNIFIED SOIL CLASSIFICATION SYSTEM



LEGEND	BH	BH/MW 7	8
	SAMPLE	4	4
	SYMBOL	▲	●

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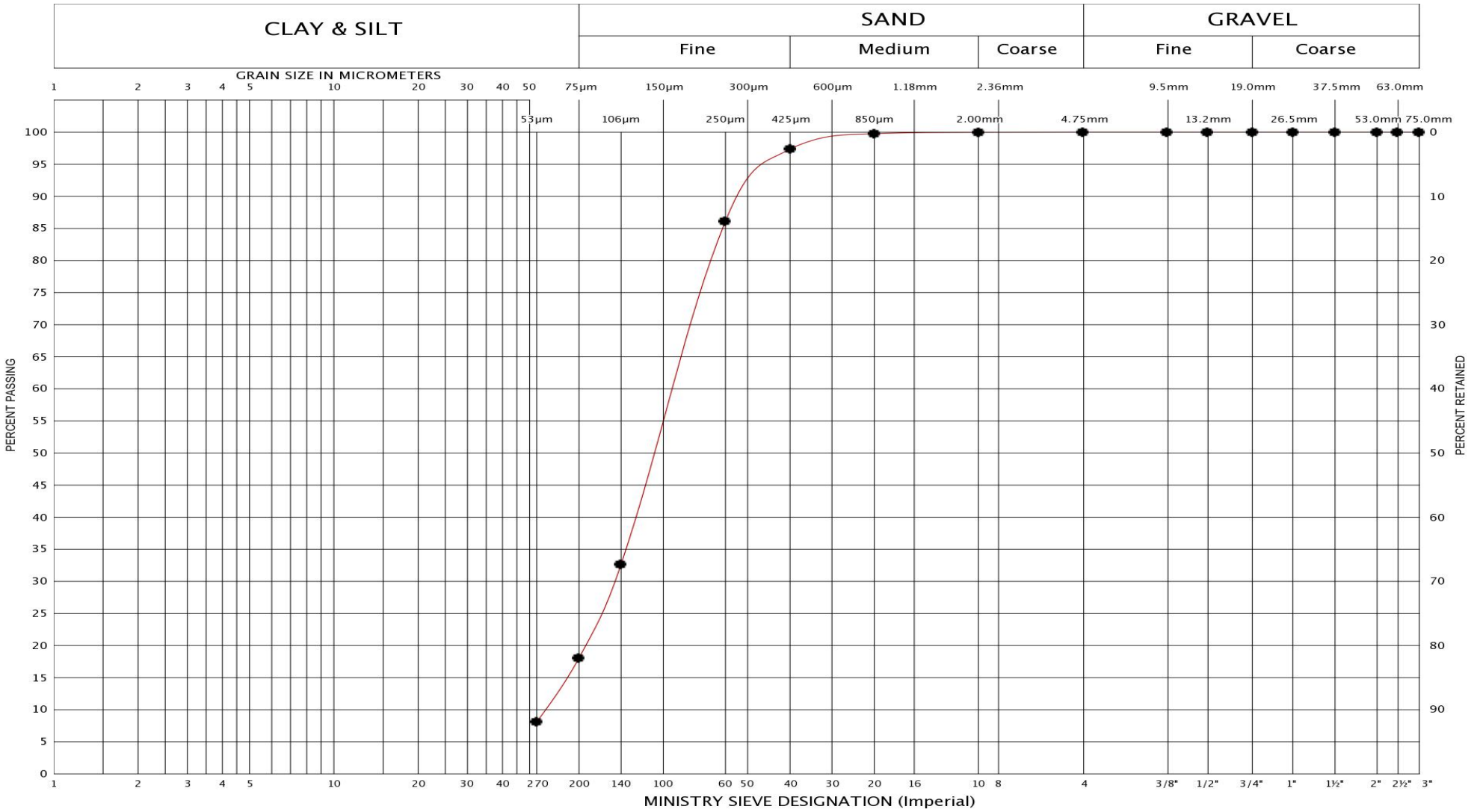
GRAIN SIZE DISTRIBUTION

TILL: Silt and Sand, Trace Gravel, Trace Clay / Silty Sand, Trace Clay

FIG No.: 2-3

Project No.: 20BF059

UNIFIED SOIL CLASSIFICATION SYSTEM



LEGEND	BH	BH/MW 3
	SAMPLE	4
	SYMBOL	●

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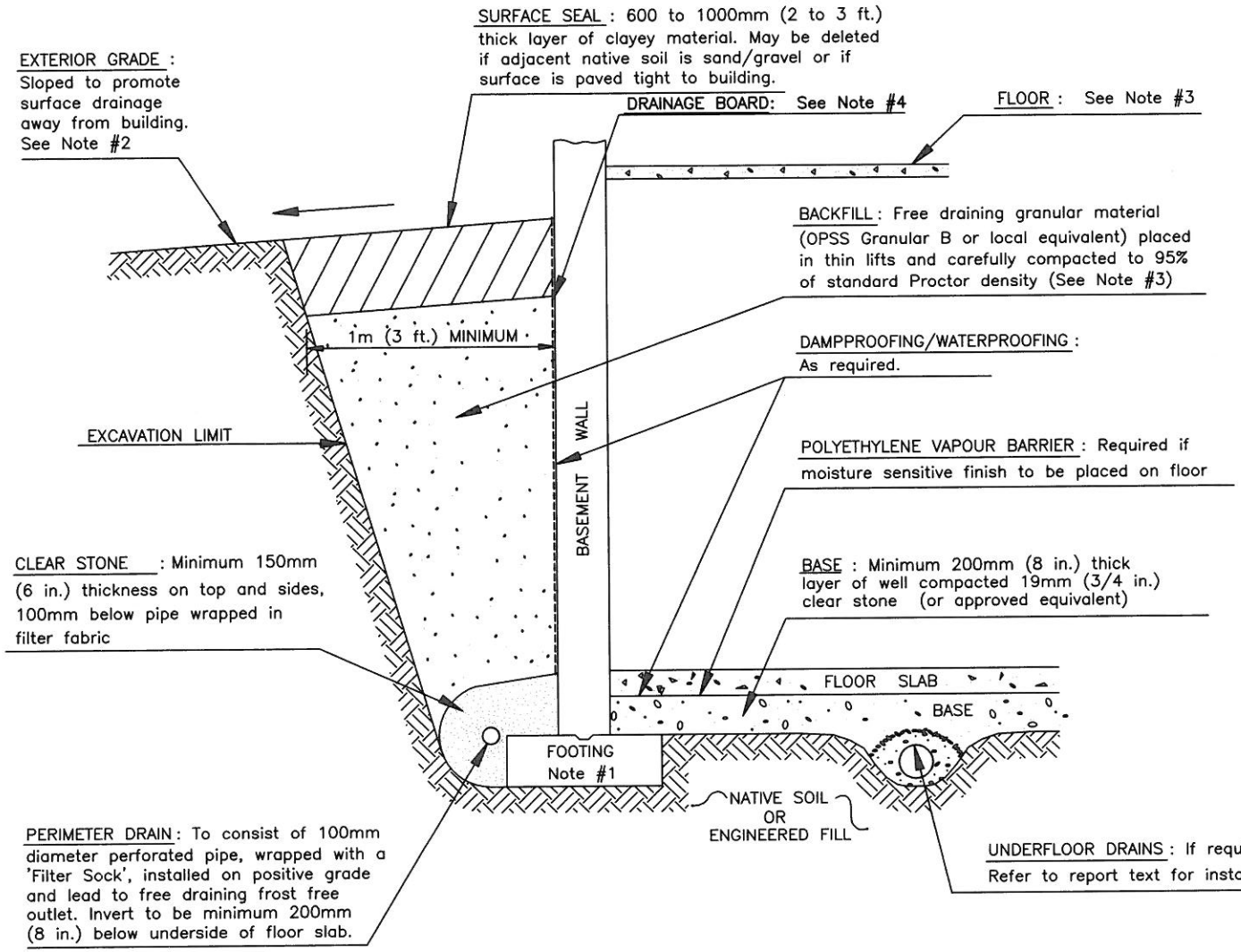
GRAIN SIZE DISTRIBUTION

SAND, Some Silt

FIG No.: 2-4

Project No.: 20BF059



NOTES

1. Footing may be constructed by placement of structural concrete neat against natural soil. Drain to be installed in a similar manner immediately above footing maintaining 200mm (8 in.) distance between top of drain and underside of floor slab.
2. Exterior grade to be minimum 300mm (12 in.) below interior floor slab, or other means established to prevent entry of surface water into building through building openings.
3. Basement wall to be supported by floor system or interior bracing prior to commencement of backfill placement. Heavy construction equipment should not be permited within a distance from the foundation wall equivalent to half the wall height. Overcompaction of backfill to be avoided as excessive lateral earth pressure may result.
4. A proprietary drainage board product may be used with compacted native soil as backfill against the wall.
5. Refer to text for details regarding founding levels, competent bearing material and construction details specific to particular site.

