Peto MacCallum Ltd.
CONSULTING ENGINEERS

GEOTECHNICAL INVESTIGATION
PROPOSED LOCKHART ROAD RESIDENTIAL SUBDIVISION
BARRIE, ONTARIO

for

BEMP 1 HOLDINGS INC. C/O ESTHER TUNSTALL

PETO MacCALLUM LTD.
19 CHURCHILL DRIVE
BARRIE, ONTARIO
L4N 8Z5
PHONE: (705) 734-3900
FAX: (705) 734-9911
EMAIL: barrie@petomaccallum.com

Distribution:
2 cc: BEMP 1 Holdings Inc. c/o Esther Tunstall (+email)
1 cc: PML Barrie

PML Ref.: 17BF005
Report: 1
May 2017

Peto MacCallum Ltd.
CONSULTING ENGINEERS

May 5, 2017

PML Ref.: 17BF005
Report: 1

Mr. Eric Lawton
BEMP Holdings 1 Inc. c/o Esther Tunstall
65 Barre Drive
Barrie, Ontario
L4N 7P1

Dear Mr. Lawton

Geotechnical Investigation
Proposed Lockhart Road Residential Subdivision
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 this assignment was provided by Mr. E. Lawton in the signed Engineering Services Agreement dated March 7, 2017 and signed Engineering Services Agreement Change Order No. 1 dated March 28, 2017.

A new residential subdivision is proposed for the 25 hectare parcel of land north of Lockhart Road, south of Lover's Creek and East of Barton Boulevard in Barrie, Ontario. The subdivision is to include approximately 300 residential units with full depth basements, a school block, a mixed-use block (commercial), and a Storm Water Management (SWM) block. Low Impact Development (LID) strategies are also being considered to manage storm water. Full site servicing and a network of roads are also proposed. The proposed development plan and proposed cut/fill plan from the RFP are shown in Drawing 1, appended. The rough grading plan provided with the RFP shows cuts/fills as much as 10 m. Servicing inverts were not known at this stage of planning and are estimated to be approximately 3 m below proposed final grade, for the purposes of this report.

A geotechnical investigation was requested in order to examine the subsurface conditions at the site, and based on this information, provide comments and geotechnical engineering recommendations for house foundations and basements, site servicing, infiltration parameters for LID, SWM pond construction, and pavement design.

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 re-use and/or off-site disposal/reuse of excess site soil. Two ground water samples were also tested.

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

INVESTIGATION PROCEDURES

Fifteen boreholes were carried out from March 14 to March 21, 2017 across the site. The boreholes were advanced to depths of 3.5 to 15.7 m, below existing grade at the locations shown on Drawing 2, appended.

Co-ordination of clearances of underground utilities was provided by PML.

The boreholes were advanced using continuous flight 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 our engineering staff.

Representative samples of the overburden were recovered at frequent depth intervals for identification purposes using a conventional split spoon sampler. 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 water in the open boreholes upon completion, if any.

Wells (50 mm diameter pipe with stick-up protective casing) were installed in four of the boreholes, and piezometers (19 mm diameter pipe with stick-up protective casing) were installed in the other eleven boreholes. Water levels in the wells and piezometers were measured about one to two weeks after installation. As per O.Reg. 903, the wells and piezometers become the property of the Owner and will have to be decommissioned when no longer required. PML would be pleased to assist in this regard.

The locations and surface elevations of the boreholes were established in the field by a sub-contracted surveying company based on a plan provided by the client and PML.

Geoenvironmental procedural protocols and testing results are discussed later in the report.

All recovered soil samples were returned to our laboratory for moisture content determinations and detailed examination to confirm field classification. Four soil samples from the boreholes, were submitted for particle size distribution analysis, and the results are presented on the Particle Size Distribution Charts on Figures 1 to 4, appended.

SITE DESCRIPTION AND SUMMARIZED SUBSURFACE CONDITIONS

The approximate 25 hectare property is some 425 m deep with an approximate 600 m frontage on Lockhart Road. The northern part of the site is a treed wetland surrounding Lover's Creek and it is understood that this area will not be developed. The central and south parts of the site, where development is planned, are currently farm fields. The proposed residential development will tie into the existing subdivision to the west, as shown in the development plan in Drawing 1, appended. Based on the topographic information provided, the site has about 18 m of relief, generally sloping down from south to north, specifically about elevation 267.0 in the southeast corner to about elevation 249.0 in the northeast corner. A general cut/fill plan provided at the RFP stage is shown in Drawing 1, appended, and proposes cuts and fills as much as 10 m.

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions, including soil classifications, inferred stratigraphy, Standard Penetration Test N values, piezometer and well installation details, ground water observations and the results of laboratory moisture content determinations and particle size distribution analyses.

Due to the soil sampling procedures and limited sample size, the depth demarcations on the borehole logs must be viewed as "transitional" zones between layers, and cannot be construed as exact geologic boundaries between layers. PML would be pleased to assist in defining geologic boundaries during construction, if required.

The site is dominated by a major glacial sand/silt till deposit. In the northern part of the development nearest to Lover's Creek wetland, a localized clayey silt unit was encountered below a topsoil mantle. Many of the boreholes also revealed a silty sand or sandy silt layer below the topsoil, overlying the major till deposit. Sand and/or silty sand layers were interbedded within the sand/silt till and below the till in several boreholes. A description of the distribution and characteristics of the various soil units and ground water observations encountered in the boreholes is as follows.

Topsoil

A 140 to 700 mm thick layer of topsoil was present at the surface of all boreholes.

Clayey Silt

A local clayey silt layer was observed below the topsoil in Boreholes 1 and 3, at the north edge of the development area, extending to 1.4 m depth (elevation 247.4 to 248.1). The unit was very soft to stiff and was frozen, with moisture contents ranging from 18 to 55%.

Upper Silty Sand/Sandy Silt

Below the topsoil in Boreholes 8, 9, 11, 12, 14, and 15, and locally beneath an upper till layer in Borehole 4, a silty sand or sandy silt unit was encountered extending to 1.4 to 2.1 m depth (elevation 250.5 to 264.0). The material was typically compact, locally very loose to loose, and moist to wet with moisture contents ranging from 9 to 35%.

Sand/Silt Till

A major sand/silt till deposit was observed in all boreholes extending to the depth of exploration in Boreholes 1, 3 to 9, and 12 to 15, and to 5.5 to 7.0 m depth (elevation 246.4 to 261.4) in Boreholes 2, 10 and 11. The till was also interrupted by sand/silty sand layers in three boreholes. The deposit comprised silty sand to sandy silt, trace gravel with cobbles and boulders noted. Three samples of the till were submitted for particle size distribution analysis and the results are provided in Figures 1 to 3, appended. The till was loose to very dense with depth, and typically moist with wet seams/layers, locally very moist or wet, with moisture contents ranging from 4 to 14%.

Sand/Silty Sand

A sand deposit was encountered below the sand/silt till in Boreholes 2, 10 and 11 extending to the depth of exploration. In Boreholes 3 and 12, a sand/silty sand layer interrupted the till deposit from 7.0 to 8.5 m depth (elevation 240.3 to 241.8) and 4.0 to 5.5 m depth (elevation 248.3 to 249.8), respectively. A sample of the material from Borehole 3 was submitted for particle size analysis and the results are provided in Figure 4, attached. The material was typically very dense, locally compact or dense, and wet with moisture contents of 6 to 16%.

Ground Water

The ground water levels measured upon completion of augering and in the piezometers/wells are summarized in the table below on a borehole by borehole basis:

BOREHOLE	WATER LEVEL IN BOREHOLES UPON COMPLETION OF AUGERING DEPTH (m)/ELEVATION	WATER LEVEL IN PIEZOMETERS /WELLS MARCH 28, 2017 DEPTH (m)/ELEVATION
1	No Water to 5.0 m depth of borehole	-1.0 / 250.5 (water above grade)
2	2.4 / 215.5	0.8 / 253.1
3	1.4 / 247.4	-1.0 / 249.8 (water above grade)
4	No Water to 5.0 m depth of borehole	1.7 / 255.9
5	No Water to 3.5 m depth of borehole	2.9 / 256.1
6	1.8 / 257.4	2.8 / 256.4
7	3.0 / 260.1	4.8 / 258.3
8	No Water to 5.0 m depth of borehole	Dry
9	No Water to 8.1 m depth of borehole	5.2 / 257.9
10	6.7 / 260.2	5.4 / 261.5
11	0.8 / 251.1	0.4 / 251.5
12	1.5 / 252.3	0.5 / 253.3
13	0.9 / 254.0	0.6 / 254.3
14	5.5 / 253.4	3.4 / 255.5
15	No Water to 5.0 m depth of borehole	Dry

Based on the water level readings, the stabilized ground water was 1 m above existing grade to 5.4 m below existing grade, with gradient trending generally downwards from the south (elevation 261.5) to the north toward Lover's Creek (elevation 249.8). Ground water levels in the northern most boreholes, closest to Lover's Creek (Boreholes 2, 3, 11 and 12) are above existing grade, indicating artesian pressure.

Ground water levels are subject to seasonal fluctuations, and in response to variations in precipitation.

GEOTECHNICAL ENGINEERING CONSIDERATIONS

General

A new residential subdivision is proposed for the 25 hectare parcel of land north of Lockhart Road, south of Lover's Creek and East of Barton Boulevard. The subdivision is to include approximately 300 residential units with full depth basements, a school block, a mixed-use block (commercial), and a Storm Water Management (SWM) block. Low Impact Development (LID) strategies are being considered to manage storm water. Full site servicing and a network of roads are also proposed. The proposed development plan and proposed cut/fill plan from the RFP are shown in Drawing 1, appended. The rough grading plan provided with the RFP shows cuts/fills as much as 10 m. Servicing inverts were not known at this stage of planning and are estimated to be approximately 3 m below proposed final grade, for the purposes of this report.

The boreholes revealed the site to be dominated by a sand/silt till deposit, with intermittent layers of sand, silty sand, sandy silt and clayey silt. The soils are typically compact to very dense within 1 m of the existing ground surface. The stabilized ground water was 1 m above existing grade to 5.4 m below existing grade, with a hydraulic gradient trending generally downwards from the south (elevation 261.5) to the north toward Lover's Creek (elevation 249.8). The ground water in the northern most boreholes (Borehole 2, 3 11 and 12), closest to Lover's Creek, is under artesian pressure (ground water level above existing grade).

The proposed site grading involves cuts and fills of as much as 10 m. The site soils are generally competent, however, the high ground water table and artesian ground water will impact site development. Further monitoring of the ground water level is recommended.

Site Grading and Engineered Fill

The rough grading plan shows cuts and fills of as much as 10 m. At the time of this report, no design had been completed on any site servicing or SWM ponds, and building finished grades and founding levels were not available.

Where grades are to be raised under structures (houses, roads, site servicing and SWM ponds) the fill needs to be constructed as engineered fill. Reference is made to Appendix A for guidelines for engineered fill construction. The following general highlights are provided:

- Strip existing topsoil, and other deleterious materials down to native inorganic soil. The excavated soil should be segregated and stockpiled for reuse or disposal;

- Proofroll exposed subgrade using a heavy roller to targeted 100% Standard Proctor maximum dry density, under geotechnical review during construction. It is advised that wet subgrade conditions can be expected in some areas which will be sensitive and easily disturbed. Also, weather will impact the moisture condition of the subgrade. In this regard, it is recommended that provisions be made for the first lift or two of engineered fill to comprise OPSS Granular B, Type II (crushed rock), subject to geotechnical review. The contractor will have to adopt equipment and methodology to take these issues into account;

- Following geotechnical review and approval of the subgrade, spread approved material in maximum 200 mm thick lifts and uniformly compacted to 100% Standard Proctor maximum dry density in building areas. Under pavements, site servicing and SWM pond areas the engineered fill may be compacted to 95% Standard Proctor maximum dry density;

- Based on the rough grading concept both cut and fill are proposed. Engineered fill material should comprise inorganic soil, free of deleterious and oversized material, at a moisture content suitable for compaction. Excavated inorganic soil from above the ground water table is expected to be generally suitable for reuse as engineered fill during relatively dry weather. Soil from below the ground water table will be too wet for reuse, unless allowed to “dry out”. Also, weather will impact the moisture conditions of the soil and suitability for reuse. Reuse of excavated soils is subject to careful moisture control and geotechnical review and approval during construction;

- Prospective imported fill material should be reviewed by PML 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.

Foundations

Under the topsoil mantle covering the site, the native soils comprised a major sand/silt till deposit with intermittent units of sand, silty sand, sandy silt and clayey silt. The native soils are typically compact to very dense below about 1 m depth. The available bearing capacities are summarized below on a borehole by borehole basis:

BOREHOLES	DEPTH (m) / ELEVATION	GEOTECHNICAL BEARING RESISTANCE AT SLS (KPa)	FACTORED BEARING RESISTANCE AT ULS (KPa)	SOIL
1	0.6 / 248.9 2.5 / 247.0	50 150	75 225	Clayey Silt Till
2	0.8 / 253.1 1.5 / 252.4	100 300	150 450	Till Till
3	0.8 / 248.0 3.5 / 245.3	100 300	150 450	Clayey Silt/Till Till/Silty Sand
4	0.8 / 256.8 1.5 / 256.1	75 300	110 450	Till Silty Sand/till
5	0.8 / 258.2 1.5 / 257.5	150 300	225 450	Till Till
6	0.8 / 258.4 1.5 / 257.7 2.0 / 259.2	75 150 300	110 225 450	Till Till Till
7	0.8 / 262.3	300	450	Till
8	0.8 / 164.6 1.5 / 263.9	200 300	300 450	Silty Sand Till
9	0.8 / 262.3 1.5 / 261.6 2.5 / 260.6	100 200 300	150 300 450	Sandy Silt Till Till
10	0.8 / 266.1 1.5 / 265.4	100 300	150 450	Till Till
11	0.8 / 251.1 1.5 / 250.4 3.0 / 248.9	100 150 300	150 225 450	Silty Sand Till Till
12	1.5 / 252.3 3.0 / 250.8 5.5 / 248.3	50 150 300	75 225 450	Silty Sand/Till Till/Sand Till
13	0.8 / 254.1 1.5 / 253.4	225 300	340 450	Till Till
14	0.8 / 258.1 1.5 / 257.4	150 300	225 450	Till Till
15	0.8 / 258.2 2.5 / 256.5	100 300	150 450	Till Till

As discussed earlier, existing topsoil needs to be removed and any upfilling under proposed building foundations will need to be constructed as engineered fill. Footings founded on a minimum 1 m of engineered fill can be designed for a net geotechnical bearing resistance at SLS of 150 kPa and a factored bearing resistance at ULS of 225 kPa.

The bearing resistance at SLS is based on total settlement of 25 mm in the bearing stratum with differential settlement of 75% of this value.

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

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.

Where ground water is present at the founding level in cut areas or other areas, a lean mix concrete skim coat should be provided immediately after approval of the subgrade to protect the subgrade soils.

Based on the soil profile 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 potential for liquefaction of soils to occur.

Basement Walls and Floor Slabs

Only general grading concepts have been provided. Basements could range from about 7.5 m above existing grade to about 12.5 m below existing grade. The high ground water table will impact basements in cut areas. In general, it is recommended that basements be established a minimum 0.5 m above the ground water level. In this regard, further monitoring of the ground water levels is recommended.

Full depth basements are proposed for all buildings. 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 compacted granular backfill = 0.5
- h = depth below grade (m) at which lateral pressure is calculated
- γ = unit weight of compacted granular backfill = 22.0 kN/m^3
- 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. Alternatively, a proprietary drainage board product can be utilized with on-site soils as backfill. A weeping tile system should be installed to prevent the build-up of hydrostatic pressure behind the wall. 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.

Foundation/basement wall backfill should be placed in thin lifts compacted to a minimum 95% Standard Proctor maximum dry density. 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 or engineered fill. In general, a minimum 200 mm thick base layer of crushed stone (nominal 19 mm size) is recommended directly under the slab. Underfloor drains are recommended where basement floor slabs are within 1.0 m of the stabilized ground water table. A polyethylene sheet vapour barrier should be incorporated under the ground floor slab if a vapour sensitive floor finish is planned.

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

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

Site Servicing

Plan and profile drawings have not been provided for this site. In this regard, it has been assumed that invert depths will be approximately 3.0 m below proposed grade. Based on this and the proposed cut/fill of as much as 10 m, invert depths will range from as much as 7 m above current grade, in high fill areas, to 13 m below current grades, in deep cut areas.

Trench Excavation and Ground Water Control

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

Bedding

It is anticipated that services will be supported in native soils or engineered fill, and bearing capacity issues are not anticipated. Where poor subgrade soils are encountered at the design invert, it may be necessary to sub-excavate and provide an increased thickness of bedding, subject to geotechnical field review.

Standard granular bedding in accordance with OPSS compacted to 95% Standard Proctor maximum dry density should be satisfactory. For flexible pipes, bedding and cover material should comprise OPSS Granular A. For rigid pipes, bedding material should comprise OPSS Granular A, and cover material may comprise select trench backfill free of oversized (200 mm diameter or less) or excessively wet material.

Backfill

Trench backfill should comprise select inorganic soil placed in maximum 200 mm thick lifts compacted to minimum 95% Standard Proctor maximum dry density, to minimize post construction settlement. Topsoil, organic/peat, excessively wet, frozen, oversized (greater than 200 mm diameter), or otherwise deleterious material should not be incorporated as trench backfill.

The moisture content should be within 2% of optimum in order to achieve the specified compaction, and should be closer to the optimum moisture content in the upper 1 m to prevent instability issues. Ideally the backfill should comprise excavated site soil in order to minimize differential frost heave.

The excavated soils at the site will comprise the predominate native granular soils. Excavated inorganic soils from above the ground water table are expected to be generally suitable for reuse as trench backfill. Inorganic material from below the ground water table will be too wet for reuse unless allowed to dry out or mixed with drier soil to render the material suitable for reuse. Weather will also impact the moisture conditions of the soil and suitability for reuse. Geotechnical review of the excavated soil and approval for use as backfill will be necessary 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.

Excavation and Ground Water Control

Based on the proposed cut/fill of as much as 10 m, invert depths for services (assumed to be 3.0 m below proposed grade) will range from as much as 7 m above current grade in high fill areas to 13 m below current grades in deep cut areas. House excavations will have a similar depth range assuming full depth basement will be about 2.5 m below proposed grade. Excavation will predominately encounter the major till deposit, locally the intermittent, sand, silty sand, sandy silt and clayey silt layers. Harder digging below about 1 to 2 m depth below existing grade should be expected and the presence of cobbles and boulders should be anticipated in the till deposit.

Subject to effective ground water control, the site soils should be considered as Type 3 soil requiring excavation side walls 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.

Upon completion of augering, ground water was typically observed at depth, with ground water not observed in some boreholes. About one to two weeks later, the stabilized ground water was 1 m above existing grade to 5.4 m below existing grade, with the hydraulic gradient trending generally downwards from the south (elevation 261.5) to the north toward Lover's Creek (elevation 249.8). The ground water in the northern most boreholes (Borehole 2, 3 11 and 12), closest to Lovers Creek, is under artesian pressure.

Accordingly, for shallow excavation, it is expected that ground water seepage should be managed using sump pumping techniques. However, in deeper excavations particularly through more permeable sand/silty sand deposits, ground water inflow could be significant, requiring the use of well points to temporarily depressurize/lower the ground water level to prevent excavation under relatively dry conditions. Dewatering systems must be designed and installed by specialists in this field.

Water taking in Ontario is governed by the Ontario Water Resources Act (OWRA) and the Water Taking and Transfer Regulation O.Reg. 387/040, Section 34 of the OWRA requires anyone taking more than 50,000 L/d to obtain a Permit-to-Take-Water (PTTW). This requirement applies to all withdrawals, whether for consumption, temporary construction dewatering or permanent drainage improvements. Projects assessed to be taking more than 50,000 L/d but less than 400,000 L/d of ground water can obtain a permit/permission online via the Environmental Activity and Sector Registry (EASR) system. If it is assessed that more than 400,000 L/d is required then a Category 3 PTTW will be required.

Based on the discussion above, a PTTW or registry on the EASR is anticipated. When design details including final grading and service inverts are available, they should be submitted to PML for review to more fully assess ground water requirements and the need for Site Specific Hydrogeological Site Assessment and application for a PTTW or EASR.

It is recommended that a test dig be undertaken to allow prospective contractors an opportunity to observe and evaluate the conditions likely to be encountered and assess preferred means of excavation and ground water control measures based on their own experience.

Infiltration Parameters

LID strategies are being considered at the site for storm water management purposes. The locations of any infiltration infrastructure are yet to be determined.

A summary of the particle size distribution analyses and estimates of permeability are provided below:

FIGURE	BOREHOLE	DEPTH (m)	SOIL DESCRIPTION	ESTIMATED PERMEABILITY, k, (cm/sec)
1	6	4.6 to 5.0	Sand/Silt Till	$1x10^{-6}$
2	8	1.5 to 2.0	Silty Sand Till	$1x10^{-5}$
3	11	3.0 to 3.5	Sand/Silt Till	$1x10^{-6}$
4	3	7.6 to 8.1	Silty Sand	$1x10^{-4}$

The following comments are presented for your consideration.

1. The till with estimated coefficient of permeability typically $1x10^{-5}$ to $1x10^{-6}$ cm/sec is semi-impervious with limited infiltration capacity.

2. The silty sand with estimated coefficient of permeability $1x10^{-4}$ cm/sec is semi-pervious and more suited for infiltration, however the limited distribution of this soil type will limit infiltration capacity.

3. Very dense soils and/or high groundwater levels will reduce infiltration capacity.

Storm Water Management Ponds

A SWM pond is proposed in the northeast corner of the site. The pond is yet to be designed and design grading is currently unknown.

Borehole 3 was conducted in the SWM Pond area and beneath the 0.7 m of topsoil, stiff clayey silt to 1.4 m depth (elevation 247.4) was revealed, over sand/silt till and a local sand layer to the 11.1 m depth of exploration. The till and sand were loose to compact to about 4.5 m depth becoming very dense below this depth. The stabilized water in the well about 12 days later was 1.0 m above existing grade (elevation 249.8) and was under artesian pressure. The following general geotechnical input is provided below:

- Berms, if required, should be constructed as engineered fill, using select material, compacted to 95% Standard Proctor maximum dry density as discussed earlier in the report. Berm material requirements (permeability) should be assessed when pond details are finalized;
- Interior side slopes should be no steeper than 5H:1V, and protected from erosion by provision of vegetation cover, granular blanket, rip rap or the like. Exterior slopes should be constructed at no steeper than 3H:1V;
- Dewatering/depressurization of the artesian ground water will need to be assessed once SWM Pond details have been established, in order to carry out construction under dry conditions, and ensure basal stability of the pond bottom;
- If the pond is to be a wet pond an impermeable liner may be required.

It is recommended that when the grading and design details of the proposed pond are determined, the drawings should be submitted for review by PML to more fully assess the geotechnical parameters, which may necessitate additional investigations to better define the drainage characteristics and ground water regime.

Pavement Design and Construction

Cut and fill is proposed for the site and it is unknown if imported material will be required. The following typical pavement thicknesses are provided considering the predominate silty sand to sandy silt site soils anticipated to make up the pavement subgrade. A review should be conducted when the road subgrade material is known.

MATERIAL	LIGHT DUTY (LOCAL RESIDENTIAL ROADS)	HEAVY DUTY (COLLECTOR ROADS)
Asphalt (mm)	110	140
Granular A Base Course (mm)	150	150
Granular B Subbase Course (mm)	300	450
Total Thickness (mm)	560	740

Subgrade preparation should include proofrolling and compacting the exposed subgrade soil with a heavy compactor to 95% Standard Proctor maximum dry density, under goetechnical review. Any unstable zones identified during this process should be sub-excavated and replaced with compacted select material.

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% Standard Proctor maximum dry density. Asphalt should be compacted in accordance with OPSS 310.

The pavement design considers that construction will be carried out during the drier time of the year and that the subgrade is stable, as determined by proofrolling operations. Where wet and/or unstable subgrade is identified, remediation may include increasing the depth of subbase, the use of Granular B Type II and/or use of geogrid reinforcement, subject to geotechnical review during construction.

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 longitudinal subdrains is recommended in conjunction with crowning of the final surface to promote drainage to the pavement edges. Subdrains should be installed at least 300 mm below the subgrade level. For details regarding pipe, filter cloth or pipe sock, bedding and cover material, refer to OPSD 216 Series. Subdrains should lead to a frost free outlet and/or be connected to storm sewer system. Maintenance holes/catch basins should be backfilled using free draining material with frost tapers and stub drains extending out from the structures. The above measures will help drain the pavement structure as well as minimize frost movement between maintenance hole/catch basins and pavement.

Topsoil Analysis

Three topsoil samples, TS 1 to TS 3, were obtained from the topsoil adjacent to boreholes as noted in the below table:

TOPSOIL SAMPLE (TS)	ASSOCIATED BOREHOLE
1	2
2	6
3	10

The samples were submitted for textural analysis and testing for general fertility parameters to Agrifood Laboratories. The Certificates of Analysis for Topsoil are provided in Appendix B.

The results indicate the topsoil is generally suitable to support plant growth.

The findings should be reviewed by the landscape architect to determine soil enhancement requirements.

Geotechnical Review and Construction Inspection and Testing

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

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

Prior to placement of structural concrete for footings, the founding surface must be inspected to verify the design bearing capacity is available or to make recommendations for remediation, if required.

The comments and recommendations provided in the report are based on the information as revealed in the boreholes. Conditions away from and between boreholes may vary, which may necessitate modifications to the recommendations contained in the report.

GEOENVIRONMENTAL CONSIDERATIONS

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 reuse/disposal options for excess excavated site soil. Two water samples from the wells were also submitted for chemical testing.

A Phase One Environmental Site Assessment (ESA) was not within the scope of work for this assignment. Accordingly, soil and ground water 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.

Site Condition Standards

In general, the applicable environmental quality guidelines depend on the site location, land use, soil texture and source of potable water at the site. In this regard, we selected the Generic Criteria of the O. Reg. 153/04, as amended, Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act dated April 15, 2011.

Based on Sections 41 and 43 of O.Reg. 153/04, as amended, and review of readily available information to determine if the site is sensitive. The subject site is directly adjacent to an area designated as an area of natural significance, an evaluated wetland identified by the Ministry of Natural Resources (MNR) and as such is considered a sensitive site.

Further, the site was reviewed against the City of Barrie's watercourses and Wellhead Protection Areas (Schedules F and G, March 2011) and MOECC website for drinking water wells as part of the protocol to determine the applicable Site Condition Standards (SCSs) for the site. In this regard, the site is not within a wellhead protection area and Lovers Creek is to the north.

Based on the above reviews, the criteria of Table 1: Full Depth Background Site Condition Standards, Table 1 SCS, are considered applicable to the site.

Soil Testing

Chemical Testing Protocols

The recovered geoenvironmental soil samples were placed in laboratory provided air tight glass containers and stored in an insulated cooler for transportation to our laboratory for detailed visual examination.

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 recovered samples displayed visual or olfactory evidence of potential contamination.

Select soil samples were submitted for chemical analysis to AGAT Laboratories Limited (AGAT), a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory in Mississauga, Ontario. The chemical analyses conducted by AGAT 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.

Soil samples were selected for chemical testing based on visual and olfactory evidence of potential contamination, as well as for site coverage and potential to be excavated.

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

- Metals and Inorganics
- Petroleum Hydrocarbons (F1 to F4 fractions)
- Volatile Organic Compounds (VOCs)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Organochlorine Pesticides

The following soil samples were submitted for testing:

Borehole 1 SS 2, (clayey silt – 0.8 to 1.2 m)
Borehole 2 SS 4, (till – 2.3 to 2.7 m)
Borehole 3 SS 2, (clayey silt – 0.8 to 1.2 m)
Borehole 5 SS 3, (till – 1.5 to 1.9 m)
Borehole 6 SS 5, (till – 3.0 to 3.5 m)
Borehole 7 SS 3, (till – 1.5 to 1.9 m)
Borehole 10 SS 2, (till – 0.8 to 1.2 m)

Analytical Findings and Conclusions

On-Site Reuse

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

In summary, the concentration of the tested parameters in the submitted soil samples were in conformance with the Table 1 SCSs applicable to the site. Accordingly, based on the testing results, the soil can be reused on-site, subject to geotechnical requirements.

It should be noted that there is no legal imperative to remove or treat soil that exceeds the applicable SCSs, provided it is demonstrated that there is no off-site impact or adverse effect. If contaminated soil is left on-site, the land Owner assumes liability associated with the site contamination and potential off-site contamination. The liability concerns could include potential scrutiny from the MOECC and the public, potential for decreased value for the land, and issues during potential divesting of the property due to environmental liability concerns on the part of the future Owners or their financiers/insurers.

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 E) which must be read in conjunction with the report.

Off-Site Reuse/Disposal

O.Reg. 153/04, as amended, has nine tables outlining SCSs (Tables 1 to 9) 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 soil can be transported. Our assessment was limited to Table 2 and Table 3 SCSs, the most common SCSs.

Based on the limited chemical testing results, the soil meets the Table 1 SCSs, the most stringent standards and can be excavated soil transported to any land site, subject to approval of the receiving authority and any geotechnical requirements.

Alternatively, excess soil can be transported to a landfill site, 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 work must be completed in accordance with local by-laws governing soil movement and/or placement at other sites;
- All analytical results and environmental assessment reports must be fully disclosed to the receiving site owners/authorities and they have agreed to receive the material;
- The applicable SCSs for the receiving site have been determined, as confirmed by the environmental consultant and the SCSs are consistent with the chemical quality of the soil originating at the source site;
- The surplus soil cannot be taken to a property for which a Record of Site Condition (RSC) is being filed as outlined in O. Reg. 153/04, as amended, unless the chemical testing program is completed in accordance with the regulation;
- The surplus soil cannot be taken to a property for which a RSC has been previously filed unless the soil quality meets the SCSs contained in the RSC;
- Transportation and placement of the surplus soil is monitored by the environmental consultant to check the material is appropriately placed at the pre-approved site;
- The receiving site must be arranged and/or approved in advance of excavation in order to avoid delays during construction. As well, it is noted the chemical testing requirements for various receiving sites is site-specific and additional testing may be required, beyond that provided in this limited sampling and testing report;
- The excavation work should be conducted in accordance with a written Soil Management Plan 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 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 should 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 leaving the site;
- It is recommended that transportation of fill material from the Source Site (s) to the Receiving Site (s) be carried out in accordance with the MOECC document *Management of Excess Soil – A Guide for Best Management Practices* dated January 2014.

Ground Water Testing

General

A limited program of ground water sampling and chemical analysis was carried out to check the geoenvironmental quality of the ground water in order to provide preliminary comments related to dewatering of the site during construction.

Ground Water Sampling and Chemical Testing Protocols

The ground water sampling and sample handling procedures were carried out according to the supporting documents of O. Reg. 153/04, as amended and established standards.

Ground water samples were collected from the monitoring wells in Boreholes 3 and 10 on March 28, 2017, after well development and purging, using dedicated sampling equipment to minimize potential cross-contamination.

The ground water samples were field logged and placed in clean, laboratory provided bottles, stored in an insulated cooler with ice and returned to our laboratory. Particular attention was applied to visual and olfactory evidence of potential contamination such as odours and sheens during the course of the field work, of which none were observed.

Ground water samples were submitted for chemical analysis to AGAT Laboratories Limited (AGAT), a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory in Mississauga, Ontario. The chemical analysis conducted by AGAT were in accordance with the O. Reg. 153/04 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 the water samples were tested for the following analyte groups:

- Metals and Inorganics
- Petroleum Hydrocarbons (F1 to F4 fractions)
- VOCs
- PAHs

Analytical Findings and Conclusions

The Certificate of Analyses for Chemical Testing are included in Appendix D.

In summary, the concentrations of the tested parameters in the submitted water samples were in conformance with Table 1 SCSs with the exception of

- Molybdenum in Borehole 3 sample, with a concentration of 37.7 µg/L, Guideline Value is 23 µg/L;
- Toluene in Borehole 3 with a concentration of 1.7 µg/L, Guideline Value is 0.8 µg/L;

These exceedances are minor, may be naturally occurring and resampling is recommended.

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

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.

Riley McFadden, EIT
Project Supervisor, Geotechnical Services

LICENSED PROFESSIONAL ENGINEER
G. R. WHITE
MAY 5/2017
PROVINCE OF ONTARIO

Geoffrey R. White, P.Eng.
Associate
Manager, Geotechnical and Geoenvironmental Services

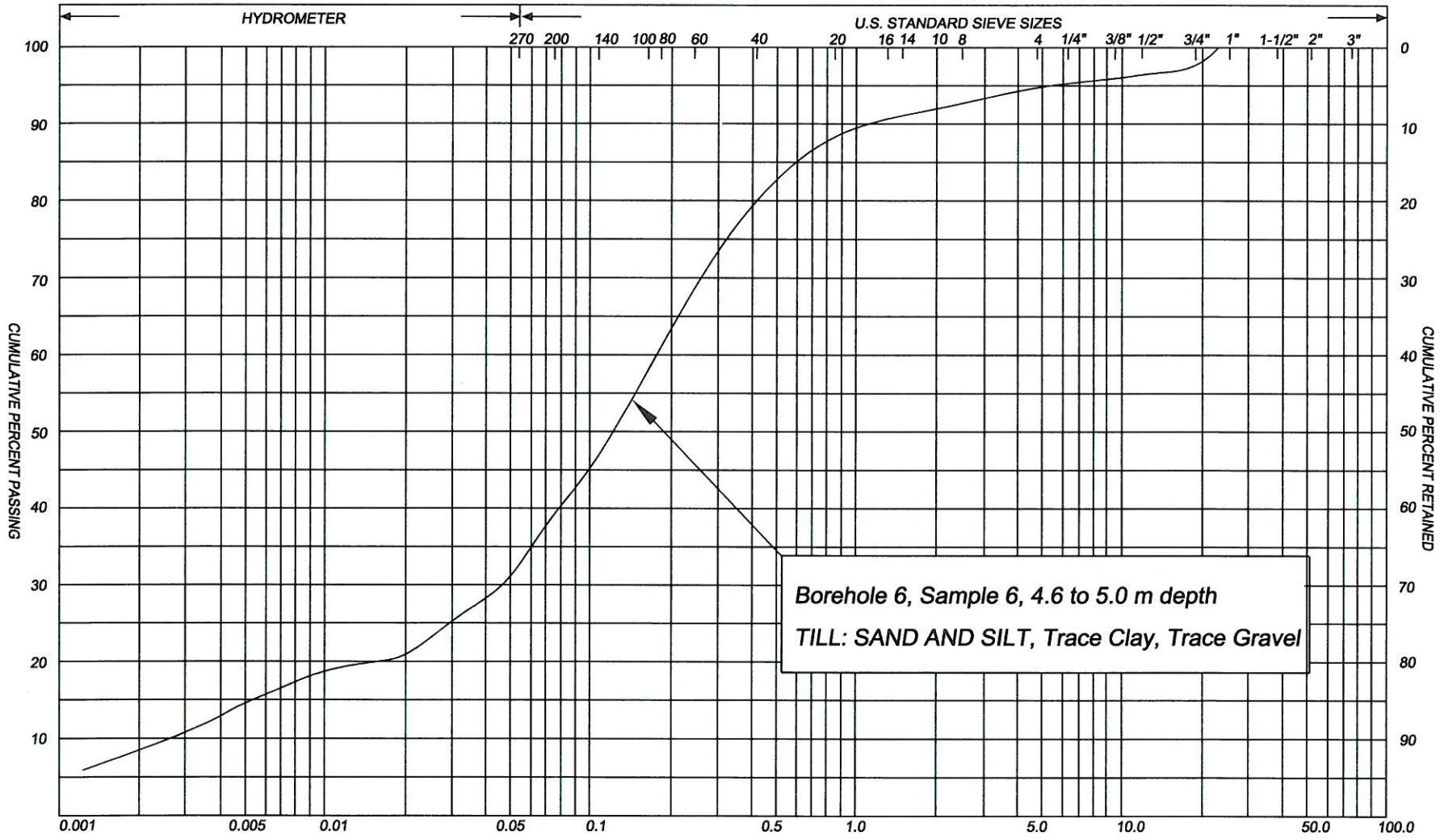
RM/GRW/GM:jlb

Enclosure(s):
Figures 1 to 4 – Particle Size Distribution Charts
Figure 5 - General Recommendations Regarding Drainage and Backfill Requirements for Basement Wall and Floor Slab Construction
List of Abbreviations
Log of Borehole Nos. 1 to 15
Drawing No. 1 – RFP Development Plan and Proposed Cut/Fill Plan
Drawing No. 2 – Borehole Location Plan
Appendix A - Engineered Fill
Appendix B - Certificates of Analyses for Topsoil
Appendix C - Certificates of Analyses for Soil
Appendix D - Certificates of Analyses for Water
Appendix E - Statement of Limitations