STANDARD DRAWING

GENERAL RECOMMENDATIONS REGARDING DRAINAGE AND BACKFILL REQUIREMENTS FOR BASEMENT WALL AND FLOOR SLAB CONSTRUCTION

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CONSULTING ENGINEERS

DRAWN:	N/A	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED:	GW	FEB. 2021	N.T.S.	20BF059	2–5
APPROVED:	GW				

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTLL	Wetter Than Liquid Limit
WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	ST	Slotted Tube Sample
WS	Washed Sample	TW	Thinwall Open
SB	Scraper Bucket Sample	TP	Thinwall Piston
AS	Auger Sample	OS	Oesterberg Sample
CS	Chunk Sample	FS	Foil Sample
GS	Grab Sample	RC	Rock Core

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

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LOG OF BOREHOLE NO. 1

17T 603735E 4911115N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 18, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
0.0	305.60	SURFACE ELEVATION 305.60				
0.00	305.52	TOPSOIL: Black, silty sand, trace organics, frozen		1	SS	2
0.70	304.90	SILTY SAND: Very loose, brown, silty sand, trace organics, frozen				
1.0		LAYERED SILTY CLAY/CLAYEY SILT: Firm, brown, silty clay to clayey silt, trace sand, sand seam, APL to WTPL		2	SS	8
				3	SS	8
2.0				4	SS	8
2.9	302.7	SAND: Dense to very dense, light brown, sand, trace to some silt, silt seams, moist		5	SS	46
3.0						
4.0						
5.0	300.6	BOREHOLE TERMINATED AT 5.0 m		6	SS	78

ELEVATION SCALE: 305, 304, 303, 302, 301

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS (ppm)

GROUND WATER OBSERVATIONS AND REMARKS

First water strike at 1.8 m

Upon completion of augering
No water
No cave

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

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CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 2

17T 603707E 4911189N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 21, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) / DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	GAS READINGS (ppm)	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 305.15									
0.10 305.05	TOPSOIL: Black, silty sand, trace organics, frozen		1	SS	1	305				
	SAND: Very loose to very dense, brown to light brown, sand, trace to some silt, frozen to moist		2	SS	2	304				
			3	SS	2	303				
			4	SS	27					
			5	SS	43	302				
						301				
4.8 300.3	BOREHOLE TERMINATED AT 4.8 m		6	SS	83/290mm					Upon completion of augering No water No cave

SHEAR STRENGTH (kPa): +FIELD VANE △TORVANE ○ Qu ▲POCKET PENETROMETER ○ Q; 50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80
PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L
WATER CONTENT (%) 10 20 30 40

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 3

17T 603692E 4911266N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 21, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres) / ELEV	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 304.20				
0.46 / 303.74	TOPSOIL: Black, silty sand, trace organics, frozen		1	SS	2
1.4 / 302.8	FILL: Dark brown, silty sand, frozen		2	SS	1
2.1 / 302.1	SILTY SAND: Loose, brown, silty sand, trace clay, moist		3	SS	5
	SAND: Loose to compact, light brown, sand, trace to some silt, moist		4	SS	4
			5	SS	13
5.2 / 299.0			6	SS	29
	BOREHOLE TERMINATED AT 5.2 m				

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER ● Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

ELEVATION SCALE: 304, 303, 302, 301, 300

PLASTIC LIMIT (w_P) NATURAL MOISTURE CONTENT (w) LIQUID LIMIT (w_L)
WATER CONTENT (%)
10 20 30 40

GAS READINGS (ppm): 0, 0, 30, 20, 10, 0

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Stick-up casing
Concrete
Bentonite seal
50 mm slotted pipe
Filter sand

Upon completion of augering
No water
No cave
Water Level Readings:

Date	Depth	Elev.
2020-01-07	Dry	-

NOTES

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CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 4

17T 603664E 4911262N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 21, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) / DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	GAS READINGS (ppm)	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
		SURFACE ELEVATION 304.35									
0.15	304.20	TOPSOIL: Black, sand, trace silt, frozen									
		FILL: Dark brown, sandy silt to silty sand, frozen to moist		1	SS	1	304				
				2	SS	1					First water strike at 0.9 m
1.4	303.0	SAND: Very loose to dense, brown, sand, trace to some silt, moist		3	SS	4	303				
				4	SS	2	302				
				5	SS	4	301				
				6	SS	7	300				
							299				
6.5	297.9			7	SS	32	298				
		BOREHOLE TERMINATED AT 6.5 m									Upon completion of augering No water No cave

SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q; 50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●; 20 40 60 80
PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30 40

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 5

17T 603709E 4911142N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 21, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 306.05				
0.0	0.10	TOPSOIL: Black, silty sand, trace organics, frozen		1	SS	3
	305.95	FILL: Dark brown to grey, silty clay, frozen				
1.0				2[1]	SS	8
	1.4					
	304.7	SAND: Compact to very dense, light brown, sand, trace to some silt, moist		3	SS	18
2.0				4	SS	35
3.0				5	SS	52
4.0						
5.0				6	SS	74
6.0				7[1]	SS	85
	6.7					
	299.4	BOREHOLE TERMINATED AT 6.7 m				
7.0						
8.0						
9.0						
10.0						
11.0						
12.0						
13.0						
14.0						
15.0						

ELEVATION SCALE: 305, 304, 303, 302, 301, 300

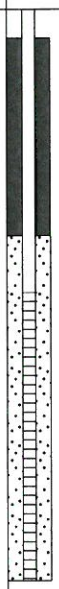
SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ● Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS (ppm): 35, 5, 15, 15, 20, 10, 0

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL



Upon completion of augering
No water
No cave
Water Level Readings:

Date	Depth	Elev.
2020-01-07	Dry	-

NOTES 1. Sample submitted for chemical testing

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 6

17T 603671E 4911177N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 21, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) +FIELD VANE △TORVANE ○ Qu ▲POCKET PENETROMETER ○ Q / DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	GAS READINGS ppm	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.05	SURFACE ELEVATION 305.50									
305.45	TOPSOIL: Black, silty sand, trace organics, frozen		1	SS	14	305			20	Stick-up casing Concrete
	FILL: Brown, sand, trace silt, frozen		2[1]	SS	18				5	Bentonite seal
1.4										
304.1	SAND: Compact to very dense, brown, sand, trace to some silt, moist with wet seam		3	SS	26	304			15	
			4	SS	37	303			15	
			5	SS	53	302			15	50 mm slotted pipe Filter sand
			6[1]	SS	54	301			0	
5.2										
300.3	BOREHOLE TERMINATED AT 5.2 m									Upon completion of augering No water No cave Water Level Readings: Date Depth Elev. 2020-01-07 Dry -

NOTES 1. Sample submitted for chemical testing

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 7

17T 603654E 4911091N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 22, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 307.70				
0.0	307.55	TOPSOIL: Brown, silty sand, trace organics, frozen		1	SS	2
		FILL: Light brown, sandy silt, trace gravel, frozen to moist		2	SS	10
2.0	305.6			3	SS	21
		SAND AND SILT TILL: Very dense, light brown, sand and silt, trace gravel, trace clay, cobbles and boulders, moist		4	SS	55
3.0				5	SS	50/290mm
5.0	302.5			6	SS	69
		BOREHOLE TERMINATED AT 5.2 m				