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17BF005
Figure No.: 1

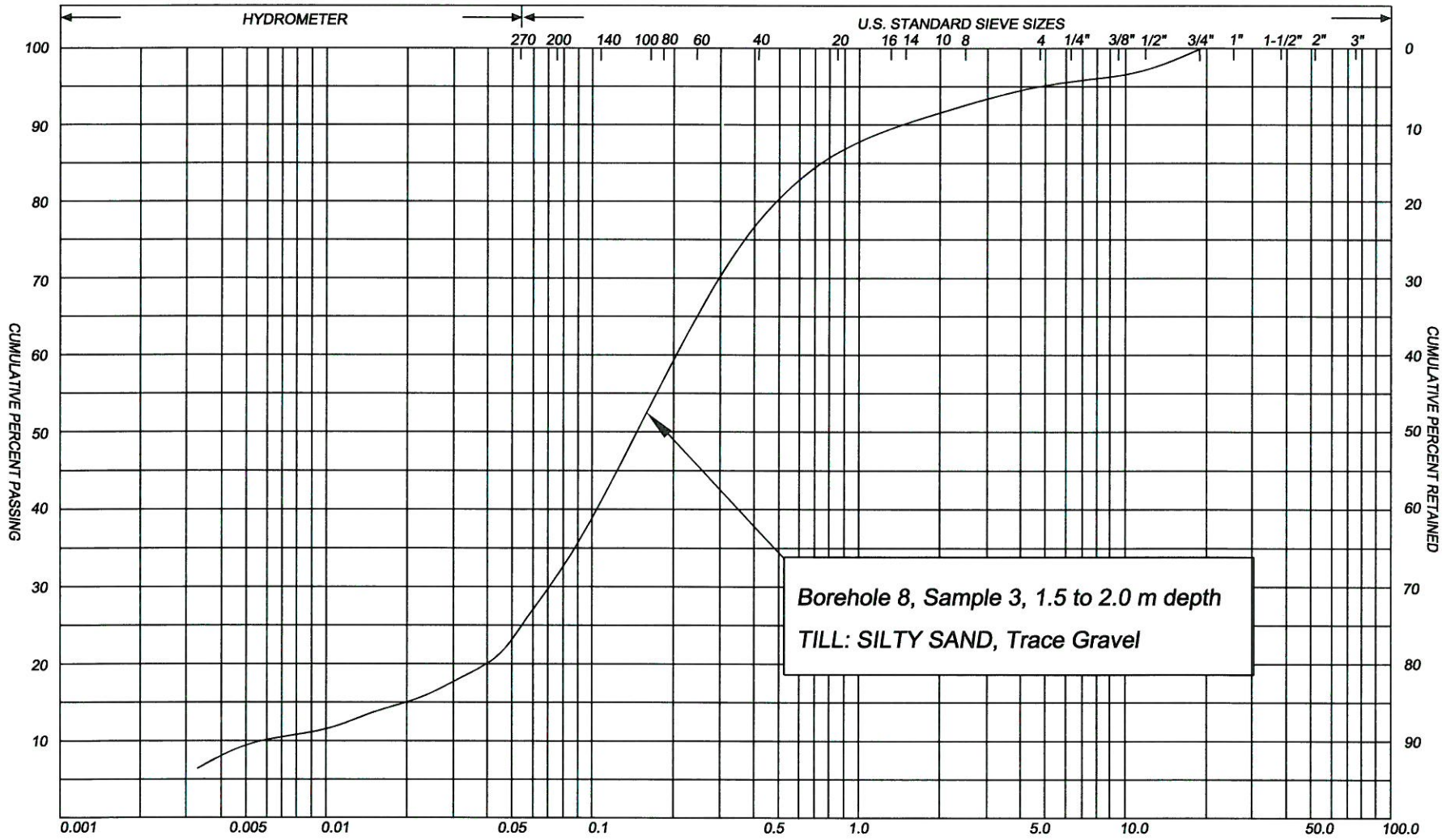


SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL	COB BLES	UNIFIED
			SAND					
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL	COBBLES	M.I.T.
	SILT			SAND					
CLAY	SILT		V. FINE	FINE	MED	COARSE	GRAVEL		U.S. BUREAU
			SAND						

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17BF005
Figure No.: 2

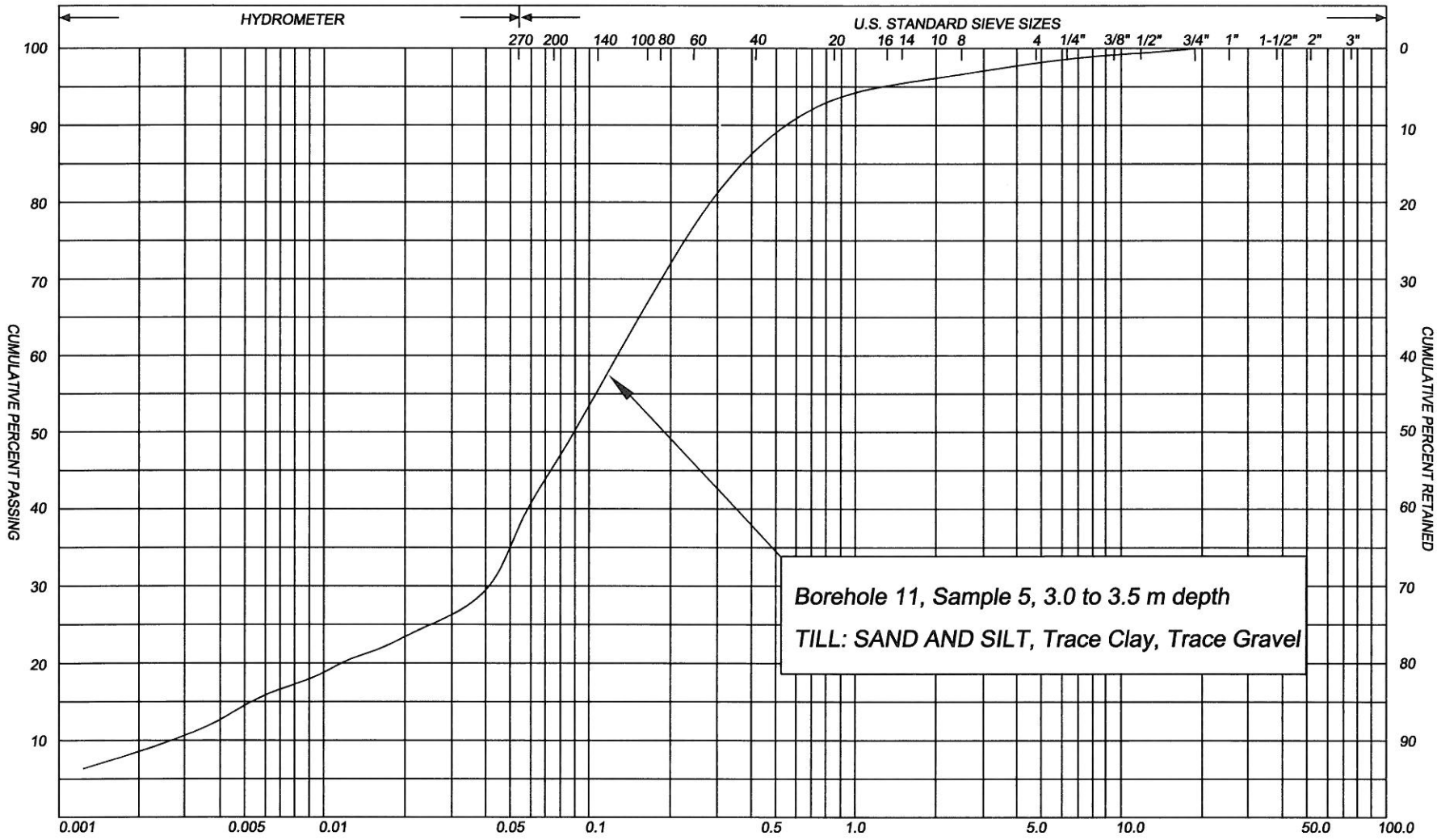


SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL	COB BLES	UNIFIED
			SAND					
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL	COBBLES	M.I.T.
	SILT			SAND					
CLAY	SILT		V. FINE	FINE	MED	COARSE	GRAVEL	U.S. BUREAU
			SAND					

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17BF005
Figure No.: 3

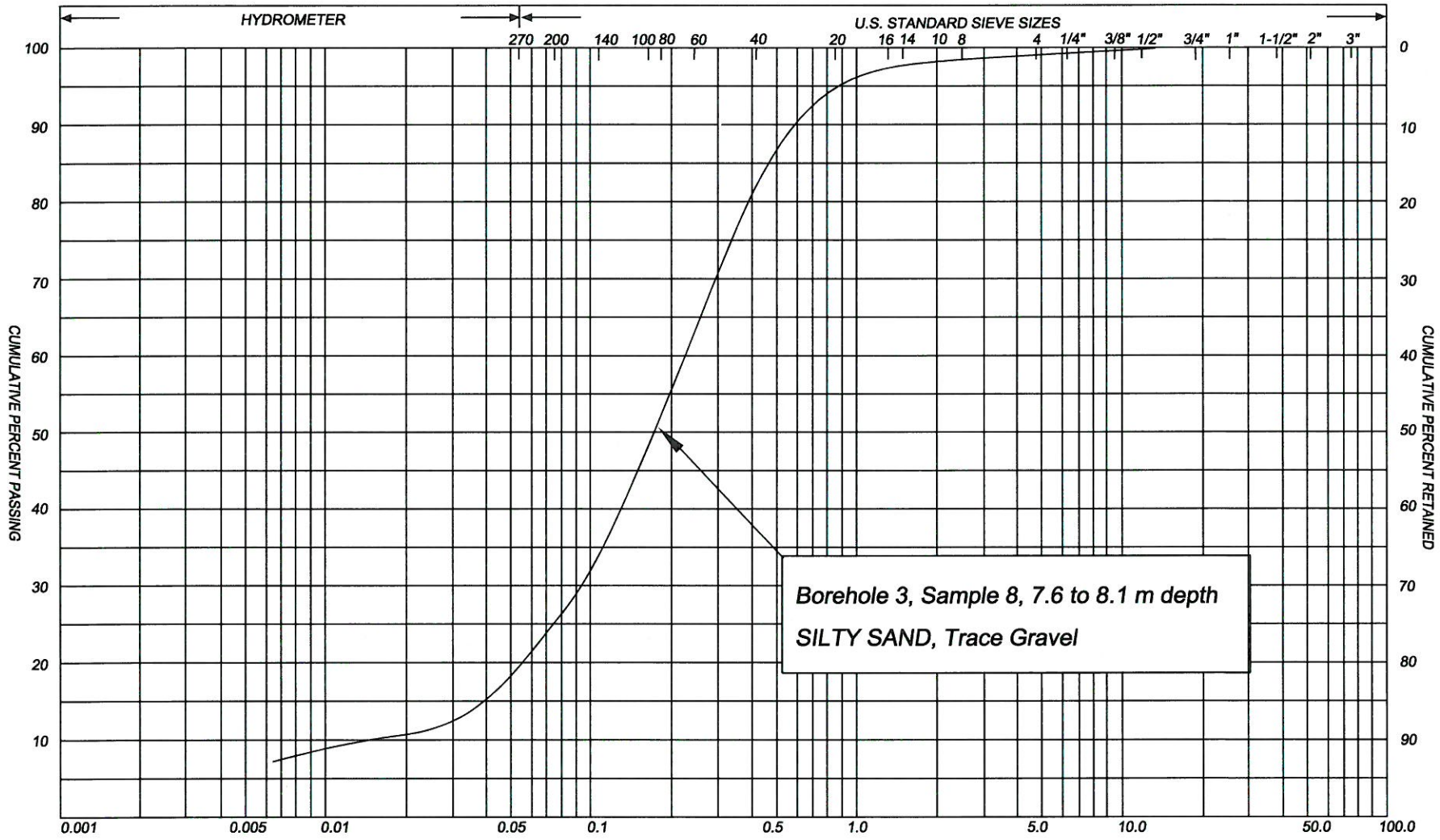


SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COB BLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T.
	SILT			SAND							
CLAY		SILT		V. FINE	FINE	MED	COARSE	GRAVEL			U.S. BUREAU
				SAND							

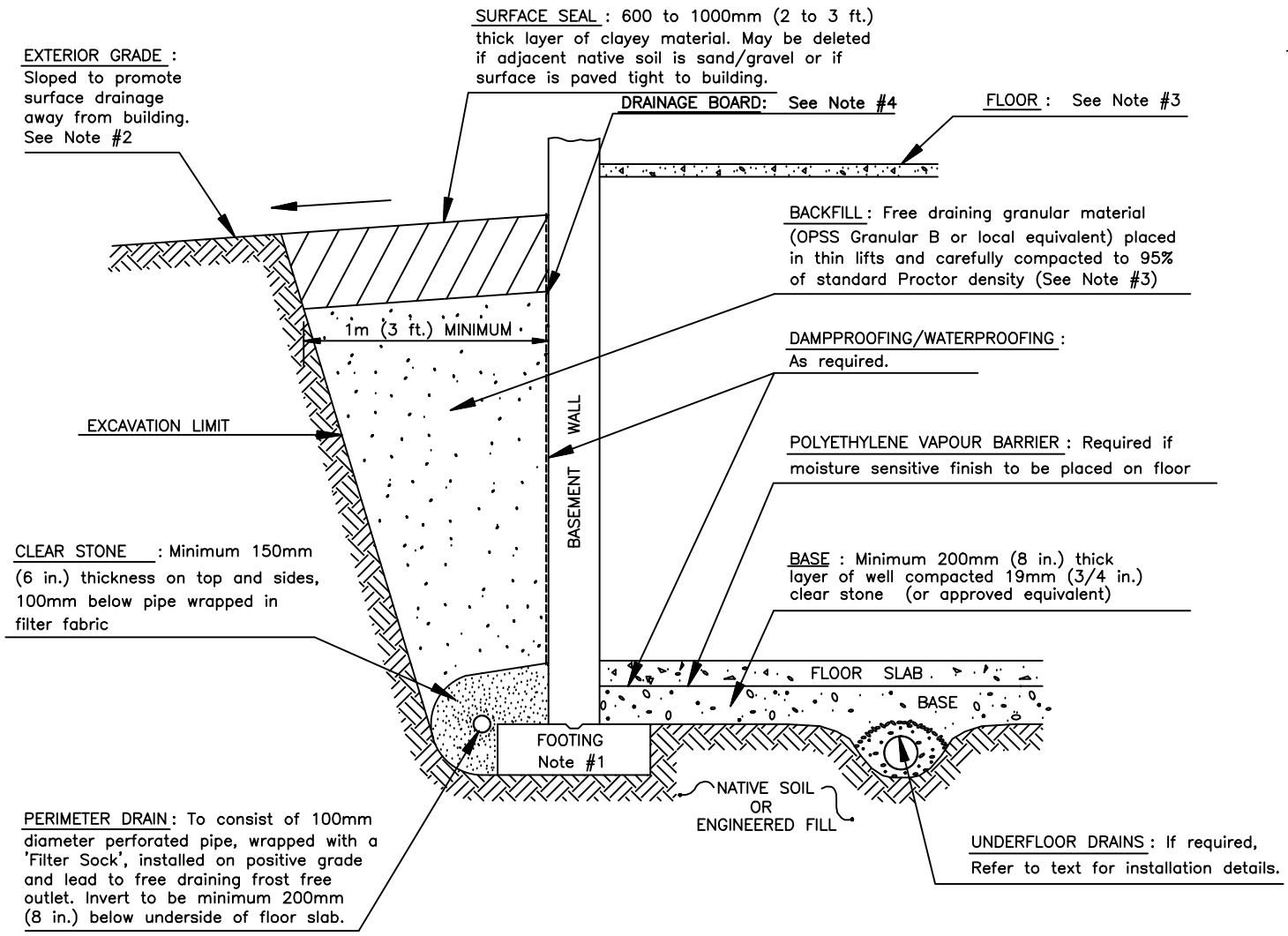
Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17BF005
Figure No.: 4



SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COB BLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T.
	SILT			SAND							
CLAY	SILT			V. FINE	FINE	MED	COARSE	GRAVEL			U.S. BUREAU
				SAND							



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

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN:	N/A	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED:	GW	MAY. 2017	N.T.S.	17BF005	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		

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		

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 1

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 14, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 249.50				
0.14 / 249.36	TOPSOIL: Brown, silty sand, trace gravel, frozen		1	SS	0
	CLAYEY SILT: Very soft to firm, brown, clayey silt, trace sand, frozen		2	SS	7
1.4 / 248.1	SAND/SILT TILL: Loose to compact, brown, sandy silt/silty sand, trace gravel, cobbles and boulders, very moist to moist		3	SS	5
			4	SS	13
			5	SS	15
5.0 / 244.5	BOREHOLE TERMINATED AT 5.0 m		6	SS	12

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

UNIT WEIGHT kN/m³

55

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

Stick-up cover
Concrete
Bentonite seal
19 mm slotted pipe
Filter sand
First water strike at 2.7 m

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

Date	Depth	Elev.
2017-03-28	+1.0	250.5

(Water above existing grade)

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 2

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 21, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 253.90				
0.70	TOPSOIL: Dark brown, silt, roots, moist		1	SS	6
253.20	SAND/SILT TILL: Compact to very dense, brown to grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist; with wet seams/layers		2	SS	11
			3	SS	26
			4	SS	36
			5	SS	46
			6	SS	64
			7	SS	91/280 mm
7.0					
246.9	SAND: Very dense to dense, brown, sand, trace silt to silty sand, trace gravel, wet		8	SS	93/280 mm
			9	SS	35
9.6					
244.3	BOREHOLE TERMINATED AT 9.6 m				

ELEVATION SCALE: 253, 252, 251, 250, 249, 248, 247, 246, 245

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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
First water strike at 2.1 m
Bentonite seal
19 mm slotted pipe
Filter sand

Upon completion of augering
Water at 2.4 m
Cave at 8.5 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	0.8	253.1

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 3

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 16, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH (metres)	ELEV	DESCRIPTION	NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 248.80			
0.0	248.80	TOPSOIL: Dark brown, silt some sand, roots, frozen	1	SS	4
0.70	248.10	CLAYEY SILT: Stiff, brown, clayey silt, trace sand, frozen	2	SS	9
1.4	247.4	SAND/SILT TILL: Loose to compact, grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist to very moist	3	SS	12
2.0			4	SS	6
3.0			5	SS	17
4.0					
5.0			6	SS	58
6.0			7	SS	65
7.0	241.8	SILTY SAND: Very dense, grey, silty sand, trace gravel, wet	8	SS	83/280 mm
8.5	240.3	SAND/SILT TILL: Very dense, grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist to very moist; with wet seams/layers	9	SS	83/280 mm
9.0					
10.0			10	SS	50/150 mm
11.0	237.7	BOREHOLE TERMINATED AT 11.1 m			
11.1					
12.0					
13.0					
14.0					
15.0					

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER O 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

UNIT WEIGHT kN/m³
65

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

Stick-up cover
Concrete
First water strike at 3.1 m
Bentonite seal
50 mm slotted pipe
Filter sand
8 67 25

Upon completion of augering
Water at 1.4 m
Cave at 2.9 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	+1.0	249.8

(Water above existing grade)

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 4

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 14, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SURFACE ELEVATION 257.55						
0.70	TOPSOIL: Dark brown, sandy silt, trace gravel, frozen		1	GS	11		Stick-up cover Concrete
256.85	SAND/SILT TILL: Loose, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, frozen		2	SS	7		Bentonite seal
1.4							
256.2	SILTY SAND: Compact, brown, silty sand, trace gravel, very moist		3	SS	26		
2.1							
255.5	SAND/SILT TILL: Dense to very dense, brown, silty sand to sandy silt, trace gravel, cobbles and boulders, moist; with wet seams/layers		4	SS	78		50 mm slotted pipe Filter sand
			5	SS	46		
5.0			6	SS	68		First water strike at 4.3 m
252.6	BOREHOLE TERMINATED AT 5.0 m						Upon completion of augering No water No cave Water Level Readings: Date 2017-03-28, Depth 1.7, Elev. 255.9

ELEVATION SCALE: 257, 256, 255, 254, 253

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

0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 5

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 16, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	ELEVATION SCALE
	SURFACE ELEVATION 259.00					
0.0	TOPSOIL: Brown, silt, trace sand, roots, frozen		1	SS	6	
0.70 / 258.30	SAND/SILT TILL: Compact to very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, moist; with wet seams/layers		2	SS	16	258
			3	SS	36	257
			4	SS	58	
3.5 / 255.5	BOREHOLE TERMINATED AT 3.5 m		5	SS	48	256

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

UNIT WEIGHT kN/m³

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

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

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

Date	Depth	Elev.
2017-03-28	2.9	256.1

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 6

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 14, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

SURFACE ELEVATION 259.15

DEPTH (metres)	ELEV	DESCRIPTION	NUMBER	TYPE	"N" VALUES
0.0	259.15	TOPSOIL: Brown, sandy silt, trace gravel, frozen	1	SS	5
0.70	258.45	SAND/SILT TILL: Loose to very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, very moist to moist; with wet seams/layers	2	SS	7
			3	SS	17
			4	SS	59
			5	SS	57
			6	SS	72/290 mm
			7	SS	81/270 mm
			8	SS	50/140 mm
9.6	249.6	BOREHOLE TERMINATED AT 9.6 m	9	SS	50/100 mm

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER O 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

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Stick-up cover
Concrete

First water strike at 0.9 m

Bentonite seal

6 56 38

19 mm slotted pipe
Filter sand

Upon completion of augering
Water at 1.8 m
Cave at 2.1 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	2.8	256.4

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 7

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 20, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

SURFACE ELEVATION 263.10

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
0.0	TOPSOIL: Dark brown, silt, trace sand, roots, moist		1	SS	1
0.70 / 262.40	SAND/SILT TILL: Very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, moist to very moist		2	SS	57
			3	SS	85/280 mm
			4	SS	86/250 mm
			5	SS	76/250 mm
			6	SS	73/250 mm
			7	SS	50/100 mm
7.0 / 256.1	Becoming grey, with wet seams/layers		8	SS	50/80 mm
			9	SS	50/130 mm
			10	SS	50/130 mm
			11	SS	85/280 mm
			12	SS	72/250 mm
	CONTINUED				

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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
First water strike at 0.6 m
Bentonite seal
19 mm slotted pipe
Filter sand

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 7

PROJECT Proposed Lockhart Road Residential Subdivision — **PML REF.** 17BF005
LOCATION Barrie, Ontario — **BORING DATE** March 20, 2017 — **ENGINEER** GW
BORING METHOD Continuous Flight Solid Stem Augers — **TECHNICIAN** RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q / DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ● (50 100 150 200 / 20 40 60 80)	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30 40)	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
15.0	CONTINUED FROM PREVIOUS PAGE									
	SAND/SILT TILL: Very dense, grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist to very moist; with wet seams/layers		13	SS	50/130 mm	248	>>●	○		
15.7 / 247.4	BOREHOLE TERMINATED AT 15.7 m									Upon completion of augering Water at 3.0 No cave Water Level Readings: Date — Depth — Elev. 2017-03-28 — 4.8 — 258.3

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 8

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 16, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	SURFACE ELEVATION 265.40				
0.0	TOPSOIL: Dark brown, sand, trace silt, roots, frozen		1	SS	12
0.70 / 264.70	SILTY SAND: Compact, brown, silty sand, moist		2	SS	22
1.4 / 264.0	SAND/SILT TILL: Very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, moist		3	SS	58
			4	SS	64
			5	SS	87/280 mm
5.0 / 260.4	BOREHOLE TERMINATED AT 5.0 m		6	SS	50

ELEVATION SCALE: 265, 264, 263, 262, 261

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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
Bentonite seal
5 63 32
19 mm slotted pipe
Filter sand

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

Date	Depth	Elev.
2017-03-28	Dry	----

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 9

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 17, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	SURFACE ELEVATION 263.10				
0.0	TOPSOIL: Brown, sand, trace to some silt, frozen		1	SS	13
0.70 262.40	SANDY SILT: Compact, brown to grey, sandy silt, moist		2	SS	10
1.4 261.7	SAND/SILT TILL: Compact to very dense, brown to grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist; with with seams/layers		3	SS	22
			4	SS	34
			5	SS	65/250 mm
			6	SS	71
			7	SS	77/250 mm
8.1 255.0	BOREHOLE TERMINATED AT 8.1 m		8	SS	84/200 mm

ELEVATION SCALE: 263, 262, 261, 260, 259, 258, 257, 256, 255

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER O 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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
Bentonite seal
19 mm slotted pipe
Filter sand

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

Date	Depth	Elev.
2017-03-28	5.2	257.9

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 10

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 21, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	SURFACE ELEVATION 266.90				
0.0	TOPSOIL: Dark brown, silt, trace sand, moist		1	SS	3
0.70					
266.20	SILT/SAND TILL: Compact to very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, moist		2	SS	10
			3	SS	53
			4	SS	54
2.9					
264.0	Becoming grey		5	SS	56
			6	SS	70/280 mm
5.5					
261.4	SAND: Very dense, brown, sand, some silt, wet		7	SS	72/250 mm
			8	SS	50/130 mm
8.1					
258.8	BOREHOLE TERMINATED AT 8.1 m				

ELEVATION SCALE: 266, 265, 264, 263, 262, 261, 260, 259

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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
Bentonite seal
First water strike at 6.1 m
50 mm slotted pipe
Filter sand

Upon completion of augering
Water at 6.7 m
Cave at 7.0 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	5.4	261.5

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 11

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 17, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 251.90				
0.0	251.90	TOPSOIL: Dark brown, silt, trace sand, roots, frozen		1	SS	2
0.70	251.20	SILTY SAND: Compact, brown, silty sand, trace organics, wet		2	SS	10
1.4	250.5	SAND/SILT TILL: Compact to very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, moist		3	SS	14
				4	SS	21
				5	SS	51
4.0	247.9	Becoming wet				
				6	SS	86
5.5	246.4	SAND: Very dense, grey, sand, some silt, trace gravel, wet				
				7	SS	68
6.6	245.3	BOREHOLE TERMINATED AT 6.6 m				

ELEVATION SCALE: 251, 250, 249, 248, 247, 246

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

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Stick-up cover
Concrete

Bentonite seal
First water strike at 1.5 m

2 52 46

19 mm slotted pipe
Filter sand

Upon completion of augering
Water at 0.8 m
Cave at 0.9 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	0.4	251.5

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 12

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 17, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 253.80				
0.0		TOPSOIL: Brown, silty sand, roots, frozen		1	SS	2
0.70	253.10	SILTY SAND: Very loose to loose, brown, silty sand, wet		2	SS	2
1.0				3	SS	6
2.0	2.1					
	251.7	SAND/SILT TILL: Loose to compact, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, wet to moist		4	SS	5
3.0				5	SS	23
4.0	4.0					
	249.8	SAND: Compact, brown, sand, some silt, trace gravel, wet		6	SS	15
5.0	5.5					
	248.3	SAND/SILT TILL: Compact to very dense, grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist		7	SS	29
6.0						
7.0				8	SS	68
8.0						
9.0	9.6			9	SS	62
	244.2	BOREHOLE TERMINATED AT 9.6 m				
10.0						
11.0						
12.0						
13.0						
14.0						
15.0						

ELEVATION SCALE: 253, 252, 251, 250, 249, 248, 247, 246, 245

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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
First water strike at 1.5 m
Bentonite seal
19 mm slotted pipe
Filter sand

Upon completion of augering
Water at 1.5 m
Cave at 6.1 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	0.5	253.3

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 13

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 21, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	SURFACE ELEVATION 254.85				
0.0	TOPSOIL: Dark brown, silty sand, moist		1	SS	3
0.70 254.15	SAND/SILT TILL: Compact to very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, very moist to moist		2	SS	23
			3	SS	34
			4	SS	60
			5	SS	66
5.0 249.9	BOREHOLE TERMINATED AT 5.0 m		6	SS	77

ELEVATION SCALE: 254, 253, 252, 251, 250

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

UNIT WEIGHT kN/m³

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

Upon completion of augering
Water at 0.9 m
Cave at 1.4 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	0.6	254.3

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 14

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 21, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 258.90				
0.0	258.90	TOPSOIL: Dark brown, silt, trace clay, roots, moist		1	SS	9
0.70	258.20	SANDY SILT: Compact, brown, sandy silt, trace organics, wet		2	SS	15
1.4	257.5	SAND/SILT TILL: Very dense, brown to grey, silty sand/sandy silt, trace gravel, cobbles and boulders, moist; with wet seams/layers		3	SS	65
				4	SS	73/250 mm
				5	SS	90/250 mm
				6	SS	80/250 mm
				7	SS	83/250 mm
8.1	250.8	BOREHOLE TERMINATED AT 8.1 m		8	SS	80/250 mm

ELEVATION SCALE: 258, 257, 256, 255, 254, 253, 252, 251

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER O 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

UNIT WEIGHT kN/m³

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

Stick-up cover
Concrete
Bentonite seal
19 mm slotted pipe
Filter sand
First water strike at 5.5 m

Upon completion of augering
Water at 5.5 m
Cave at 6.1 m
Water Level Readings:

Date	Depth	Elev.
2017-03-28	3.4	255.5

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 15

PROJECT Proposed Lockhart Road Residential Subdivision
PML REF. 17BF005
LOCATION Barrie, Ontario
BORING DATE March 16, 2017
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN RM

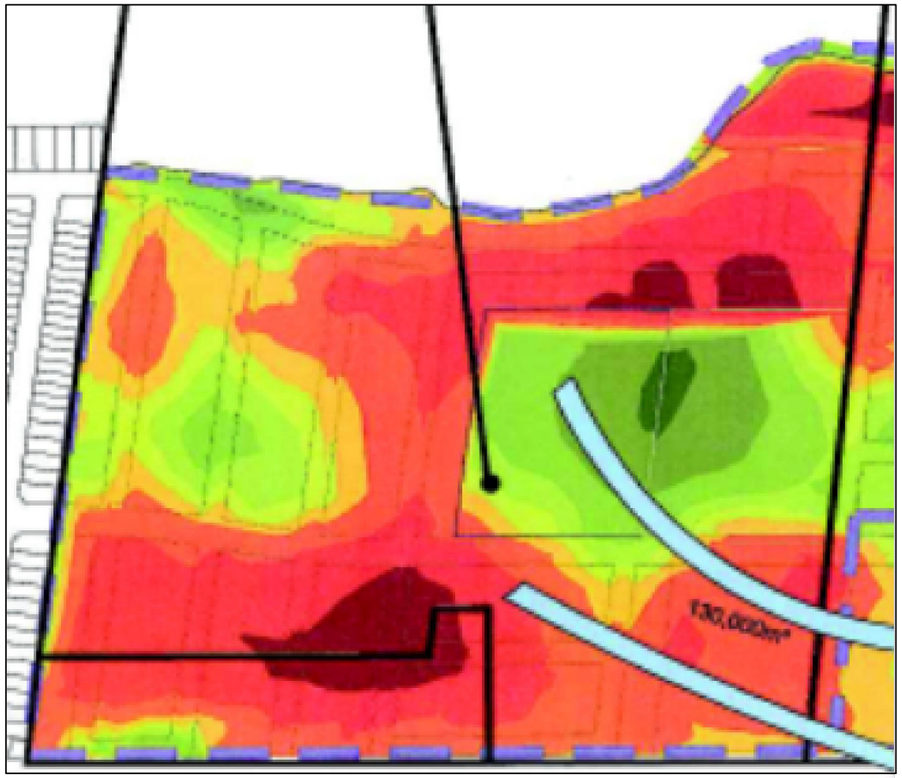
DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) / DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SURFACE ELEVATION 259.00									
0.0	TOPSOIL: Dark brown, sand, trace silt, roots and twigs, frozen		1	SS	5					Stick-up cover Concrete
0.70 / 258.30	SANDY SILT: Compact, brown, sandy silt, moist		2	SS	10	258				
1.4 / 257.6	SAND/SILT TILL: Compact to very dense, brown, silty sand/sandy silt, trace gravel, cobbles and boulders, very moist to moist		3	SS	12	257				Bentonite seal
			4	SS	34					
3.0			5	SS	80/280 mm	256				19 mm slotted pipe Filter sand
4.0						255				
5.0 / 254.0	BOREHOLE TERMINATED AT 5.0 m		6	SS	84/280 mm	254				Upon completion of augering No water No cave Water Level Readings: Date Depth Elev. 2017-03-28 Dry ----
6.0										
7.0										
8.0										
9.0										
10.0										
11.0										
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

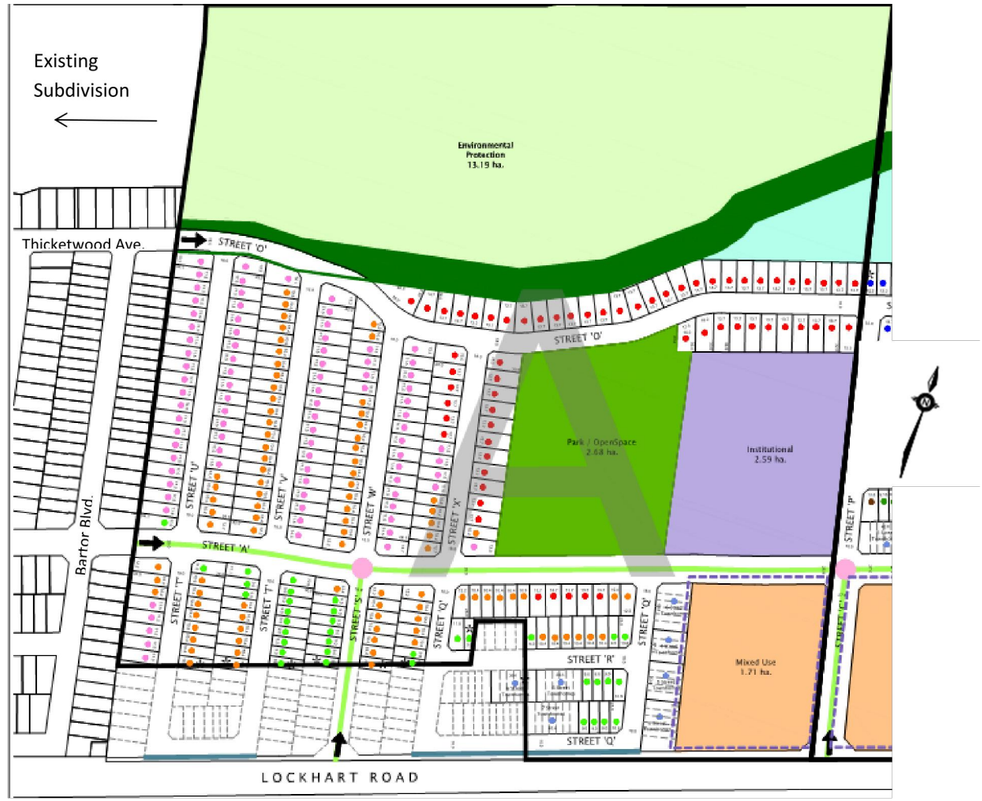
NOTES

BEMP 1 – Cut/Fill



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-10.000	-5.000	
2	-5.000	-2.500	
3	-2.500	-1.000	
4	-1.000	-0.300	
5	-0.300	0.300	
6	0.300	1.000	
7	1.000	2.500	
8	2.500	5.000	
9	5.000	10.000	