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ● Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

ELEVATION SCALE: 307, 306, 305, 304, 303

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS (ppm): 30, 25, 25, 25, 35, 15

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Stick-up casing
Concrete
Bentonite seal
50 mm slotted pipe
Filter sand

Upon completion of augering
No water
No cave
Water Level Readings:

Date	Depth	Elev.
2021-01-07	Dry	-

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 7A

17T 603654E 4911091N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Hollow Stem Augers
BORING DATE January 12, 2021
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	GAS READINGS (ppm)	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.0		SURFACE ELEVATION 307.70					307		Stick-up casing Concrete
1.0									
2.0							306		
3.0		Unsampled to 6.0 m. Drilled 1 m North from BH/MW7 (see BH/MW7)					305		
4.0							304		Bentonite seal
5.0							303		
6.0	6.0 301.7	SAND: Very dense to dense, light brown to brown sand, trace to some silt, moist to wet		7	SS	85/595 mm	302		
7.0							301		
8.0				8	SS	89/580 mm	300		
9.0				9	SS	73/560 mm	299		50 mm slotted pipe Filter sand First ground water strike at 9.2 m
10.0							298		
11.0	11.3 296.4	BOREHOLE TERMINATED AT 11.3 m		10	SS	30	297		Upon completion of augering Water at 8.6 m No cave Water Level Readings: Date Depth Elev. 2021-01-20 8.6 299.1
12.0									
13.0									
14.0									
15.0									

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ● Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 8

17T 603628E 4911135N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 22, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE
		SURFACE ELEVATION 307.90					
0.0	307.75	TOPSOIL: Black, silty sand, trace organics, frozen		1	SS	3	
		FILL: Dark brown, sand, some silt, trace gravel, frozen to moist		2	SS	6	307
1.4	306.5	SILTY SAND TILL: Compact to dense, brown, silty sand, trace clay, trace gravel, cobbles and boulders, moist		3	SS	14	306
2.0				4	SS	37	
2.9	305.0	SAND: Very dense, brown, sand, trace to some silt, moist		5	SS	65	305
4.0							304
5.0	302.9	BOREHOLE TERMINATED AT 5.0 m		6	SS	59	303

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ● Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Upon completion of augering
No water
No cave

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 9

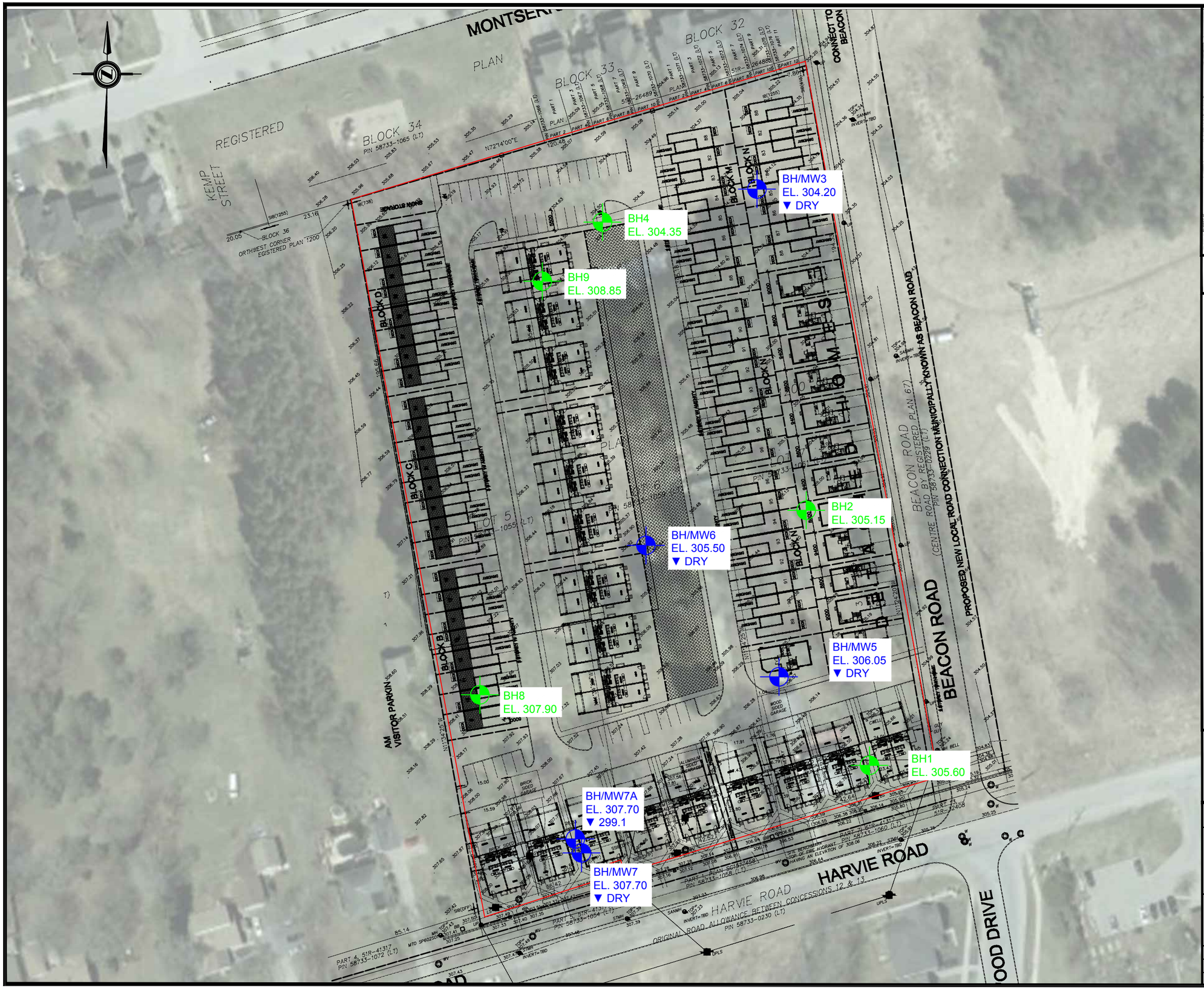
17T 603645E 4911241N

PROJECT Proposed Residential Subdivision
LOCATION 108, 116, 122 Harvie Road, Barrie Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE December 21, 2020
PML REF. 20BF059
ENGINEER GW
TECHNICIAN SB

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) / DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	GAS READINGS (ppm)	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
		SURFACE ELEVATION 308.85									
0.15	308.70	TOPSOIL: Black, sand, trace silt, trace organics, frozen		1	SS	2					
		FILL: Dark brown, sand, trace silt, frozen to moist		2	SS	8	308				First water strike at 0.9 m
1.4	307.5	SILTY SAND TILL: Compact, brown, silty sand, trace clay, trace gravel, cobbles and boulders, moist		3	SS	12	307				
2.1	306.8	SAND: Loose to compact, light brown, sand, trace to some silt, moist		4	SS	11	306				
				5	SS	8	305				
5.0	303.9	BOREHOLE TERMINATED AT 5.0 m		6	SS	30	304				Upon completion of augering No water No cave

SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q; 50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80
PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30 40

NOTES



KEY PLAN
GRAVENHURST, ONTARIO

LEGEND:

- SITE BOUNDARIES
- BH1 EL. 305.60 — BOREHOLE SURFACE ELEVATION
- BH/MW3 EL. 304.20 ▼ DRY — BOREHOLE/MONITORING WELL SURFACE ELEVATION GROUND WATER ELEVATION ON 2021-01-07

REFERENCE:

BASE PLAN PRODUCED FROM THE COUNTY OF SIMCOE ONLINE INTERACTIVE MAP.