BEMP 1 Development Plan



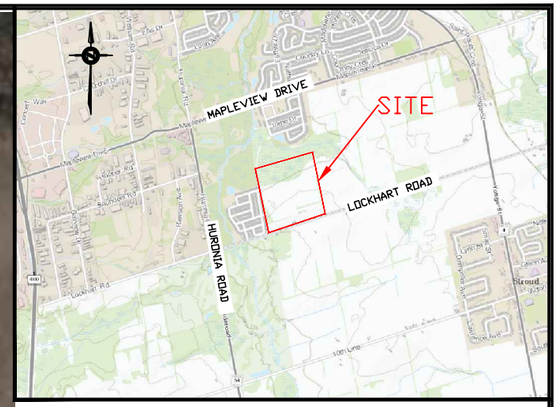
RFP DEVELOPMENT PLAN AND
PROPOSED CUT/FILL PLAN

PROPOSED LOCKHART ROAD RESIDENTIAL SUBDIVISION

BARRIE, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	RM	DATE	SCALE	PML REF.	DRAWING NO.
CHECKED	GW	MAY. 2017	AS SHOWN	17BF005	1
APPROVED	GW				



KEY PLAN
BARRIE, ONTARIO

LEGEND:

SITE LIMITS

BH1 EL. 249.50 — BOREHOLE 1 (PIEZOMETER) SURFACE ELEVATION 249.50

BH3 EL. 248.80 — BOREHOLE 3 (WELL) SURFACE ELEVATION 248.80

REFERENCE:

BASE PLAN PRODUCED USING SIMCOE COUNTY INTERACTIVE MAPPING, MARCH 2017

0m 45 90 135 180 225

SCALE

BOREHOLE LOCATION PLAN

PROPOSED LOCKHART ROAD RESIDENTIAL SUBDIVISION
BARRIE, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	RM	MAY 2017	AS SHOWN	17BF005	2
CHECKED	GW				
APPROVED	GW				

APPENDIX A

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 B

Certificates of Analysis for Topsoil

SGS AGRIFOOD LABORATORIES

1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

AgTest Topsoil Report

Report # 534244 PETO MACCALLUM LTD-BARRIE- Geoff-Richard - City Of Barrie - BH2-BH10

Lab No.: 31100501 Sample ID: - TS 1 - Adjacent BH2

Test Description	Analysis	Typical Guidelines	Within Range (Y/N)
pH	7.27	5.5 - 7.5	Y
Organic Matter %	4.3	4 - 15	Y
Total Salts (mmhos/cm)	0.11	< 1.5	Y
Phosphorus (ppm)	21.5	10 - 60	Y
Potassium (ppm)	156.0	80 - 250	Y
Calcium (ppm)	2473.2	1000 - 4000	Y
Magnesium (ppm)	74.1	100 - 300	N
Chloride (ppm)	4.0	< 100	Y
Sodium (ppm)	4.3	< 200	Y
Sodium Adsorption Ratio	0.4	< 15	Y
CEC (MEQ/100g)	14.6		
Base Sat. K (%)	2.7		
Base Sat. Mg (%)	4.2		
Base Sat. Ca (%)	84.8		
Base Sat. H (%)	8.2		
Sand Fraction %	62.0	20 - 75	Y
Silt Fraction %	37.0	5 - 50	Y
Clay Fraction %	1.0	5 - 30	N
Texture	Sandy Loam	Loam/Sandy Loam	

The values in the Typical Guidelines are characteristic of a Sandy Loam to Loam topsoil, and are considered to be optimal for these soil types. Your results are compared to these ranges in the Within Range column with Yes/No designation, however No does not necessarily suggest a soil will not support growth. Soil modification recommendations are made where possible to amend soil test values that fall beyond this optimal range.

Magnesium levels will be raised by following the fertility guidelines below.

General Fertility Guidelines for Turf Grass:
Before seeding or sodding, apply 10-20-5 at 5.5 lbs and magnesium sulphate at 6.5 lbs per 1000 sq feet and incorporate into the rootzone. After establishment apply 21-7-7 with slow release nitrogen at 3 lbs per 1000 sq feet.

Recommendations turf grass	N	P_2O_5	K_2O	Mg	Lime (te/ha)
(lb/ac)	24	45		30	
(lb/1000 sq.ft)	0.56	1.05		0.70	
(kg/100 sq.m)	0.27	0.50		0.34	

Authorized By: *Jack Legg - CCA-ON, 4R NMS*

PETO MACCALLUM LTD-BARRIE- Geoff-Richard - City Of Barrie - BH2-BH10
19 Churchill Drive
Barrie, ON L4N 8Z5

Email

Date Received: Mar-23-2017
Date Reported: Mar-29-2017

Fax: 705-734-9911
Email: gwhite@petomaccallum.com; barrie@petomaccallum.com

SGS AGRIFOOD LABORATORIES

1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

AgTest Topsoil Report

Lab No.: 31100502 Sample ID: - TS 2 - Adjacent BH6

Test Description	Analysis	Typical Guidelines	Within Range (Y/N)
pH	7.44	5.5 - 7.5	Y
Organic Matter %	1.9	4 - 15	N
Total Salts (mmhos/cm)	0.23	< 1.5	Y
Phosphorus (ppm)	5.2	10 - 60	N
Potassium (ppm)	92.1	80 - 250	Y
Calcium (ppm)	4495.8	1000 - 4000	N
Magnesium (ppm)	84.6	100 - 300	N
Chloride (ppm)	4.0	< 100	Y
Sodium (ppm)	9.9	< 200	Y
Sodium Adsorption Ratio	0.1	< 15	Y
CEC (MEQ/100g)	24.6		
Base Sat. K (%)	1.0		
Base Sat. Mg (%)	2.9		
Base Sat. Ca (%)	91.3		
Base Sat. H (%)	4.9		
Sand Fraction %	58.0	20 - 75	Y
Silt Fraction %	41.0	5 - 50	Y
Clay Fraction %	1.0	5 - 30	N
Texture	Sandy Loam	Loam/Sandy Loam	

The values in the Typical Guidelines are characteristic of a Sandy Loam to Loam topsoil, and are considered to be optimal for these soil types. Your results are compared to these ranges in the Within Range column with Yes/No designation, however No does not necessarily suggest a soil will not support growth. Soil modification recommendations are made where possible to amend soil test values that fall beyond this optimal range.

Soil organic matter content can be increased to 4% with sphagnum peat moss at 28 kg per cubic meter of topsoil. Up to 30% of this rate can be substituted with compost. Higher inclusion rates of compost may be used if the mineral content is known and adjustments are made to reflect that content in the fertility guidelines. Testing the compost as topsoil will provide the pertinent information.

Phosphorus levels will be raised by following the fertility guidelines below.

High levels of calcium are typical of Ontario topsoil and pose no threat to plant growth.

Magnesium levels will be raised by following the fertility guidelines below.

General Fertility Guidelines for Turf Grass:
Before seeding or sodding, apply 10-20-10 at 12 lbs and magnesium sulphate at 4.5 lbs per 1000 sq feet and incorporate into the rootzone. After establishment apply 21-7-7 with slow release nitrogen at 3 lbs per 1000 sq feet.

Recommendations turf grass	N	P2O5	K2O	Mg	Lime (te/ha)
(lb/ac)	54	80	58	20	
(lb/1000 sq.ft)	1.26	1.86	1.35	0.47	
(kg/100 sq.m)	0.61	0.90	0.65	0.22	

Authorized By: *Jack Legg - CCA-ON, 4R NMS*

PETO MACCALLUM LTD-BARRIE- Geoff-Richard - City Of Barrie - BH2-BH10
19 Churchill Drive
Barrie, ON L4N 8Z5

Email

Date Received: Mar-23-2017
Date Reported: Mar-29-2017

Fax: 705-734-9911
Email: gwhite@petomaccallum.com; barrie@petomaccallum.com

SGS AGRIFOOD LABORATORIES

1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

AgTest Topsoil Report

Lab No.: 31100503 Sample ID: - TS 3 - Adjacent BH10

Test Description	Analysis	Typical Guidelines	Within Range (Y/N)
pH	6.14	5.5 - 7.5	Y
Buffer pH	6.7		
Organic Matter %	3.1	4 - 15	N
Total Salts (mmhos/cm)	0.07	< 1.5	Y
Phosphorus (ppm)	21.9	10 - 60	Y
Potassium (ppm)	112.4	80 - 250	Y
Calcium (ppm)	1444.1	1000 - 4000	Y
Magnesium (ppm)	76.3	100 - 300	N
Chloride (ppm)	2.0	< 100	Y
Sodium (ppm)	6.3	< 200	Y
Sodium Adsorption Ratio	0.4	< 15	Y
CEC (MEQ/100g)	9.3		
Base Sat. K (%)	3.1		
Base Sat. Mg (%)	6.8		
Base Sat. Ca (%)	77.3		
Base Sat. H (%)	12.8		
Sand Fraction %	60.0	20 - 75	Y
Silt Fraction %	37.0	5 - 50	Y
Clay Fraction %	3.0	5 - 30	N
Texture	Sandy Loam	Loam/Sandy Loam	

The values in the Typical Guidelines are characteristic of a Sandy Loam to Loam topsoil, and are considered to be optimal for these soil types. Your results are compared to these ranges in the Within Range column with Yes/No designation, however No does not necessarily suggest a soil will not support growth. Soil modification recommendations are made where possible to amend soil test values that fall beyond this optimal range.

Soil organic matter content can be increased to 4% with sphagnum peat moss at 12 kg per cubic meter of topsoil. Up to 30% of this rate can be substituted with compost. Higher inclusion rates of compost may be used if the mineral content is known and adjustments are made to reflect that content in the fertility guidelines. Testing the compost as topsoil will provide the pertinent information.

Magnesium levels will be raised by following the fertility guidelines below.

General Fertility Guidelines for Turf Grass:
Before seeding or sodding, apply 6-12-12 at 9 lbs and magnesium sulphate at 4.5 lbs per 1000 sq feet and incorporate into the rootzone. After establishment apply 21-7-7 with slow release nitrogen at 3 lbs per 1000 sq feet.

Recommendations turf grass	N	P2O5	K2O	Mg	Lime (te/ha)
(lb/ac)	24	45	34	20	
(lb/1000 sq.ft)	0.56	1.05	0.79	0.47	
(kg/100 sq.m)	0.27	0.50	0.38	0.22	

Authorized By: *Jack Legg - CCA-ON, 4R NMS*

PETO MACCALLUM LTD-BARRIE- Geoff-Richard - City Of Barrie - BH2-BH10
19 Churchill Drive
Barrie, ON L4N 8Z5

Email

Date Received: Mar-23-2017
Date Reported: Mar-29-2017

Fax: 705-734-9911
Email: gwhite@petomaccallum.com; barrie@petomaccallum.com

SGS AGRIFOOD LABORATORIES

1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

Report # 534205 Analytical Report Page 1 of 1

Email

PETO MACCALLUM LTD - BARRIE - Geoff - City
Of Barrie BH2 - BH10 Atz
19 Churchill Drive
Barrie, ON L4N 8Z5

Fax: 705-734-9911
Email: gwhite@petomaccallum.com; rblair@petomaccallum.com

Date Received: Mar-23-2017
Date Reported: Apr-03-2017

Sample ID:	Lab ID	Atrazine (ppm)
TS 1 - Adjacent BH2	31099701	< 0.05
TS 2 - Adjacent BH6	31099702	< 0.05
TS 3 - Adjacent BH10	31099703	< 0.05

Interpretation of Test Results

Triazine Residue	Injury and Crop Information
< 0.05 ppm	Generally no injury except to very susceptible vegetables (i.e. cucumbers) and cash crops (i.e. tobacco) planted in sandy soil during warm, dry weather
0.05 - 0.10 ppm	Slight injury or stunted growth may be expected to susceptible plants (see above) in sandy loam at normal weather conditions. Tomatoes, oats, alfalfa and lawn grass seed may be affected.
0.10 - 0.20 ppm	Tomatoes, red beets, tobacco, oats and vegetables should not be planted, Beans (soya, kidney, white) and barley may be affected. Exception is soils with high organic matter content (12%).
0.20 - 0.30 ppm	Injury to most crops except corn, flax, sorghum and grass sodding.
> 0.30 ppm	Severe injury can occur on all susceptible crops except triazene resistant canola (i.e. OAC Triton)

These residue levels are based on representative soil samples.
Increased organic matter content in soil reduces injury
Dry and warm weather accentuates triazine activity.

Authorized By: *Jack Legg*

CCA-ON, 4R NMS

APPENDIX C

Certificates of Analysis for Soil

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PETO MACCALLUM
19 CHURCHILL DRIVE
BARRIE, ON L4N8Z5
(705) 734-3900

ATTENTION TO: Geoff White

PROJECT: 17BF005

AGAT WORK ORDER: 17T199461

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Mar 31, 2017

PAGES (INCLUDING COVER): 15

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2017-03-23

DATE REPORTED: 2017-03-31

		SAMPLE DESCRIPTION:		BH3 SS2	BH7 SS3	BH10 SS2	BH2 SS4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-03-16	2017-03-20	2017-03-21	2017-03-21
Parameter	Unit	G / S	RDL	8276279	8276348	8276357	8276363
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	2	1	1	1
Barium	µg/g	220	2	163	43	45	42
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	7	<5	<5	<5
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.10	<0.10	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	25	9	10	8
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2
Cobalt	µg/g	21	0.5	8.7	3.2	3.9	3.0
Copper	µg/g	92	1	16	6	8	6
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040
Electrical Conductivity	mS/cm	0.57	0.005	0.168	0.093	0.086	0.090
Lead	µg/g	120	1	8	2	3	2
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10
Molybdenum	µg/g	2	0.5	<0.5	<0.5	<0.5	<0.5
Nickel	µg/g	82	1	19	6	8	5
Selenium	µg/g	1.5	0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2	<0.2
Sodium Adsorption Ratio	NA	2.4	NA	0.148	0.096	0.061	0.057
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	1.0	<0.5	<0.5	<0.5
Vanadium	µg/g	86	1	35	19	20	17
Zinc	µg/g	290	5	48	17	20	15
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.42	7.47	7.72	7.71

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8276279-8276363 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Certified By: Amanjot Bhela

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - OC Pesticides (Soil)

DATE RECEIVED: 2017-03-23

DATE REPORTED: 2017-03-31

		SAMPLE DESCRIPTION:		BH3 SS2	BH7 SS3	BH10 SS2	BH2 SS4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-03-16	2017-03-20	2017-03-21	2017-03-21
Parameter	Unit	G / S	RDL	8276279	8276348	8276357	8276363
Aldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.05	0.007	<0.007	<0.007	<0.007	<0.007
DDD	µg/g	0.05	0.007	<0.007	<0.007	<0.007	<0.007
DDE	µg/g	0.05	0.007	<0.007	<0.007	<0.007	<0.007
DDT	µg/g	1.4	0.007	<0.007	<0.007	<0.007	<0.007
Dieldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005
Gamma-Hexachlorocyclohexane	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005
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	0.005	<0.005	<0.005	<0.005	<0.005
Surrogate	**Unit**	**Acceptable Limits**					
Decachlorobiphenyl	%	60-130		78	84	62	74
TCMX	%	50-140		70	74	54	66

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8276279-8276363 Results are based on the dry weight of the soil.
Note: DDT applies to the total of op'DDT and pp'DDT, DDD applies to the total of op'DDD and pp'DDD and DDE applies to the total of op'DDE and pp'DDE. Endosulfan applies to the total of Endosulfan I and Endosulfan II.
Chlordane applies to the total of Alpha-Chlordane and Gamma-Chlordane.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2017-03-23

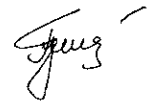
DATE REPORTED: 2017-03-31

		SAMPLE DESCRIPTION:		BH3 SS2	BH7 SS3	BH10 SS2	BH2 SS4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-03-16	2017-03-20	2017-03-21	2017-03-21
Parameter	**Unit**	**G / S**	**RDL**	**8276279**	**8276348**	**8276357**	**8276363**
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	18.0	10.3	11.1	9.5
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**					
Chrysene-d12	%	50-140		77	75	70	68

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8276279-8276363 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2017-03-23

DATE REPORTED: 2017-03-31

		SAMPLE DESCRIPTION:		BH3 SS2	BH7 SS3	BH10 SS2	BH2 SS4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-03-16	2017-03-20	2017-03-21	2017-03-21
Parameter	Unit	G / S	RDL	8276279	8276348	8276357	8276363
F1 (C6 to C10)	µg/g	25	5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g		50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	120	50	NA	NA	NA	NA
Moisture Content	%		0.1	18.0	10.3	11.1	9.5
Surrogate	**Unit**	**Acceptable Limits**					
Terphenyl	%	60-140		92	97	85	77

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8276279-8276363 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2017-03-23

DATE REPORTED: 2017-03-31

		SAMPLE DESCRIPTION:		BH3 SS2	BH7 SS3	BH10 SS2	BH2 SS4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-03-16	2017-03-20	2017-03-21	2017-03-21
Parameter	Unit	G / S	RDL	8276279	8276348	8276357	8276363
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/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
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03
1,3-Dichloropropene	µg/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2017-03-23

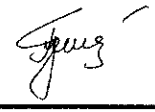
DATE REPORTED: 2017-03-31

		SAMPLE DESCRIPTION:		BH3 SS2	BH7 SS3	BH10 SS2	BH2 SS4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-03-16	2017-03-20	2017-03-21	2017-03-21
Parameter	Unit	G / S	RDL	8276279	8276348	8276357	8276363
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02
Xylene Mixture	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**					
4-Bromofluorobenzene	% Recovery	50-140		89	93	91	87
Toluene-d8	% Recovery	50-140		111	109	110	105

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8276279-8276363 The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Mar 31, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	8276363	8276363	<0.8	<0.8	NA	< 0.8	110%	70%	130%	108%	80%	120%	87%	70%	130%
Arsenic	8276363	8276363	1	1	NA	< 1	108%	70%	130%	106%	80%	120%	106%	70%	130%
Barium	8276363	8276363	42	42	0.0%	< 2	98%	70%	130%	99%	80%	120%	102%	70%	130%
Beryllium	8276363	8276363	<0.5	<0.5	NA	< 0.5	80%	70%	130%	110%	80%	120%	91%	70%	130%
Boron	8276363	8276363	<5	<5	NA	< 5	88%	70%	130%	104%	80%	120%	93%	70%	130%
Boron (Hot Water Soluble)	8276363	8276363	<0.10	<0.10	NA	< 0.10	107%	60%	140%	104%	70%	130%	98%	60%	140%
Cadmium	8276363	8276363	<0.5	<0.5	NA	< 0.5	99%	70%	130%	109%	80%	120%	107%	70%	130%
Chromium	8276363	8276363	8	8	NA	< 2	99%	70%	130%	109%	80%	120%	118%	70%	130%
Chromium VI	8277762		<0.2	<0.2	NA	< 0.2	93%	70%	130%	98%	80%	120%	100%	70%	130%
Cobalt	8276363	8276363	3.0	3.0	0.0%	< 0.5	104%	70%	130%	109%	80%	120%	101%	70%	130%
Copper	8276363	8276363	6	6	0.0%	< 1	99%	70%	130%	114%	80%	120%	96%	70%	130%
Cyanide	8273556		<0.040	<0.040	NA	< 0.040	101%	70%	130%	101%	80%	120%	95%	70%	130%
Electrical Conductivity	8276363	8276363	0.090	0.089	1.1%	< 0.005	93%	90%	110%	NA			NA		
Lead	8276363	8276363	2	2	NA	< 1	106%	70%	130%	105%	80%	120%	91%	70%	130%
Mercury	8276363	8276363	<0.10	<0.10	NA	< 0.10	103%	70%	130%	92%	80%	120%	96%	70%	130%
Molybdenum	8276363	8276363	<0.5	<0.5	NA	< 0.5	102%	70%	130%	109%	80%	120%	103%	70%	130%
Nickel	8276363	8276363	5	6	18.2%	< 1	109%	70%	130%	112%	80%	120%	121%	70%	130%
Selenium	8276363	8276363	<0.4	<0.4	NA	< 0.4	103%	70%	130%	106%	80%	120%	108%	70%	130%
Silver	8276363	8276363	<0.2	<0.2	NA	< 0.2	92%	70%	130%	120%	80%	120%	113%	70%	130%
Sodium Adsorption Ratio	8276363	8276363	0.057	0.053	7.3%	NA	NA			NA			NA		
Thallium	8276363	8276363	<0.4	<0.4	NA	< 0.4	108%	70%	130%	108%	80%	120%	103%	70%	130%
Uranium	8276363	8276363	<0.5	<0.5	NA	< 0.5	94%	70%	130%	93%	80%	120%	93%	70%	130%
Vanadium	8276363	8276363	17	17	0.0%	< 1	102%	70%	130%	107%	80%	120%	111%	70%	130%
Zinc	8276363	8276363	15	15	NA	< 5	103%	70%	130%	113%	80%	120%	74%	70%	130%
pH, 2:1 CaCl2 Extraction	8276279	8276279	7.42	7.36	0.8%	NA	101%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Amanjot Bhela

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Mar 31, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)															
F1 (C6 to C10)	8276524		< 5	< 5	NA	< 5	75%	60%	130%	85%	85%	115%	75%	70%	130%
F2 (C10 to C16)	8277762		< 10	< 10	NA	< 10	99%	60%	130%	92%	80%	120%	87%	70%	130%
F3 (C16 to C34)	8277762		< 50	< 50	NA	< 50	102%	60%	130%	91%	80%	120%	85%	70%	130%
F4 (C34 to C50)	8277762		< 50	< 50	NA	< 50	101%	60%	130%	91%	80%	120%	92%	70%	130%
O. Reg. 153(511) - VOCs (Soil)															
Acetone	8269836		< 0.50	< 0.50	NA	< 0.50	108%	50%	140%	103%	50%	140%	98%	50%	140%
Benzene	8269836		< 0.02	< 0.02	NA	< 0.02	76%	50%	140%	85%	60%	130%	83%	50%	140%
Bromodichloromethane	8269836		< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	74%	60%	130%	90%	50%	140%
Bromoform	8269836		< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	80%	60%	130%	100%	50%	140%
Bromomethane	8269836		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	121%	50%	140%	110%	50%	140%
Carbon Tetrachloride	8269836		< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	78%	60%	130%	72%	50%	140%
Chlorobenzene	8269836		< 0.05	< 0.05	NA	< 0.05	78%	50%	140%	98%	60%	130%	103%	50%	140%
Chloroform	8269836		< 0.04	< 0.04	NA	< 0.04	82%	50%	140%	85%	60%	130%	76%	50%	140%
Cis- 1,2-Dichloroethylene	8269836		< 0.02	< 0.02	NA	< 0.02	83%	50%	140%	85%	60%	130%	83%	50%	140%
Dibromochloromethane	8269836		< 0.05	< 0.05	NA	< 0.05	79%	50%	140%	86%	60%	130%	107%	50%	140%
1,3-Dichlorobenzene	8269836		< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	73%	60%	130%	83%	50%	140%
1,2-Dichlorobenzene	8269836		< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	71%	60%	130%	87%	50%	140%
1,4-Dichlorobenzene	8269836		< 0.05	< 0.05	NA	< 0.05	81%	50%	140%	84%	60%	130%	100%	50%	140%
Dichlorodifluoromethane	8269836		< 0.05	< 0.05	NA	< 0.05	71%	50%	140%	77%	50%	140%	120%	50%	140%
1,1-Dichloroethane	8269836		< 0.02	< 0.02	NA	< 0.02	81%	50%	140%	80%	60%	130%	68%	50%	140%
1,2-Dichloroethane	8269836		< 0.03	< 0.03	NA	< 0.03	83%	50%	140%	85%	60%	130%	84%	50%	140%
1,1-Dichloroethylene	8269836		< 0.05	< 0.05	NA	< 0.05	71%	50%	140%	94%	60%	130%	78%	50%	140%
1,2-Dichloropropane	8269836		< 0.03	< 0.03	NA	< 0.03	79%	50%	140%	74%	60%	130%	93%	50%	140%
1,3-Dichloropropene	8269836		< 0.04	< 0.04	NA	< 0.04	92%	50%	140%	83%	60%	130%	75%	50%	140%
Ethylbenzene	8269836		< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	77%	60%	130%	88%	50%	140%
Ethylene Dibromide	8269836		< 0.04	< 0.04	NA	< 0.04	87%	50%	140%	90%	60%	130%	107%	50%	140%
Methyl Ethyl Ketone	8269836		< 0.50	< 0.50	NA	< 0.50	90%	50%	140%	72%	50%	140%	78%	50%	140%
Methyl Isobutyl Ketone	8269836		< 0.50	< 0.50	NA	< 0.50	90%	50%	140%	99%	50%	140%	122%	50%	140%
Methyl tert-butyl Ether	8269836		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	82%	60%	130%	74%	50%	140%
Methylene Chloride	8269836		< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	101%	60%	130%	101%	50%	140%
Styrene	8269836		< 0.05	< 0.05	NA	< 0.05	79%	50%	140%	91%	60%	130%	80%	50%	140%
1,1,2,2-Tetrachloroethane	8269836		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	94%	60%	130%	120%	50%	140%
1,1,1,2-Tetrachloroethane	8269836		< 0.04	< 0.04	NA	< 0.04	81%	50%	140%	90%	60%	130%	95%	50%	140%
Tetrachloroethylene	8269836		< 0.05	< 0.05	NA	< 0.05	74%	50%	140%	87%	60%	130%	99%	50%	140%
Toluene	8269836		< 0.05	< 0.05	NA	< 0.05	76%	50%	140%	98%	60%	130%	116%	50%	140%
Trans- 1,2-Dichloroethylene	8269836		< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	84%	60%	130%	89%	50%	140%
1,1,1-Trichloroethane	8269836		< 0.05	< 0.05	NA	< 0.05	71%	50%	140%	82%	60%	130%	73%	50%	140%
1,1,2-Trichloroethane	8269836		< 0.04	< 0.04	NA	< 0.04	97%	50%	140%	95%	60%	130%	125%	50%	140%
Trichloroethylene	8269836		0.27	0.33	20.0%	< 0.03	74%	50%	140%	84%	60%	130%	90%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Mar 31, 2017			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Trichlorofluoromethane	8269836		< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	96%	50%	140%	120%	50%	140%
Vinyl Chloride	8269836		< 0.02	< 0.02	NA	< 0.02	97%	50%	140%	122%	50%	140%	87%	50%	140%
m & p-Xylene	8269836		< 0.05	< 0.05	NA	< 0.05	76%	50%	140%	85%	60%	130%	96%	50%	140%
n-Hexane	8269836		< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	84%	60%	130%	94%	50%	140%
o-Xylene	8269836		< 0.05	< 0.05	NA	< 0.05	78%	50%	140%	86%	60%	130%	99%	50%	140%
O. Reg. 153(511) - PAHs (Soil)															
Acenaphthene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	116%	50%	140%	113%	50%	140%
Acenaphthylene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	114%	50%	140%	109%	50%	140%
Anthracene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	114%	50%	140%	107%	50%	140%
Benz(a)anthracene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	116%	50%	140%	111%	50%	140%
Benzo(a)pyrene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	105%	50%	140%	111%	50%	140%
Benzo(b)fluoranthene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	126%	50%	140%	117%	50%	140%
Benzo(g,h,i)perylene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	84%	50%	140%	98%	50%	140%
Benzo(k)fluoranthene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	106%	50%	140%	107%	50%	140%
Chrysene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	97%	50%	140%	109%	50%	140%	99%	50%	140%
Dibenz(a,h)anthracene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	89%	50%	140%	114%	50%	140%
Fluoranthene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	110%	50%	140%	107%	50%	140%
Fluorene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	116%	50%	140%	112%	50%	140%
Indeno(1,2,3-cd)pyrene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	90%	50%	140%	107%	50%	140%
Naphthalene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	118%	50%	140%	112%	50%	140%
Phenanthrene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	112%	50%	140%	110%	50%	140%
Pyrene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	111%	50%	140%	106%	50%	140%
2-and 1-methyl Naphthalene	8276363	8276363	< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	118%	50%	140%	113%	50%	140%
O. Reg. 153(511) - OC Pesticides (Soil)															
Aldrin	8267227		< 0.005	< 0.005	NA	< 0.005	109%	50%	140%	94%	50%	140%	68%	50%	140%
Chlordane	8267227		< 0.007	< 0.007	NA	< 0.007	87%	50%	140%	91%	50%	140%	78%	50%	140%
DDD	8267227		< 0.007	< 0.007	NA	< 0.007	94%	50%	140%	94%	50%	140%	84%	50%	140%
DDE	8267227		< 0.007	< 0.007	NA	< 0.007	88%	50%	140%	98%	50%	140%	78%	50%	140%
DDT	8267227		< 0.007	< 0.007	NA	< 0.007	88%	50%	140%	87%	50%	140%	78%	50%	140%
Dieldrin	8267227		< 0.005	< 0.005	NA	< 0.005	84%	50%	140%	90%	50%	140%	80%	50%	140%
Endosulfan	8267227		< 0.005	< 0.005	NA	< 0.005	89%	50%	140%	88%	50%	140%	69%	50%	140%
Endrin	8267227		< 0.005	< 0.005	NA	< 0.005	84%	50%	140%	76%	50%	140%	82%	50%	140%
Gamma-Hexachlorocyclohexane	8267227		< 0.005	< 0.005	NA	< 0.005	92%	50%	140%	78%	50%	140%	66%	50%	140%
Heptachlor	8267227		< 0.005	< 0.005	NA	< 0.005	80%	50%	140%	90%	50%	140%	80%	50%	140%
Heptachlor Epoxide	8267227		< 0.005	< 0.005	NA	< 0.005	90%	50%	140%	96%	50%	140%	82%	50%	140%
Hexachlorobenzene	8267227		< 0.005	< 0.005	NA	< 0.005	92%	50%	140%	100%	50%	140%	92%	50%	140%
Hexachlorobutadiene	8267227		< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	100%	50%	140%	68%	50%	140%
Hexachloroethane	8267227		< 0.01	< 0.01	NA	< 0.01	82%	50%	140%	96%	50%	140%	64%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Mar 31, 2017			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Methoxychlor	8267227		< 0.005	< 0.005	NA	< 0.005	76%	50%	140%	82%	50%	140%	96%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Aldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Chlordane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDD	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDE	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDT	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Dieldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endosulfan	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Gamma-Hexachlorocyclohexane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor Epoxide	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobenzene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobutadiene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachloroethane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Methoxychlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
TCMX	ORG-91-5112	EPA SW-846 3541,3620 & 8081	GC/ECD
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Moisture Content	ORG-91-5106	EPA SW-846 3541 & 8270	BALANCE
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	CCME Tier 1 Method	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T199461

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

Troxler 3430

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #: 17T194461

Cooler Quantity: Med

Arrival Temperatures: 3.4 4.2 4.9 / 3.0 3.2 2.9

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company: Reto MacCallum Ltd

Contact: Geoff White

Address: 19 Churchill Drive, Barrie, ON

Phone: 705-734-3900 Fax: 705-734-9911

Reports to be sent to:

1. Email: rmcfadden@retomaccallum.com
2. Email: rblair@retomaccallum.com

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 (Indicate One)
☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region ____ (Indicate One)

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a Record of Site Condition? ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply): ____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 17B1205

Site Location: Lockhart

Sampled By: R. MacFadden

AGAT Quote #: 130685 PO:

Please note: If quote number is not provided, client will be billed full price for analysis

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (please Circle) Y / N	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐NO_3/NO_2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3/NO_2	Volatiles: ☐VOC ☐BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH3 SS2	Mar 16		5	S	4 jars + 1 vial		✓						✓	✓		✓			✓		
BH7 SS3	Mar 20		5	S	4		✓						✓	✓		✓			✓		
BH10 SS2	Mar 21		5	S	4		✓						✓	✓		✓			✓		
BH2 SS4	Mar 21		5	S	4		✓						✓	✓		✓			✓		

Samples Relinquished By (Print Name and Sign): R. Blair

Date: 21-03-23 Time: 3105

Samples Relinquished By (Print Name and Sign): Kian

Date: 21/3/23 Time: 1605

Samples Relinquished By (Print Name and Sign):

Date: 28/03/23 Time:

Samples Received By (Print Name and Sign):

Date: Time:

Page 1 of 1

N°: T 024101

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PETO MACCALLUM
19 CHURCHILL DRIVE
BARRIE, ON L4N8Z5
(705) 734-3900

ATTENTION TO: Geoff White

PROJECT: 17BF005

AGAT WORK ORDER: 17T197704

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Mar 29, 2017

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

SAMPLING SITE:

ATTENTION TO: Geoff White

SAMPLED BY:R. Mcfadden

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2017-03-20

DATE REPORTED: 2017-03-29

		SAMPLE DESCRIPTION:		BH6 SS5	BH5 SS3	BH1 SS2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-14	2017-03-14	2017-03-14
Parameter	Unit	G / S	RDL	8264534	8264536	8264545
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	<1	<1	2
Barium	µg/g	220	2	55	41	134
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	<5	<5	9
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.43	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	10	8	22
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2
Cobalt	µg/g	21	0.5	3.7	2.5	8.3
Copper	µg/g	92	1	8	6	15
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Electrical Conductivity	mS/cm	0.57	0.005	0.109	0.100	0.147
Lead	µg/g	120	1	2	2	6
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Molybdenum	µg/g	2	0.5	0.6	<0.5	<0.5
Nickel	µg/g	82	1	7	5	16
Selenium	µg/g	1.5	0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2
Sodium Adsorption Ratio	NA	2.4	NA	0.118	0.133	0.134
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	<0.5	<0.5	<0.5
Vanadium	µg/g	86	1	19	16	34
Zinc	µg/g	290	5	19	14	45
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.91	7.94	7.73

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8264534-8264545 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Certified By: Amanjot Bhela

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

O. Reg. 153(511) - OC Pesticides (Soil)

DATE RECEIVED: 2017-03-20

DATE REPORTED: 2017-03-29

		SAMPLE DESCRIPTION:		BH6 SS5	BH5 SS3	BH1 SS2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-14	2017-03-14	2017-03-14
Parameter	Unit	G / S	RDL	8264534	8264536	8264545
Aldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.05	0.007	<0.007	<0.007	<0.007
DDD	µg/g	0.05	0.007	<0.007	<0.007	<0.007
DDE	µg/g	0.05	0.007	<0.007	<0.007	<0.007
DDT	µg/g	1.4	0.007	<0.007	<0.007	<0.007
Dieldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	0.005	<0.005	<0.005	<0.005
Gamma-Hexachlorocyclohexane	µg/g	0.01	0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.01	0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.01	0.01	<0.01	<0.01	<0.01
Hexachloroethane	µg/g	0.01	0.01	<0.01	<0.01	<0.01
Methoxychlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005
Surrogate	**Unit**	**Acceptable Limits**				
Decachlorobiphenyl	%	60-130		102	108	114
TCMX	%	50-140		76	90	100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8264534-8264545 Results are based on the dry weight of the soil.
Note: DDT applies to the total of op'DDT and pp'DDT, DDD applies to the total of op'DDD and pp'DDD and DDE applies to the total of op'DDE and pp'DDE. Endosulfan applies to the total of Endosulfan I and Endosulfan II.
Chlordane applies to the total of Alpha-Chlordane and Gamma-Chlordane.