0m 10 20 30 40 50
APPROXIMATE SCALE

SITE PLAN

PHASE ONE - ENVIRONMENTAL SITE ASSESSMENT
PROPOSED RESIDENTIAL SUBDIVISION
108, 116, 122 HARVIE ROAD, BARRIE, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	SB	DATE	SCALE	PML REF.	DRAWING NO.
CHECKED	AK	FEB 2021	AS SHOWN	20BF059	2-1
APPROVED	MA				

APPENDIX A

Statement of Limitations

STATEMENT OF LIMITATIONS

This report is prepared for and made available for the sole use of the client named. Peto MacCallum Ltd. (PML) hereby disclaims any liability or responsibility to any person or entity, other than those for whom this report is specifically issued, for any loss, damage, expenses, or penalties that may arise or result from the use of any information or recommendations contained in this report. The contents of this report may not be used or relied upon by any other person without the express written consent and authorization of PML.

This report shall not be relied upon for any purpose other than as agreed with the client named without the written consent of PML. It shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. A portion of this report may not be used as a separate entity: that is to say the report is to be read in its entirety at all times.

The report is based solely on the scope of services which are specifically referred to in this report. No physical or intrusive testing has been performed, except as specifically referenced in this report. This report is not a certification of compliance with past or present regulations, codes, guidelines and policies.

The scope of services carried out by PML is based on details of the proposed development and land use to address certain issues, purposes and objectives with respect to the specific site as identified by the client. Services not expressly set forth in writing are expressly excluded from the services provided by PML. In other words, PML has not performed any observations, investigations, study analysis, engineering evaluation or testing that is not specifically listed in the scope of services in this report. PML assumes no responsibility or duty to the client for any such services and shall not be liable for failing to discover any condition, whose discovery would require the performance of services not specifically referred to in this report.

STATEMENT OF LIMITATIONS
(continued)

The findings and comments made by PML in this report are based on the conditions observed at the time of PML's site reconnaissance. No assurances can be made and no assurances are given with respect to any potential changes in site conditions following the time of completion of PML's field work. Furthermore, regulations, codes and guidelines may change at any time subsequent to the date of this report and these changes may effect the validity of the findings and recommendations given in this report.

The results and conclusions with respect to site conditions are therefore in no way intended to be taken as a guarantee or representation, expressed or implied, that the site is free from any contaminants from past or current land use activities or that the conditions in all areas of the site and beneath or within structures are the same as those areas specifically sampled.

Any investigation, examination, measurements or sampling explorations at a particular location may not be representative of conditions between sampled locations. Soil, ground water, surface water, or building material conditions between and beyond the sampled locations may differ from those encountered at the sampling locations and conditions may become apparent during construction which could not be detected or anticipated at the time of the intrusive sampling investigation.

Budget estimates contained in this report are to be viewed as an engineering estimate of probable costs and provided solely for the purposes of assisting the client in its budgeting process. It is understood and agreed that PML will not in any way be held liable as a result of any budget figures provided by it.

The Client expressly waives its right to withhold PML's fees, either in whole or in part, or to make any claim or commence an action or bring any other proceedings, whether in contract, tort, or otherwise against PML in anyway connected with advice or information given by PML relating to the cost estimate or Environmental Remediation/Cleanup and Restoration or Soil and Ground Water Management Plan Cost Estimate.

APPENDIX B

Engineered Fill

ENGINEERED FILL

The information presented in this appendix is intended for general guidance only. Site specific conditions and prevailing weather may require modification of compaction standards, backfill type or procedures. Each site must be discussed, and procedures agreed with Peto MacCallum Ltd. prior to the start of the earthworks and must be subject to ongoing review during construction. This appendix is not intended to apply to embankments. Steeply sloping ravine residential lots require special consideration.

For fill to be classified as engineered fill suitable for supporting structural loads, a number of conditions must be satisfied, including but not necessarily limited to the following:

1. Purpose

The site specific purpose of the engineered fill must be recognized. In advance of construction, all parties should discuss the project and its requirements and agree on an appropriate set of standards and procedures.

2. Minimum Extent

The engineered fill envelope must extend beyond the footprint of the structure to be supported. The minimum extent of the envelope should be defined from a geotechnical perspective by:

- at founding level, extend a minimum 1.0 m beyond the outer edge of the foundations, greater if adequate layout has not yet been completed as noted below; and
- extend downward and outward at a slope no greater than 45° to meet the subgrade

All fill within the envelope established above must meet the requirements of engineered fill in order to support the structure safely. Other considerations such as survey control, or construction methods may require an envelope that is larger, as noted in the following sections.

Once the minimum envelope has been established, structures must not be moved or extended without consultation with Peto MacCallum Ltd. Similarly, Peto MacCallum Ltd. should be consulted prior to any excavation within the minimum envelope.

3. Survey Control

Accurate survey control is essential to the success of an engineered fill project. The boundaries of the engineered fill must be laid out by a surveyor in consultation with engineering staff from Peto MacCallum Ltd. Careful consideration of the maximum building envelope is required.

During construction it is necessary to have a qualified surveyor provide total station control on the three dimensional extent of filling.

4. Subsurface Preparation

Prior to placement of fill, the subgrade must be prepared to the satisfaction of Peto MacCallum Ltd. All deleterious material must be removed and in some cases, excavation of native mineral soils may be required.

Particular attention must be paid to wet subgrades and possible additional measures required to achieve sufficient compaction. Where fill is placed against a slope, benching may be necessary and natural drainage paths must not be blocked.

5. Suitable Fill Materials

All material to be used as fill must be approved by Peto MacCallum Ltd. Such approval will be influenced by many factors and must be site and project specific. External fill sources must be sampled, tested and approved prior to material being hauled to site.

6. Test Section

In advance of the start of construction of the engineered fill pad, the Contractor should conduct a test section. The compaction criterion will be assessed in consultation with Peto MacCallum Ltd. for the various fill material types using different lift thicknesses and number of passes for the compaction equipment proposed by the Contractor.

Additional test sections may be required throughout the course of the project to reflect changes in fill sources, natural moisture content of the material and weather conditions.

The Contractor should be particularly aware of changes in the moisture content of fill material. Site review by Peto MacCallum Ltd. is required to ensure the desired lift thickness is maintained and that each lift is systematically compacted, tested and approved before a subsequent lift is commenced.

7. Inspection and Testing

Uniform, thorough compaction is crucial to the performance of the engineered fill and the supported structure. Hence, all subgrade preparation, filling and compacting must be carried out under the full-time inspection by Peto MacCallum Ltd.

All founding surfaces for all buildings and residential dwellings or any part thereof (including but not limited to footings and floor slabs) on structural fill or native soils must be inspected and approved by PML engineering personnel prior to placement of the base/subbase granular material and/or concrete. The purpose of the inspection is to ensure the subgrade soils are capable of supporting the building/house foundation and floor slab loads and to confirm the building/house envelope does not extend beyond the limits of any structural fill pads.

8. Protection of Fill

Fill is generally more susceptible to the effects of weather than natural soil. Fill placed and approved to the level at which structural support is required must be protected from excessive wetting, drying, erosion or freezing. Where adequate protection has not been provided, it may be necessary to provide deeper footings or to strip and recompact some of the fill.

9. Construction Delay Time Considerations

The integrity of the fill pad can deteriorate due to the harsh effects of our Canadian weather. Hence, particular care must be taken if the fill pad is constructed over a long time period.

It is necessary therefore, that all fill sources are tested to ensure the material compactability prior to the soil arriving at site. When there has been a lengthy delay between construction periods of the fill pad, it is necessary to conduct subgrade proof rolling, test pits or boreholes to verify the adequacy of the exposed subgrade to accept new fill material.

When the fill pad will be constructed over a lengthy period of time, a field survey should be completed at the end of each construction season to verify the areal extent and the level at which the compacted fill has been brought up to, tested and approved.

In the following spring, subexcavation may be necessary if the fill pad has been softened attributable to ponded surface water or freeze/thaw cycles.

A new survey is required at the beginning of the next construction season to verify that random dumping and/or spreading of fill has not been carried out at the site.

10. Approved Fill Pad Surveillance

It should be appreciated that once the fill pad has been brought to final grade and documented by field survey, there must be ongoing surveillance to ensure that the integrity of the fill pad is not threatened.

Grading operations adjacent to fill pads can often take place several months or years after completion of the fill pad.

It is imperative that all site management and supervision staff, the staff of Contractors and earthwork operators be fully aware of the boundaries of all approved engineered fill pads.

Excavation into an approved engineered fill pad should never be contemplated without the full knowledge, approval and documentation by the geotechnical consultant.

If the fill pad is knowingly built several years in advance of ultimate construction, the areal limits of the fill pad should be substantially overbuilt laterally to allow for changes in possible structure location and elevation and other earthwork operations and competing interests on the site. The overbuilt distance required is project and/or site specified.

Iron bars should be placed at the corner/intermediate points of the fill pad as a permanent record of the approved limits of the work for record keeping purposes.

11. Unusual Working Conditions

Construction of fill pads may at times take place at night and/or during periods of freezing weather conditions because of the requirements of the project schedule. It should be appreciated therefore, that both situations present more difficult working conditions. The Owner, Contractor, Design Consultant and Geotechnical Engineer must be willing to work together to revise site construction procedures, enhance field testing and surveillance, and incorporate design modifications as necessary to suit site conditions.

When working at night there must be sufficient artificial light to properly illuminate the fill pad and borrow areas.

Placement of material to form an engineered fill pad during winter and freezing temperatures has its own special conditions that must be addressed. It is imperative that each day prior to placement of new fill, the exposed subgrade must be inspected and any overnight snow or frozen material removed. Particular attention should be given to the borrow source inspection to ensure only nonfrozen fill is brought to the site.

The Contractor must continually assess the work program and have the necessary spreading and compacting equipment to ensure that densification of the fill material takes place in a minimum amount of time. Changes may be required to the spreading methods, lift thickness, and compaction techniques to ensure the desired compaction is achieved uniformly throughout each fill lift.

The Contractor should adequately protect the subgrade at the end of each shift to minimize frost penetration overnight. Since water cannot be added to the fill material to facilitate compaction, it is imperative that densification of the fill be achieved by additional compaction effort and an appropriate reduced lift thickness. Once the fill pad has been completed, it must be properly protected from freezing temperatures and ponding of water during the spring thaw period.

If the pad is unusually thick or if the fill thickness varies dramatically across the width or length of the fill pad, Peto MacCallum Ltd. should be consulted for additional recommendations. In this case, alternative special provisions may be recommended, such as providing a surcharge preload for a limited time or increase the degree of compaction of the fill.

APPENDIX C

Certificates of Analyses for Chemical Testing

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (i)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Cyanide	10	Kingston	US	29-Dec-20	A-CN s K	in house
Conductivity	10	Holly Lane	ROD	04-Jan-21	A-COND-01 (o)	SM 2510B
pH	10	Richmond Hill	HAZ	30-Dec-20	A-pH-02 (rh)	MOEE3530
Chromium (VI)	10	Holly Lane	LMG	30-Dec-20	D-CRVI-02 (o)	EPA7196A
Mercury	10	Holly Lane	PBK	04-Jan-21	D-HG-01 (o)	EPA 7471A
Sodium Adsorption Ratio	10	Holly Lane	AHM	04-Jan-21	D-ICP-01 SAR (o)	SM 3120
Metals - ICP-OES	10	Holly Lane	AHM	04-Jan-21	D-ICP-02 (o)	EPA 6010
Metals - ICP-MS	10	Holly Lane	TPR	04-Jan-21	D-ICPMS-01 (o)	EPA 6020

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (i)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH1 SS2	BH2 SS2	BH4 SS2	BH8 SS2	O. Reg. 153	
	Sample I.D.		B20-40261-1	B20-40261-2	B20-40261-3	B20-40261-4	Tbl. 1 - All	
	Date Collected		18-Dec-20	21-Dec-20	21-Dec-20	22-Dec-20		
Parameter	**Units**	**R.L.**						
pH @25°C	pH Units		7.48	7.38	7.34	7.76		
Conductivity @25°C	mS/cm	0.001	0.18	0.148	0.113	0.101	0.57	
Cyanide (Free)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.051	
Sodium Adsorption Ratio	units		0.249	0.181	0.0859	0.0778	2.4	
Antimony	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.3	
Arsenic	µg/g	0.5	1.9	0.9	1.5	1.2	18	
Barium	µg/g	1	63	18	62	35	220	
Beryllium	µg/g	0.2	0.4	0.2	0.4	0.3	2.5	
Boron	µg/g	0.5	3.4	1.1	3.2	3.3	36	
Cadmium	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.2	
Chromium	µg/g	1	18	10	17	13	70	
Chromium (VI)	µg/g	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.66	
Cobalt	µg/g	1	7	4	7	5	21	
Copper	µg/g	1	13	4	9	12	92	
Lead	µg/g	5	7	< 5	< 5	< 5	120	
Mercury	µg/g	0.005	0.023	0.011	0.015	0.007	0.27	
Molybdenum	µg/g	1	< 1	< 1	< 1	< 1	2	
Nickel	µg/g	1	13	5	11	9	82	
Selenium	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.5	
Silver	µg/g	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.5	
Thallium	µg/g	0.1	0.1	< 0.1	< 0.1	< 0.1	1	
Uranium	µg/g	0.1	0.4	0.4	0.4	0.4	2.5	
Vanadium	µg/g	1	34	22	32	27	86	
Zinc	µg/g	3	34	12	26	20	290	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW5 SS2	BH/MW5 SS7	DUP A	DUP B	O. Reg. 153	
	Sample I.D.		B20-40261-5	B20-40261-6	B20-40261-7	B20-40261-8	Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20	21-Dec-20	21-Dec-20		
Parameter	**Units**	**R.L.**						
pH @25°C	pH Units		7.55	8.13	7.53	8.21		
Conductivity @25°C	mS/cm	0.001	0.205	0.085	0.215	0.082	0.57	
Cyanide (Free)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.051	
Sodium Adsorption Ratio	units		0.210	0.297	0.220	0.375	2.4	
Antimony	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.3	
Arsenic	µg/g	0.5	2.3	0.6	2.9	< 0.5	18	
Barium	µg/g	1	115	11	153	10	220	
Beryllium	µg/g	0.2	0.7	< 0.2	0.9	< 0.2	2.5	
Boron	µg/g	0.5	6.0	1.9	7.5	1.7	36	
Cadmium	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.2	
Chromium	µg/g	1	29	8	34	8	70	
Chromium (VI)	µg/g	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.66	
Cobalt	µg/g	1	11	3	14	3	21	
Copper	µg/g	1	18	5	23	4	92	
Lead	µg/g	5	8	< 5	10	< 5	120	
Mercury	µg/g	0.005	0.022	< 0.005	0.022	< 0.005	0.27	
Molybdenum	µg/g	1	< 1	< 1	< 1	< 1	2	
Nickel	µg/g	1	20	4	26	4	82	
Selenium	µg/g	0.5	0.5	< 0.5	< 0.5	< 0.5	1.5	
Silver	µg/g	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.5	
Thallium	µg/g	0.1	< 0.1	< 0.1	0.2	< 0.1	1	
Uranium	µg/g	0.1	0.5	0.3	0.5	0.4	2.5	
Vanadium	µg/g	1	44	25	46	25	86	
Zinc	µg/g	3	46	12	59	9	290	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
pH @25°C	pH Units		7.91	8.22				
Conductivity @25°C	mS/cm	0.001	0.076	0.063			0.57	
Cyanide (Free)	µg/g	0.05	< 0.05	< 0.05			0.051	
Sodium Adsorption Ratio	units		0.0908	0.190			2.4	
Antimony	µg/g	0.5	< 0.5	< 0.5			1.3	
Arsenic	µg/g	0.5	0.6	< 0.5			18	
Barium	µg/g	1	12	11			220	
Beryllium	µg/g	0.2	< 0.2	< 0.2			2.5	
Boron	µg/g	0.5	1.5	1.5			36	
Cadmium	µg/g	0.5	< 0.5	< 0.5			1.2	
Chromium	µg/g	1	8	6			70	
Chromium (VI)	µg/g	0.2	< 0.2	< 0.2			0.66	
Cobalt	µg/g	1	3	2			21	
Copper	µg/g	1	5	4			92	
Lead	µg/g	5	< 5	< 5			120	
Mercury	µg/g	0.005	< 0.005	< 0.005			0.27	
Molybdenum	µg/g	1	< 1	< 1			2	
Nickel	µg/g	1	4	3			82	
Selenium	µg/g	0.5	< 0.5	< 0.5			1.5	
Silver	µg/g	0.2	< 0.2	< 0.2			0.5	
Thallium	µg/g	0.1	< 0.1	< 0.1			1	
Uranium	µg/g	0.1	0.3	0.3			2.5	
Vanadium	µg/g	1	20	16			86	
Zinc	µg/g	3	14	8			290	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (i)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (ii)**