Certified By: N Poprnikoff

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2017-03-20

DATE REPORTED: 2017-03-29

		SAMPLE DESCRIPTION:		BH6 SS5	BH5 SS3	BH1 SS2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-14	2017-03-14	2017-03-14
Parameter	Unit	G / S	RDL	8264534	8264536	8264545
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	24.1	11.1	14.6
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**				
Chrysene-d12	%	50-140		77	61	78

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8264534-8264545 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2017-03-20

DATE REPORTED: 2017-03-29

		SAMPLE DESCRIPTION:		BH6 SS5	BH5 SS3	BH1 SS2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-14	2017-03-14	2017-03-14
Parameter	Unit	G / S	RDL	8264534	8264536	8264545
F1 (C6 to C10)	µg/g	25	5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g		50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	120	50	NA	NA	NA
Moisture Content	%		0.1	24.1	11.1	14.6
Surrogate	**Unit**	**Acceptable Limits**				
Terphenyl	%	60-140		74	81	86

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8264534-8264545 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: N Popruckoff

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

SAMPLING SITE:

ATTENTION TO: Geoff White

SAMPLED BY:R. Mcfadden

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2017-03-20

DATE REPORTED: 2017-03-29

		SAMPLE DESCRIPTION:		BH6 SS5	BH5 SS3	BH1 SS2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-14	2017-03-14	2017-03-14
Parameter	Unit	G / S	RDL	8264534	8264536	8264545
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
1,3-Dichloropropene	µg/g	0.05	0.04	<0.04	<0.04	<0.04
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05

Certified By: N Popnickoff

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2017-03-20

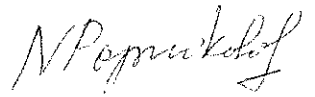
DATE REPORTED: 2017-03-29

		SAMPLE DESCRIPTION:		BH6 SS5	BH5 SS3	BH1 SS2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-14	2017-03-14	2017-03-14
Parameter	**Unit**	**G / S**	**RDL**	**8264534**	**8264536**	**8264545**
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02
Xylene Mixture	ug/g	0.05	0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**				
4-Bromofluorobenzene	% Recovery	50-140		92	92	92
Toluene-d8	% Recovery	50-140		99	99	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

8264534-8264545 The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

Soil Analysis

RPT Date: Mar 29, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	8264536	8264536	<0.8	<0.8	NA	< 0.8	109%	70%	130%	101%	80%	120%	103%	70%	130%
Arsenic	8264536	8264536	<1	<1	NA	< 1	108%	70%	130%	101%	80%	120%	110%	70%	130%
Barium	8264536	8264536	41	40	2.5%	< 2	104%	70%	130%	98%	80%	120%	110%	70%	130%
Beryllium	8264536	8264536	<0.5	<0.5	NA	< 0.5	89%	70%	130%	101%	80%	120%	100%	70%	130%
Boron	8264536	8264536	<5	<5	NA	< 5	73%	70%	130%	104%	80%	120%	103%	70%	130%
Boron (Hot Water Soluble)	8270109		<0.10	<0.10	NA	< 0.10	104%	60%	140%	100%	70%	130%	94%	60%	140%
Cadmium	8264536	8264536	<0.5	<0.5	NA	< 0.5	102%	70%	130%	105%	80%	120%	114%	70%	130%
Chromium	8264536	8264536	8	8	NA	< 2	90%	70%	130%	100%	80%	120%	113%	70%	130%
Chromium VI	8257361		<0.2	<0.2	NA	< 0.2	96%	70%	130%	96%	80%	120%	95%	70%	130%
Cobalt	8264536	8264536	2.5	2.5	0.0%	< 0.5	98%	70%	130%	105%	80%	120%	105%	70%	130%
Copper	8264536	8264536	6	5	18.2%	< 1	94%	70%	130%	112%	80%	120%	104%	70%	130%
Cyanide	8262148		<0.040	<0.040	NA	< 0.040	106%	70%	130%	105%	80%	120%	107%	70%	130%
Electrical Conductivity	8264536	8264536	0.100	0.102	2.0%	< 0.005	94%	90%	110%	NA			NA		
Lead	8264536	8264536	2	2	NA	< 1	106%	70%	130%	101%	80%	120%	102%	70%	130%
Mercury	8264536	8264536	<0.10	<0.10	NA	< 0.10	98%	70%	130%	95%	80%	120%	83%	70%	130%
Molybdenum	8264536	8264536	<0.5	<0.5	NA	< 0.5	110%	70%	130%	103%	80%	120%	118%	70%	130%
Nickel	8264536	8264536	5	5	0.0%	< 1	98%	70%	130%	106%	80%	120%	105%	70%	130%
Selenium	8264536	8264536	<0.4	<0.4	NA	< 0.4	114%	70%	130%	100%	80%	120%	114%	70%	130%
Silver	8264536	8264536	<0.2	<0.2	NA	< 0.2	118%	70%	130%	115%	80%	120%	122%	70%	130%
Sodium Adsorption Ratio	8264536	8264536	0.133	0.131	1.5%	NA	NA			NA			NA		
Thallium	8264536	8264536	<0.4	<0.4	NA	< 0.4	102%	70%	130%	102%	80%	120%	106%	70%	130%
Uranium	8264536	8264536	<0.5	<0.5	NA	< 0.5	95%	70%	130%	94%	80%	120%	98%	70%	130%
Vanadium	8264536	8264536	16	15	6.5%	< 1	96%	70%	130%	99%	80%	120%	112%	70%	130%
Zinc	8264536	8264536	14	13	NA	< 5	100%	70%	130%	110%	80%	120%	113%	70%	130%
pH, 2:1 CaCl2 Extraction	8259663		9.79	9.77	0.2%	NA	100%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Amanjot Bhela

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

Trace Organics Analysis

RPT Date: Mar 29, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Soil)															
Acetone	8259671		< 0.50	< 0.50	NA	< 0.50	98%	50%	140%	86%	50%	140%	114%	50%	140%
Benzene	8259671		< 0.02	< 0.02	NA	< 0.02	105%	50%	140%	70%	60%	130%	85%	50%	140%
Bromodichloromethane	8259671		< 0.05	< 0.05	NA	< 0.05	126%	50%	140%	76%	60%	130%	91%	50%	140%
Bromoform	8259671		< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	104%	60%	130%	113%	50%	140%
Bromomethane	8259671		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	110%	50%	140%	90%	50%	140%
Carbon Tetrachloride	8259671		< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	82%	60%	130%	106%	50%	140%
Chlorobenzene	8259671		< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	114%	60%	130%	118%	50%	140%
Chloroform	8259671		< 0.04	< 0.04	NA	< 0.04	102%	50%	140%	73%	60%	130%	89%	50%	140%
Cis- 1,2-Dichloroethylene	8259671		< 0.02	< 0.02	NA	< 0.02	105%	50%	140%	72%	60%	130%	83%	50%	140%
Dibromochloromethane	8259671		< 0.05	< 0.05	NA	< 0.05	97%	50%	140%	103%	60%	130%	95%	50%	140%
1,3-Dichlorobenzene	8259671		< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	119%	60%	130%	115%	50%	140%
1,2-Dichlorobenzene	8259671		< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	115%	60%	130%	116%	50%	140%
1,4-Dichlorobenzene	8259671		< 0.05	< 0.05	NA	< 0.05	126%	50%	140%	119%	60%	130%	126%	50%	140%
Dichlorodifluoromethane	8259671		< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	81%	50%	140%	89%	50%	140%
1,1-Dichloroethane	8259671		< 0.02	< 0.02	NA	< 0.02	121%	50%	140%	97%	60%	130%	107%	50%	140%
1,2-Dichloroethane	8259671		< 0.03	< 0.03	NA	< 0.03	119%	50%	140%	93%	60%	130%	102%	50%	140%
1,1-Dichloroethylene	8259671		< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	94%	60%	130%	117%	50%	140%
1,2-Dichloropropane	8259671		< 0.03	< 0.03	NA	< 0.03	108%	50%	140%	118%	60%	130%	83%	50%	140%
1,3-Dichloropropene	8259671		< 0.04	< 0.04	NA	< 0.04	90%	50%	140%	92%	60%	130%	79%	50%	140%
Ethylbenzene	8259671		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	103%	60%	130%	109%	50%	140%
Ethylene Dibromide	8259671		< 0.04	< 0.04	NA	< 0.04	105%	50%	140%	102%	60%	130%	100%	50%	140%
Methyl Ethyl Ketone	8259671		< 0.50	< 0.50	NA	< 0.50	103%	50%	140%	70%	50%	140%	83%	50%	140%
Methyl Isobutyl Ketone	8259671		< 0.50	< 0.50	NA	< 0.50	76%	50%	140%	81%	50%	140%	87%	50%	140%
Methyl tert-butyl Ether	8259671		< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	81%	60%	130%	92%	50%	140%
Methylene Chloride	8259671		< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	79%	60%	130%	81%	50%	140%
Styrene	8259671		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	93%	60%	130%	103%	50%	140%
1,1,2,2-Tetrachloroethane	8259671		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	111%	60%	130%	107%	50%	140%
1,1,1,2-Tetrachloroethane	8259671		< 0.04	< 0.04	NA	< 0.04	116%	50%	140%	112%	60%	130%	111%	50%	140%
Tetrachloroethylene	8259671		< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	112%	60%	130%	120%	50%	140%
Toluene	8259671		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	105%	60%	130%	92%	50%	140%
Trans- 1,2-Dichloroethylene	8259671		< 0.05	< 0.05	NA	< 0.05	123%	50%	140%	89%	60%	130%	113%	50%	140%
1,1,1-Trichloroethane	8259671		< 0.05	< 0.05	NA	< 0.05	125%	50%	140%	86%	60%	130%	103%	50%	140%
1,1,2-Trichloroethane	8259671		< 0.04	< 0.04	NA	< 0.04	100%	50%	140%	112%	60%	130%	91%	50%	140%
Trichloroethylene	8259671		< 0.03	< 0.03	NA	< 0.03	121%	50%	140%	81%	60%	130%	100%	50%	140%
Trichlorofluoromethane	8259671		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	110%	50%	140%	114%	50%	140%
Vinyl Chloride	8259671		< 0.02	< 0.02	NA	< 0.02	82%	50%	140%	119%	50%	140%	95%	50%	140%
m & p-Xylene	8259671		< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	111%	60%	130%	118%	50%	140%
n-Hexane	8259671		< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	87%	60%	130%	128%	50%	140%
o-Xylene	8259671		< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	117%	60%	130%	118%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

Trace Organics Analysis (Continued)

RPT Date: Mar 29, 2017			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)															
F1 (C6 to C10)	8258069		< 5	< 5	NA	< 5	82%	60%	130%	106%	85%	115%	82%	70%	130%
F2 (C10 to C16)	8259889		< 10	< 10	NA	< 10	96%	60%	130%	81%	80%	120%	71%	70%	130%
F3 (C16 to C34)	8259889		< 50	< 50	NA	< 50	105%	60%	130%	85%	80%	120%	72%	70%	130%
F4 (C34 to C50)	8259889		< 50	< 50	NA	< 50	100%	60%	130%	103%	80%	120%	94%	70%	130%
O. Reg. 153(511) - PAHs (Soil)															
Acenaphthene	8259667		< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	112%	50%	140%	87%	50%	140%
Acenaphthylene	8259667		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	109%	50%	140%	78%	50%	140%
Anthracene	8259667		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	109%	50%	140%	82%	50%	140%
Benz(a)anthracene	8259667		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	64%	50%	140%	75%	50%	140%
Benzo(a)pyrene	8259667		< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	96%	50%	140%	98%	50%	140%
Benzo(b)fluoranthene	8259667		< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	94%	50%	140%	95%	50%	140%
Benzo(g,h,i)perylene	8259667		< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	86%	50%	140%	90%	50%	140%
Benzo(k)fluoranthene	8259667		< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	99%	50%	140%	109%	50%	140%
Chrysene	8259667		< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	70%	50%	140%	81%	50%	140%
Dibenz(a,h)anthracene	8259667		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	85%	50%	140%	99%	50%	140%
Fluoranthene	8259667		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	92%	50%	140%	87%	50%	140%
Fluorene	8259667		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	110%	50%	140%	79%	50%	140%
Indeno(1,2,3-cd)pyrene	8259667		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	81%	50%	140%	85%	50%	140%
Naphthalene	8259667		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	110%	50%	140%	123%	50%	140%
Phenanthrene	8259667		< 0.05	< 0.05	NA	< 0.05	97%	50%	140%	103%	50%	140%	97%	50%	140%
Pyrene	8259667		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	92%	50%	140%	87%	50%	140%
2-and 1-methyl Naphthalene	8259667		< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	129%	50%	140%	112%	50%	140%
O. Reg. 153(511) - OC Pesticides (Soil)															
Aldrin	8267227		< 0.005	< 0.005	NA	< 0.005	109%	50%	140%	94%	50%	140%	68%	50%	140%
Chlordane	8267227		< 0.007	< 0.007	NA	< 0.007	87%	50%	140%	91%	50%	140%	78%	50%	140%
DDD	8267227		< 0.007	< 0.007	NA	< 0.007	94%	50%	140%	94%	50%	140%	84%	50%	140%
DDE	8267227		< 0.007	< 0.007	NA	< 0.007	88%	50%	140%	98%	50%	140%	78%	50%	140%
DDT	8267227		< 0.007	< 0.007	NA	< 0.007	88%	50%	140%	87%	50%	140%	78%	50%	140%
Dieldrin	8267227		< 0.005	< 0.005	NA	< 0.005	84%	50%	140%	90%	50%	140%	80%	50%	140%
Endosulfan	8267227		< 0.005	< 0.005	NA	< 0.005	89%	50%	140%	88%	50%	140%	69%	50%	140%
Endrin	8267227		< 0.005	< 0.005	NA	< 0.005	84%	50%	140%	76%	50%	140%	82%	50%	140%
Gamma-Hexachlorocyclohexane	8267227		< 0.005	< 0.005	NA	< 0.005	92%	50%	140%	78%	50%	140%	66%	50%	140%
Heptachlor	8267227		< 0.005	< 0.005	NA	< 0.005	80%	50%	140%	90%	50%	140%	80%	50%	140%
Heptachlor Epoxide	8267227		< 0.005	< 0.005	NA	< 0.005	90%	50%	140%	96%	50%	140%	82%	50%	140%
Hexachlorobenzene	8267227		< 0.005	< 0.005	NA	< 0.005	92%	50%	140%	100%	50%	140%	92%	50%	140%
Hexachlorobutadiene	8267227		< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	100%	50%	140%	68%	50%	140%
Hexachloroethane	8267227		< 0.01	< 0.01	NA	< 0.01	82%	50%	140%	96%	50%	140%	64%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

Trace Organics Analysis (Continued)

RPT Date: Mar 29, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Methoxychlor	8267227		< 0.005	< 0.005	NA	< 0.005	76%	50%	140%	82%	50%	140%	96%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popowich

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Aldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Chlordane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDD	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDE	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDT	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Dieldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endosulfan	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Gamma-Hexachlorocyclohexane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor Epoxide	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobenzene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobutadiene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachloroethane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Methoxychlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
TCMX	ORG-91-5112	EPA SW-846 3541,3620 & 8081	GC/ECD
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Moisture Content	ORG-91-5106	EPA SW-846 3541 & 8270	BALANCE
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	CCME Tier 1 Method	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T197704

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:R. Mcfadden

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905 712.5122
webearth agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #: 17T197704

Cooler Quantity: Med

Arrival Temperatures: 4.5 4.8 4.2 3.7 3.4 3.1

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company: Peto MacCallum Ltd.
Contact: Geoff White
Address: 14 Churchill Dr. Barrie ON
Phone: 705 734 3900 Fax: 705 734 9911
Reports to be sent to:
1. Email: gw mcfadden@petomaccallum.com
2. Email: rblair@petomaccallum.com

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☒ Regulation 153/04 — Table ___ (Indicate One)
☒ Ind/Com ☒ Res/Park ☐ Agriculture
Soil Texture (Check One): ☒ Coarse ☐ Fine
Region: ___ (Indicate One)

☐ Sewer Use ☐ Sanitary ☐ Storm

☐ Regulation 558 ☐ CCME ☐ Prov. Water Quality Objectives (PWQO) ☐ Other
___ (Indicate One)

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply): ___

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 17BF005
Site Location: Lockhart
Sampled By: R. McFadden
AGAT Quote #: ___ PO: ___
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition? ☐ Yes ☒ No

Report Guideline on Certificate of Analysis ☒ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Please Circle) Y / N	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr6+ ☐EC ☐FOC ☐NO3/NO2 ☐Tota N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH3 ☐TKN ☐NO3 ☐NO2 ☐NO3/NO2	Volatiles: ☒VOC ☒BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH6 SS5	Mar 14		5	S			X						X	X		X					
BH5 SS3	↓		↓	↓			↓						↓	↓		↓					
BH1 SS2	↓		↓	↓			↓						↓	↓		↓					

Samples Relinquished By (Print Name and Sign): Kimberley Dow
Date: Mar 20 2017/3/20 Time: 9:00 4:59

Samples Received By (Print Name and Sign): Kar
Date: 2017/3/20 Time: 11:46

Page 1 of 1
No: T030034

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #:

Cooler Quantity: Nil

Arrival Temperatures:

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: [illegible]

Contact: [illegible]

Address: [illegible]

Phone: [illegible] Fax: [illegible]

Reports to be sent to:

1. Email: [illegible]
2. Email: [illegible]

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04

Table (Indicate One) ☐ Ind/Comm ☐ Res/Park ☐ Agriculture

Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use ☐ Sanitary ☐ Storm

Region (Indicate One)

☐ Regulation 558

☐ CCME

☐ Prov. Water Quality Objectives (PWQO)

☐ Other (Indicate One)

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: [illegible]

Site Location: [illegible]

Sampled By: [illegible]

AGAT Quote #: 130685 PO:

Please note: if quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special instructions	Field Filtered - Metals, Hg, CrVI (Please Circle) Y / N	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	(Check Applicable) ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_2 ☐ NO_3 ☐ NO_2/NO_3	Volatiles: ☑ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	OC Pesticides					
BHL 555	May 11		3	S			X						X	X		X						X					
BHS 552	1		1	1			1						1	1		1						X					
BHL 552	1		1	1			1						1	1		1						X					

Samples Relinquished By (Print Name and Sign): [illegible]	Date: May 11	Time: 1600	Samples Received By (Print Name and Sign): [illegible]	Date: 2011/05/12	Time: 11:40
Samples Relinquished By (Print Name and Sign): [illegible]	Date: 2011/05/12	Time:	Samples Received By (Print Name and Sign):	Date:	Time:
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:

Page ____ of ____

N°: T 030034

APPENDIX D

Certificates of Analysis for Water

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PETO MACCALLUM
19 CHURCHILL DRIVE
BARRIE, ON L4N8Z5
(705) 734-3900

ATTENTION TO: Geoff White

PROJECT: 17BF005

AGAT WORK ORDER: 17T200385

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: Apr 04, 2017

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PAHs (Water)

DATE RECEIVED: 2017-03-28

DATE REPORTED: 2017-04-04

		SAMPLE DESCRIPTION:		BH10	BH3
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2017-03-28	2017-03-28
Parameter	Unit	G / S	RDL	8283381	8283397
Acenaphthene	µg/L	4.1	0.20	<0.20	<0.20
Acenaphthylene	µg/L	1	0.20	<0.20	<0.20
Anthracene	µg/L	0.1	0.10	<0.10	<0.10
Benz(a)anthracene	µg/L	0.2	0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.01	0.01	<0.01	<0.01
Benzo(b)fluoranthene	µg/L	0.1	0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.2	0.20	<0.20	<0.20
Benzo(k)fluoranthene	µg/L	0.1	0.10	<0.10	<0.10
Chrysene	µg/L	0.1	0.10	<0.10	<0.10
Dibenz(a,h)anthracene	µg/L	0.2	0.20	<0.20	<0.20
Fluoranthene	µg/L	0.4	0.20	<0.20	<0.20
Fluorene	µg/L	120	0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	µg/L	0.2	0.20	<0.20	<0.20
Naphthalene	µg/L	7	0.20	0.65	<0.20
Phenanthrene	µg/L	0.1	0.10	<0.10	<0.10
Pyrene	µg/L	0.2	0.20	<0.20	<0.20
2-and 1-methyl Naphthalene	µg/L	2	0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**			
Chrysene-d12	%	50-140		61	63

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses

8283381-8283397 Note: The result for Benzo(b)Flouranthene is the total of the Benzo(b)&(j)Flouranthene isomers because the isomers co-elute on the GC column.