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DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
VOC's	6	Richmond Hill	FAL	24-Dec-20	C-VOC-02 (rh)	EPA 8260

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Final Report

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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW5 SS2	BH/MW5 SS7	DUP A	DUP B	O. Reg. 153	
	Sample I.D.		B20-40261-5	B20-40261-6	B20-40261-7	B20-40261-8	Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20	21-Dec-20	21-Dec-20		
Parameter	**Units**	**R.L.**						
Acetone	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Benzene	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	
Bromodichloromethane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Bromoform	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Bromomethane	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Carbon Tetrachloride	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Monochlorobenzene (Chlorobenzene)	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Chloroform	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dibromochloromethane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichlorobenzene,1,2-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichlorobenzene,1,3-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichlorobenzene,1,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichlorodifluoromethane	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichloroethane,1,1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethane,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethylene,1,1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethene, cis-1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethene, trans-1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloropropane,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloropropene, cis-1,3-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02		
Dichloropropene, trans-1,3-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02		
Dichloropropene 1,3-cis+trans	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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Christine Burke
Lab Manager

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Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (ii)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW5 SS2	BH/MW5 SS7	DUP A	DUP B	O. Reg. 153	
	Sample I.D.		B20-40261-5	B20-40261-6	B20-40261-7	B20-40261-8	Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20	21-Dec-20	21-Dec-20		
Parameter	**Units**	**R.L.**						
Ethylbenzene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dibromoethane,1,2-(Ethylene Dibromide)	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Hexane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Methyl Ethyl Ketone	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Methyl Isobutyl Ketone	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Methyl-t-butyl Ether	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichloromethane (Methylene Chloride)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Styrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Tetrachloroethane,1,1,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Tetrachloroethane,1,1,2,2-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Tetrachloroethylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Toluene	µg/g	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.2	
Trichloroethane,1,1,1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Trichloroethane,1,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Trichloroethylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Trichlorofluoromethane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.25	
Vinyl Chloride	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	
Xylene, m,p-	µg/g	0.03	< 0.03	< 0.03	< 0.03	< 0.03		
Xylene, o-	µg/g	0.03	< 0.03	< 0.03	< 0.03	< 0.03		
Xylene, m,p,o-	µg/g	0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.05	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (ii)**

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Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
Acetone	µg/g	0.5	< 0.5	< 0.5			0.5	
Benzene	µg/g	0.02	< 0.02	< 0.02			0.02	
Bromodichloromethane	µg/g	0.02	< 0.02	< 0.02			0.05	
Bromoform	µg/g	0.02	< 0.02	< 0.02			0.05	
Bromomethane	µg/g	0.05	< 0.05	< 0.05			0.05	
Carbon Tetrachloride	µg/g	0.05	< 0.05	< 0.05			0.05	
Monochlorobenzene (Chlorobenzene)	µg/g	0.02	< 0.02	< 0.02			0.05	
Chloroform	µg/g	0.02	< 0.02	< 0.02			0.05	
Dibromochloromethane	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichlorobenzene,1,2-	µg/g	0.05	< 0.05	< 0.05			0.05	
Dichlorobenzene,1,3-	µg/g	0.05	< 0.05	< 0.05			0.05	
Dichlorobenzene,1,4-	µg/g	0.05	< 0.05	< 0.05			0.05	
Dichlorodifluoromethane	µg/g	0.05	< 0.05	< 0.05			0.05	
Dichloroethane,1,1-	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichloroethane,1,2-	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichloroethylene,1,1-	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichloroethene, cis-1,2-	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichloroethene, trans-1,2-	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichloropropane,1,2-	µg/g	0.02	< 0.02	< 0.02			0.05	
Dichloropropene, cis-1,3-	µg/g	0.02	< 0.02	< 0.02				
Dichloropropene, trans-1,3-	µg/g	0.02	< 0.02	< 0.02				
Dichloropropene 1,3-cis+trans	µg/g	0.02	< 0.02	< 0.02			0.05	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
Ethylbenzene	µg/g	0.05	< 0.05	< 0.05			0.05	
Dibromoethane,1,2-(Ethylene Dibromide)	µg/g	0.02	< 0.02	< 0.02			0.05	
Hexane	µg/g	0.02	< 0.02	< 0.02			0.05	
Methyl Ethyl Ketone	µg/g	0.5	< 0.5	< 0.5			0.5	
Methyl Isobutyl Ketone	µg/g	0.5	< 0.5	< 0.5			0.5	
Methyl-t-butyl Ether	µg/g	0.05	< 0.05	< 0.05			0.05	
Dichloromethane (Methylene Chloride)	µg/g	0.05	< 0.05	< 0.05			0.05	
Styrene	µg/g	0.05	< 0.05	< 0.05			0.05	
Tetrachloroethane,1,1,1,2-	µg/g	0.02	< 0.02	< 0.02			0.05	
Tetrachloroethane,1,1,2,2-	µg/g	0.05	< 0.05	< 0.05			0.05	
Tetrachloroethylene	µg/g	0.05	< 0.05	< 0.05			0.05	
Toluene	µg/g	0.2	< 0.2	< 0.2			0.2	
Trichloroethane,1,1,1-	µg/g	0.02	< 0.02	< 0.02			0.05	
Trichloroethane,1,1,2-	µg/g	0.02	< 0.02	< 0.02			0.05	
Trichloroethylene	µg/g	0.05	< 0.05	< 0.05			0.05	
Trichlorofluoromethane	µg/g	0.02	< 0.02	< 0.02			0.25	
Vinyl Chloride	µg/g	0.02	< 0.02	< 0.02			0.02	
Xylene, m,p-	µg/g	0.03	< 0.03	< 0.03				
Xylene, o-	µg/g	0.03	< 0.03	< 0.03				
Xylene, m,p,o-	µg/g	0.03	< 0.03	< 0.03			0.05	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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DATE RECEIVED: 23-Dec-20
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SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
% Moisture	10	Richmond Hill	FAL	24-Dec-20	A-% moisture RH	
PHC(F2-F4)	10	Kingston	KPR	30-Dec-20	C-PHC-S-001 (k)	CWS Tier 1
PHC(F1)	6	Richmond Hill	FAL	24-Dec-20	C-VPHS-01 (rh)	CWS Tier 1
PHC(F1)	4	Richmond Hill	FAL	30-Dec-20	C-VPHS-01 (rh)	CWS Tier 1

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH1 SS2	BH2 SS2	BH4 SS2	BH8 SS2	O. Reg. 153	
	Sample I.D.		B20-40261-1	B20-40261-2	B20-40261-3	B20-40261-4	Tbl. 1 - All	
	Date Collected		18-Dec-20	21-Dec-20	21-Dec-20	22-Dec-20		
Parameter	**Units**	**R.L.**						
PHC F1 (C6-C10)	µg/g	10					25	
PHC F1 (C6-C10)	µg/g	10	< 10	< 10	< 10	< 10	25	
PHC F2 (>C10-C16)	µg/g	5	< 5	< 5	< 5	< 5	10	
PHC F3 (>C16-C34)	µg/g	10	35	< 10	< 10	< 10	240	
PHC F4 (>C34-C50)	µg/g	10	< 10	< 10	< 10	< 10	120	
% moisture	%		16.1	14.8	16.5	10.6		

O. Reg. 153 - Soil, Ground Water and Sediment Standards
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Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW5 SS2	BH/MW5 SS7	DUP A	DUP B	O. Reg. 153	
	Sample I.D.		B20-40261-5	B20-40261-6	B20-40261-7	B20-40261-8	Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20	21-Dec-20	21-Dec-20		
Parameter	**Units**	**R.L.**						
PHC F1 (C6-C10)	µg/g	10	< 10	< 10	< 10	< 10	25	
PHC F1 (C6-C10)	µg/g	10					25	
PHC F2 (>C10-C16)	µg/g	5	< 5	< 5	< 6	< 5	10	
PHC F3 (>C16-C34)	µg/g	10	11	< 10	39	< 10	240	
PHC F4 (>C34-C50)	µg/g	10	< 10	< 10	11	< 10	120	
% moisture	%		19.6	4.9	22.8	8.2		

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (iii)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
PHC F1 (C6-C10)	µg/g	10	< 10	< 10			25	
PHC F1 (C6-C10)	µg/g	10					25	
PHC F2 (>C10-C16)	µg/g	5	< 5	< 5			10	
PHC F3 (>C16-C34)	µg/g	10	< 10	18			240	
PHC F4 (>C34-C50)	µg/g	10	< 10	10			120	
% moisture	%		4.5	4.9				

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
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DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
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DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
SVOC	6	Kingston	sge	30-Dec-20	C-NAB-S-001 (k)	EPA 8270

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

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Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW5 SS2	BH/MW5 SS7	DUP A	DUP B	O. Reg. 153	
	Sample I.D.		B20-40261-5	B20-40261-6	B20-40261-7	B20-40261-8	Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20	21-Dec-20	21-Dec-20		
Parameter	**Units**	**R.L.**						
Acenaphthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.072	
Acenaphthylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.093	
Anthracene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.16	
Benzo(a)anthracene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.36	
Benzo(a)pyrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.3	
Benzo(b)fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.47	
Benzo(k)fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.48	
Benzo(g,h,i)perylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.68	
Biphenyl, 1, 1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Bis(2-Chloroethyl)ether	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.5	
Bis(2-Chloroisopropyl)ether	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.5	
Bis(2-ethylhexyl) Phthalate	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	5	
Chloroaniline, 4-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.5	
Chlorophenol, 2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.1	
Chrysene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	2.8	
Dibenzo(a,h)anthracene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.1	
Dichlorobenzidine, 3,3'-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	1	
Dichlorophenol, 2,4-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.1	
Diethyl Phthalate	µg/g	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.5	
Dimethyl Phthalate	µg/g	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.5	
Dimethylphenol, 2,4-	µg/g	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	
Dinitrophenol, 2,4-	µg/g	1	< 1	< 1	< 1	< 1	2	
Dinitrotoluene, 2,4-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.5	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (iv)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW5 SS2	BH/MW5 SS7	DUP A	DUP B	O. Reg. 153	
	Sample I.D.		B20-40261-5	B20-40261-6	B20-40261-7	B20-40261-8	Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20	21-Dec-20	21-Dec-20		
Parameter	**Units**	**R.L.**						
Dinitrotoluene, 2,6-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.5	
Fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.56	
Fluorene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.12	
Indeno(1,2,3,-cd)pyrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.23	
Methylnaphthalene,1-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	
Methylnaphthalene,2-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	
Methylnaphthalene 2-(1-)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	
Naphthalene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	
Pentachlorophenol	µg/g	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	
Phenanthrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.69	
Phenol	µg/g	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5	
Pyrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	1	
Trichlorobenzene,1,2,4-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Trichlorophenol, 2,4,5-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.1	
Trichlorophenol 2,4,6-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.1	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Attention: Alicia Kimberley

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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
Acenaphthene	µg/g	0.05	< 0.05	< 0.05			0.072	
Acenaphthylene	µg/g	0.05	< 0.05	< 0.05			0.093	
Anthracene	µg/g	0.05	< 0.05	< 0.05			0.16	
Benzo(a)anthracene	µg/g	0.05	< 0.05	< 0.05			0.36	
Benzo(a)pyrene	µg/g	0.05	< 0.05	< 0.05			0.3	
Benzo(b)fluoranthene	µg/g	0.05	< 0.05	< 0.05			0.47	
Benzo(k)fluoranthene	µg/g	0.05	< 0.05	< 0.05			0.48	
Benzo(g,h,i)perylene	µg/g	0.05	< 0.05	< 0.05			0.68	
Biphenyl, 1, 1-	µg/g	0.02	< 0.02	< 0.02			0.05	
Bis(2-Chloroethyl)ether	µg/g	0.02	< 0.02	< 0.02			0.5	
Bis(2-Chloroisopropyl)ether	µg/g	0.02	< 0.02	< 0.02			0.5	
Bis(2-ethylhexyl) Phthalate	µg/g	0.5	< 0.5	< 0.5			5	
Chloroaniline, 4-	µg/g	0.02	< 0.02	< 0.02			0.5	
Chlorophenol, 2-	µg/g	0.02	< 0.02	< 0.02			0.1	
Chrysene	µg/g	0.05	< 0.05	< 0.05			2.8	
Dibenzo(a,h)anthracene	µg/g	0.05	< 0.05	< 0.05			0.1	
Dichlorobenzidine, 3,3'-	µg/g	0.05	< 0.05	< 0.05			1	
Dichlorophenol, 2,4-	µg/g	0.02	< 0.02	< 0.02			0.1	
Diethyl Phthalate	µg/g	0.1	< 0.1	< 0.1			0.5	
Dimethyl Phthalate	µg/g	0.1	< 0.1	< 0.1			0.5	
Dimethylphenol, 2,4-	µg/g	0.1	< 0.1	< 0.1			0.2	
Dinitrophenol, 2,4-	µg/g	1	< 1	< 1			2	
Dinitrotoluene, 2,4-	µg/g	0.02	< 0.02	< 0.02			0.5	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
Dinitrotoluene, 2,6-	µg/g	0.02	< 0.02	< 0.02			0.5	
Fluoranthene	µg/g	0.05	< 0.05	< 0.05			0.56	
Fluorene	µg/g	0.05	< 0.05	< 0.05			0.12	
Indeno(1,2,3,-cd)pyrene	µg/g	0.05	< 0.05	< 0.05			0.23	
Methylnaphthalene,1-	µg/g	0.05	< 0.05	< 0.05			0.59	
Methylnaphthalene,2-	µg/g	0.05	< 0.05	< 0.05			0.59	
Methylnaphthalene 2-(1-)	µg/g	0.05	< 0.05	< 0.05			0.59	
Naphthalene	µg/g	0.05	< 0.05	< 0.05			0.09	
Pentachlorophenol	µg/g	0.1	< 0.1	< 0.1			0.1	
Phenanthrene	µg/g	0.05	< 0.05	< 0.05			0.69	
Phenol	µg/g	0.01	< 0.01	< 0.01			0.5	
Pyrene	µg/g	0.05	< 0.05	< 0.05			1	
Trichlorobenzene,1,2,4-	µg/g	0.02	< 0.02	< 0.02			0.05	
Trichlorophenol, 2,4,5-	µg/g	0.02	< 0.02	< 0.02			0.1	
Trichlorophenol 2,4,6-	µg/g	0.02	< 0.02	< 0.02			0.1	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
OC Pesticides	6	Kingston	CS	31-Dec-20	C-PESTCL-01 K	EPA 8080

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH1 SS2	BH2 SS2	BH4 SS2	BH8 SS2	O. Reg. 153	
	Sample I.D.		B20-40261-1	B20-40261-2	B20-40261-3	B20-40261-4	Tbl. 1 - All	
	Date Collected		18-Dec-20	21-Dec-20	21-Dec-20	22-Dec-20		
Parameter	**Units**	**R.L.**						
Aldrin	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Chlordane (alpha)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Chlordane (Gamma)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Chlordane Total (alpha+gamma)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
DDD, 2,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
DDD, 4,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
DDD Total	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
DDE, 2,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
DDE, 4,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
DDE Total	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
DDT, 2,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
DDT, 4,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05		
DDT Total	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.4	
Dieldrin	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Lindane (Hexachlorocyclohexane, Gamma)	µg/g	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	
Endosulfan I	µg/g	0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Endosulfan II	µg/g	0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Endosulfan I/II	µg/g	0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.04	
Endrin	µg/g	0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.04	
Heptachlor	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Heptachlor Epoxide	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Hexachlorobenzene	µg/g	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: GH0123 **REPORT No. B20-40261 (v)**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Alicia Kimberley

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH1 SS2	BH2 SS2	BH4 SS2	BH8 SS2	O. Reg. 153	
	Sample I.D.		B20-40261-1	B20-40261-2	B20-40261-3	B20-40261-4	Tbl. 1 - All	
	Date Collected		18-Dec-20	21-Dec-20	21-Dec-20	22-Dec-20		
Parameter	**Units**	**R.L.**						
Hexachlorobutadiene	µg/g	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	
Hexachloroethane	µg/g	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	
Methoxychlor	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

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DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153 Tbl. 1 - All	
	Sample I.D.		B20-40261-9	B20-40261-10				
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
Aldrin	µg/g	0.05	< 0.05	< 0.05			0.05	
Chlordane (alpha)	µg/g	0.05	< 0.05	< 0.05				
Chlordane (Gamma)	µg/g	0.05	< 0.05	< 0.05				
Chlordane Total (alpha+gamma)	µg/g	0.05	< 0.05	< 0.05			0.05	
DDD, 2,4-	µg/g	0.05	< 0.05	< 0.05				
DDD, 4,4-	µg/g	0.05	< 0.05	< 0.05				
DDD Total	µg/g	0.05	< 0.05	< 0.05			0.05	
DDE, 2,4-	µg/g	0.05	< 0.05	< 0.05				
DDE, 4,4-	µg/g	0.05	< 0.05	< 0.05				
DDE Total	µg/g	0.05	< 0.05	< 0.05			0.05	
DDT, 2,4-	µg/g	0.05	< 0.05	< 0.05				
DDT, 4,4-	µg/g	0.05	< 0.05	< 0.05				
DDT Total	µg/g	0.05	< 0.05	< 0.05			1.4	
Dieldrin	µg/g	0.05	< 0.05	< 0.05			0.05	
Lindane (Hexachlorocyclohexane, Gamma)	µg/g	0.01	< 0.01	< 0.01			0.01	
Endosulfan I	µg/g	0.04	< 0.04	< 0.04				
Endosulfan II	µg/g	0.04	< 0.04	< 0.04				
Endosulfan I/II	µg/g	0.04	< 0.04	< 0.04			0.04	
Endrin	µg/g	0.04	< 0.04	< 0.04			0.04	
Heptachlor	µg/g	0.05	< 0.05	< 0.05			0.05	
Heptachlor Epoxide	µg/g	0.05	< 0.05	< 0.05			0.05	
Hexachlorobenzene	µg/g	0.01	< 0.01	< 0.01			0.01	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

	Client I.D.		BH/MW6 SS2	BH/MW6 SS6			O. Reg. 153	
	Sample I.D.		B20-40261-9	B20-40261-10			Tbl. 1 - All	
	Date Collected		21-Dec-20	21-Dec-20				
Parameter	**Units**	**R.L.**						
Hexachlorobutadiene	µg/g	0.01	< 0.01	< 0.01			0.01	
Hexachloroethane	µg/g	0.01	< 0.01	< 0.01			0.01	
Methoxychlor	µg/g	0.05	< 0.05	< 0.05			0.05	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

R.L. = Reporting Limit
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Lab Manager

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DATE RECEIVED: 23-Dec-20
DATE REPORTED: 05-Jan-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 20BF059
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 1 - All - Table 1 - Res/Park/Institutional/Indus/Com/Commun

Christine Burke
Lab Manager

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TESTING REQUIREMENTS

- [x] O.Reg 153 — Table 1 — [ ] Medium/Fine [ ] Coarse
- [ ] RPI [ ] ICC — [ ] Agricultural (O.Reg 153)
- [ ] Yes [ ] No — Record of Site Condition (O.Reg 153)
- Provincial Water Quality Objectives
- [ ] Sewer Use By-Law: _____
- [ ] MISA Guidelines
- [ ] O.Reg 558 Leachate Analysis
- Disposal Site: _____
- [ ] Landfill Monitoring
- [ ] Other: _____

REPORT NUMBER (Lab Use): B20-40261

Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? [ ] Yes [x] No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custody)

Indicate Laboratory Samples are submitted to: [ ] Kingston [ ] Ottawa [ ] Richmond Hill [ ] Windsor [x] Barrie [ ] London

Organization: Peto MacCallum Ltd.	Address and Invoicing Address (if different): 19 Churchill Drive, Barrie, ON L4N8Z5, barrie@petomaccallum.com
Contact: A. Kimberley	
Tel: 705-734-3900	
Fax: 705-734-9911	Quote No.:
Email: akimberley@petomaccallum.com	P.O. No.:
	Project Name: 20BF059
	Additional Info: sberg@petomaccallum.com

TURNAROUND SERVICE REQUESTED (see back page)

- [ ] Platinum 200% Surcharge
- [ ] Gold 100% Surcharge
- [ ] Silver 50% Surcharge
- [ ] Bronze 25% Surcharge
- [x] Standard 5-7 days
- [ ] Specific Date: _____

* Sample Matrix Legend: WW=Waste Water, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soil, Sed=Sediment, PC=Paint Chips, F=Filter, Oil = Oil

Lab No:	Sample Identification	S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	METALS AND INORGANICS	PHCs	VOCs	PAHs	BNAE	OC PESTICIDES	Suspected Highly Contaminated	✓	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered(Y/N)
1	BH1 SS2		Soil	2020-12-18		X	X				X					2	
2	BH2 SS2		Soil	2020-12-21		X	X				X					2	
3	BH4 SS2		Soil	2020-12-21		X	X				X					2	
4	BH8 SS2		Soil	2020-12-22		X	X				X					2	
5	BH/MW5 SS2		Soil	2020-12-21		X	X	X	X	X						4	
6	BH/MW5 SS7		Soil	2020-12-21		X	X	X	X	X						4	
7	DUP A		Soil	2020-12-21		X	X	X	X	X						4	
8	DUP B		Soil	2020-12-21		X	X	X	X	X						4	
9	BH/MW6 SS2		Soil	2020-12-21		X	X	X	X	X	X					4	
10	BH/MW6 SS6		Soil	2020-12-21		X	X	X	X	X	X					4	
	#1→4. NaOH vials submitted- prep in lab GS as per client email																

SAMPLE SUBMISSION INFORMATION

	Sampled By:	Submitted by:
Print:	S.Berg	S.Berg
Sign:		
	2020-12-21	2020-12-23
	Date (yy-mm-dd)/Time:	Date (yy-mm-dd)/Time:

SHIPPING INFORMATION

- [ ] Client's Courier
- [ ] Caduceon's Courier
- [x] Drop Off
- [ ] Caduceon (Pick-up)

Invoice [ ]

# of Pieces: 1

REPORTING / INVOICING

- [ ] Report by Fax
- [x] Report by Email
- [x] Invoice by Email
- [ ] Invoice by Mail

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)

Received By (print): Elvie Signature: ES

Date Received (yy-mm-dd): 20-12-23 Time Received: 12:30

Laboratory Prepared Bottles: [x] Yes [ ] No

Sample Temperature °C: 10.5 Labeled by: AM

Comments: Prep vials (#5-10) -70
Jar→1
Jar→0

Page 1 of 1

GH0123

White: Lab Copy / Yellow: Invoicing Copy / Pink: Client Copy

CofC, May 2019, Revision No: 22