Certified By: N Popnikolov

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Water)

DATE RECEIVED: 2017-03-28

DATE REPORTED: 2017-04-04

		SAMPLE DESCRIPTION:		BH10	BH3
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2017-03-28	2017-03-28
Parameter	Unit	G / S	RDL	8283381	8283397
F1 (C6 to C10)	µg/L	420	25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	420	25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100
F2 (C10 to C16) minus Naphthalene	µg/L		100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100
F3 (C16 to C34) minus PAHs	µg/L		100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA
Surrogate	**Unit**	**Acceptable Limits**			
Terphenyl	%	60-140		123	102

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses

8283381-8283397 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: N Popowich

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2017-03-28

DATE REPORTED: 2017-04-04

		SAMPLE DESCRIPTION:		BH10	BH3
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2017-03-28	2017-03-28
Parameter	Unit	G / S	RDL	8283381	8283397
Acetone	µg/L	2700	1.0	<1.0	<1.0
Benzene	µg/L	0.5	0.20	<0.20	0.37
Bromodichloromethane	µg/L	2	0.20	<0.20	<0.20
Bromoform	µg/L	5	0.10	<0.10	<0.10
Bromomethane	µg/L	0.89	0.20	<0.20	<0.20
Carbon Tetrachloride	µg/L	0.2	0.20	<0.20	<0.20
Chlorobenzene	µg/L	0.5	0.10	<0.10	<0.10
Chloroform	µg/L	2	0.20	<0.20	<0.20
Dibromochloromethane	µg/L	2	0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	0.5	0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	0.5	0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	0.5	0.10	<0.10	<0.10
Dichlorodifluoromethane	µg/L	590	0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	0.5	0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	0.5	0.30	<0.30	<0.30
1,1-Dichloroethylene	µg/L	0.5	0.30	<0.30	<0.30
1,2-Dichloropropane	µg/L	0.5	0.20	<0.20	<0.20
1,3-Dichloropropene	µg/L	0.5	0.30	<0.30	<0.30
Ethylbenzene	µg/L	0.5	0.10	<0.10	0.44
Ethylene Dibromide	µg/L	0.2	0.10	<0.10	<0.10
Methyl Ethyl Ketone	µg/L	400	1.0	<1.0	<1.0
Methyl Isobutyl Ketone	µg/L	640	1.0	<1.0	<1.0
Methyl tert-butyl ether	µg/L	15	0.20	<0.20	<0.20
Methylene Chloride	µg/L	5	0.30	<0.30	<0.30
Styrene	µg/L	0.5	0.10	<0.10	<0.10
1,1,1,2-Tetrachloroethane	µg/L	1.1	0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	0.5	0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	0.5	0.20	<0.20	<0.20
Toluene	µg/L	0.8	0.20	0.28	**1.7**
1,1,2-Trichloroethane	µg/L	0.5	0.20	<0.20	<0.20

Certified By: N Popnikolov

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2017-03-28

DATE REPORTED: 2017-04-04

		SAMPLE DESCRIPTION:		BH10	BH3
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2017-03-28	2017-03-28
Parameter	Unit	G / S	RDL	8283381	8283397
1,1,1-Trichloroethane	µg/L	0.5	0.30	<0.30	<0.30
Trichloroethylene	µg/L	0.5	0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	150	0.40	<0.40	<0.40
Vinyl Chloride	µg/L	0.5	0.17	<0.17	<0.17
Xylene Mixture	µg/L	72	0.20	<0.20	0.51
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
m & p-Xylene	µg/L		0.20	<0.20	0.40
n-Hexane	µg/L	5	0.20	<0.20	<0.20
o-Xylene	µg/L		0.10	<0.10	0.11
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**			
4-Bromofluorobenzene	% Recovery	50-140		85	83
Toluene-d8	% Recovery	50-140		92	107

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses

Certified By: N Popovkof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2017-03-28

DATE REPORTED: 2017-04-04

		SAMPLE DESCRIPTION:		BH10		BH3
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2017-03-28		2017-03-28
Parameter	Unit	G / S	RDL	8283381	RDL	8283397
Antimony	µg/L	1.5	1.0	<1.0	1.0	<1.0
Arsenic	µg/L	13	1.0	<1.0	1.0	<1.0
Barium	µg/L	610	2.0	35.2	2.0	82.3
Beryllium	µg/L	0.5	0.5	<0.5	0.5	<0.5
Boron	µg/L	1700	10.0	25.5	10.0	229
Cadmium	µg/L	0.5	0.2	<0.2	0.2	<0.2
Chloride	µg/L	790000	200	30000	100	12700
Chromium	µg/L	11	2.0	3.3	2.0	<2.0
Chromium VI	µg/L	25	5	<5	5	<5
Cobalt	µg/L	3.8	0.5	<0.5	0.5	<0.5
Copper	µg/L	5	1.0	<1.0	1.0	<1.0
Cyanide	µg/L	5	2	<2	2	<2
Electrical Conductivity	uS/cm		2	675	2	469
Lead	µg/L	1.9	0.5	<0.5	0.5	<0.5
Mercury	µg/L	0.1	0.02	<0.02	0.02	<0.02
Molybdenum	µg/L	23	0.5	1.1	0.5	**37.7**
Nickel	µg/L	14	1.0	1.7	1.0	1.6
Selenium	µg/L	5	1.0	1.0	1.0	<1.0
Silver	µg/L	0.3	0.2	<0.2	0.2	<0.2
Sodium	µg/L	490000	500	4760	500	9150
Thallium	µg/L	0.5	0.3	<0.3	0.3	<0.3
Uranium	µg/L	8.9	0.5	<0.5	0.5	4.0
Vanadium	µg/L	3.9	0.4	1.4	0.4	1.0
Zinc	µg/L	160	5.0	<5.0	5.0	6.8
pH	pH Units		NA	8.15	NA	8.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses

8283397 Please note that the analytical result for Molybdenum has been confirmed by re-analysis.

Certified By: Sofya Pehlyova

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Guideline Violation

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

CLIENT NAME: PETO MACCALLUM

ATTENTION TO: Geoff White

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
8283397	BH3	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Molybdenum	µg/L	23	37.7
8283397	BH3	ON T1 GW	O. Reg. 153(511) - VOCs (Water)	Toluene	µg/L	0.8	1.7

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Apr 04, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Water)															
F1 (C6 to C10)	8285086		< 25	< 25	NA	< 25	80%	60%	140%	88%	60%	140%	95%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	103%	60%	140%	63%	60%	140%	62%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	102%	60%	140%	73%	60%	140%	78%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	88%	60%	140%	102%	60%	140%	93%	60%	140%
O. Reg. 153(511) - VOCs (Water)															
Acetone	8273671		< 1.0	< 1.0	NA	< 1.0	103%	50%	140%	102%	50%	140%	91%	50%	140%
Benzene	8273671		< 0.20	< 0.20	NA	< 0.20	100%	50%	140%	113%	60%	130%	84%	50%	140%
Bromodichloromethane	8273671		< 0.20	< 0.20	NA	< 0.20	108%	50%	140%	101%	60%	130%	89%	50%	140%
Bromoform	8273671		< 0.10	< 0.10	NA	< 0.10	108%	50%	140%	107%	60%	130%	85%	50%	140%
Bromomethane	8273671		< 0.20	< 0.20	NA	< 0.20	73%	50%	140%	86%	50%	140%	117%	50%	140%
Carbon Tetrachloride	8273671		< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	105%	60%	130%	90%	50%	140%
Chlorobenzene	8273671		< 0.10	< 0.10	NA	< 0.10	76%	50%	140%	86%	60%	130%	77%	50%	140%
Chloroform	8273671		< 0.20	< 0.20	NA	< 0.20	115%	50%	140%	114%	60%	130%	96%	50%	140%
Dibromochloromethane	8273671		< 0.10	< 0.10	NA	< 0.10	118%	50%	140%	109%	60%	130%	86%	50%	140%
1,4-Dichlorobenzene	8273671		< 0.10	< 0.10	NA	< 0.10	94%	50%	140%	99%	60%	130%	83%	50%	140%
1,2-Dichlorobenzene	8273671		< 0.10	< 0.10	NA	< 0.10	86%	50%	140%	104%	60%	130%	92%	50%	140%
1,3-Dichlorobenzene	8273671		< 0.10	< 0.10	NA	< 0.10	81%	50%	140%	102%	60%	130%	86%	50%	140%
Dichlorodifluoromethane	8273671		< 0.20	< 0.20	NA	< 0.20	72%	50%	140%	113%	50%	140%	80%	50%	140%
1,2-Dichloroethane	8273671		< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	104%	60%	130%	78%	50%	140%
1,1-Dichloroethane	8273671		< 0.30	< 0.30	NA	< 0.30	118%	50%	140%	112%	60%	130%	82%	50%	140%
1,1-Dichloroethylene	8273671		< 0.30	< 0.30	NA	< 0.30	116%	50%	140%	103%	60%	130%	89%	50%	140%
1,2-Dichloropropane	8273671		< 0.20	< 0.20	NA	< 0.20	100%	50%	140%	87%	60%	130%	92%	50%	140%
1,3-Dichloropropene	8273671		< 0.30	< 0.30	NA	< 0.30	105%	50%	140%	83%	60%	130%	80%	50%	140%
Ethylbenzene	8273671		< 0.10	< 0.10	NA	< 0.10	88%	50%	140%	111%	60%	130%	93%	50%	140%
Ethylene Dibromide	8273671		< 0.10	< 0.10	NA	< 0.10	112%	50%	140%	100%	60%	130%	71%	50%	140%
Methyl Ethyl Ketone	8273671		< 1.0	< 1.0	NA	< 1.0	84%	50%	140%	102%	50%	140%	103%	50%	140%
Methyl Isobutyl Ketone	8273671		< 1.0	< 1.0	NA	< 1.0	104%	50%	140%	89%	50%	140%	75%	50%	140%
Methyl tert-butyl ether	8273671		< 0.20	< 0.20	NA	< 0.20	112%	50%	140%	95%	60%	130%	80%	50%	140%
Methylene Chloride	8273671		< 0.30	< 0.30	NA	< 0.30	88%	50%	140%	102%	60%	130%	87%	50%	140%
Styrene	8273671		< 0.10	< 0.10	NA	< 0.10	101%	50%	140%	113%	60%	130%	95%	50%	140%
1,1,1,2-Tetrachloroethane	8273671		< 0.10	< 0.10	NA	< 0.10	113%	50%	140%	104%	60%	130%	81%	50%	140%
1,1,2,2-Tetrachloroethane	8273671		< 0.10	< 0.10	NA	< 0.10	118%	50%	140%	95%	60%	130%	81%	50%	140%
Tetrachloroethylene	8273671		< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	107%	60%	130%	80%	50%	140%
Toluene	8273671		< 0.20	< 0.20	NA	< 0.20	91%	50%	140%	116%	60%	130%	85%	50%	140%
1,1,2-Trichloroethane	8273671		< 0.20	< 0.20	NA	< 0.20	100%	50%	140%	96%	60%	130%	87%	50%	140%
1,1,1-Trichloroethane	8273671		< 0.30	< 0.30	NA	< 0.30	106%	50%	140%	119%	60%	130%	86%	50%	140%
Trichloroethylene	8273671		< 0.20	< 0.20	NA	< 0.20	97%	50%	140%	93%	60%	130%	70%	50%	140%
Trichlorofluoromethane	8273671		< 0.40	< 0.40	NA	< 0.40	74%	50%	140%	112%	50%	140%	110%	50%	140%
Vinyl Chloride	8273671		< 0.17	< 0.17	NA	< 0.17	84%	50%	140%	113%	50%	140%	109%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Apr 04, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
cis- 1,2-Dichloroethylene	8273671		< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	95%	60%	130%	82%	50%	140%
m & p-Xylene	8273671		< 0.20	< 0.20	NA	< 0.20	100%	50%	140%	120%	60%	130%	107%	50%	140%
n-Hexane	8273671		< 0.20	< 0.20	NA	< 0.20	80%	50%	140%	95%	60%	130%	109%	50%	140%
o-Xylene	8273671		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	107%	60%	130%	92%	50%	140%
trans- 1,2-Dichloroethylene	8273671		< 0.20	< 0.20	NA	< 0.20	85%	50%	140%	98%	60%	130%	85%	50%	140%
O. Reg. 153(511) - PAHs (Water)															
Acenaphthene	8283534		< 0.20	< 0.20	NA	< 0.20	112%	50%	140%	111%	50%	140%	113%	50%	140%
Acenaphthylene	8283534		< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	109%	50%	140%	114%	50%	140%
Anthracene	8283534		< 0.10	< 0.10	NA	< 0.10	101%	50%	140%	99%	50%	140%	103%	50%	140%
Benz(a)anthracene	8283534		< 0.20	< 0.20	NA	< 0.20	74%	50%	140%	86%	50%	140%	73%	50%	140%
Benzo(a)pyrene	8283534		< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	97%	50%	140%	112%	50%	140%
Benzo(b)fluoranthene	8283534		< 0.10	< 0.10	NA	< 0.10	98%	50%	140%	99%	50%	140%	105%	50%	140%
Benzo(g,h,i)perylene	8283534		< 0.20	< 0.20	NA	< 0.20	92%	50%	140%	98%	50%	140%	93%	50%	140%
Benzo(k)fluoranthene	8283534		< 0.10	< 0.10	NA	< 0.10	120%	50%	140%	111%	50%	140%	116%	50%	140%
Chrysene	8283534		< 0.10	< 0.10	NA	< 0.10	85%	50%	140%	95%	50%	140%	77%	50%	140%
Dibenz(a,h)anthracene	8283534		< 0.20	< 0.20	NA	< 0.20	80%	50%	140%	85%	50%	140%	83%	50%	140%
Fluoranthene	8283534		< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	105%	50%	140%	102%	50%	140%
Fluorene	8283534		< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	105%	50%	140%	110%	50%	140%
Indeno(1,2,3-cd)pyrene	8283534		< 0.20	< 0.20	NA	< 0.20	83%	50%	140%	85%	50%	140%	127%	50%	140%
Naphthalene	8283534		< 0.20	< 0.20	NA	< 0.20	112%	50%	140%	113%	50%	140%	127%	50%	140%
Phenanthrene	8283534		< 0.10	< 0.10	NA	< 0.10	106%	50%	140%	108%	50%	140%	109%	50%	140%
Pyrene	8283534		< 0.20	< 0.20	NA	< 0.20	97%	50%	140%	103%	50%	140%	99%	50%	140%
2-and 1-methyl Naphthalene	8283534		< 0.20	< 0.20	NA	< 0.20	134%	50%	140%	91%	50%	140%	104%	50%	140%

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.
When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popovkof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Apr 04, 2017			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Antimony	8285290		<1.0	<1.0	NA	< 1.0	103%	70%	130%	100%	80%	120%	99%	70%	130%
Arsenic	8285290		1.4	1.3	NA	< 1.0	100%	70%	130%	98%	80%	120%	99%	70%	130%
Barium	8285290		30.6	30.0	2.0%	< 2.0	102%	70%	130%	100%	80%	120%	96%	70%	130%
Beryllium	8285290		<0.5	<0.5	NA	< 0.5	100%	70%	130%	95%	80%	120%	103%	70%	130%
Boron	8285290		68.8	72.8	5.6%	< 10.0	105%	70%	130%	100%	80%	120%	103%	70%	130%
Cadmium	8285290		<0.2	<0.2	NA	< 0.2	103%	70%	130%	105%	80%	120%	104%	70%	130%
Chloride	8286912		467000	447000	4.4%	< 100	102%	70%	130%	101%	70%	130%	106%	70%	130%
Chromium	8285290		3.9	4.1	NA	< 2.0	105%	70%	130%	105%	80%	120%	101%	70%	130%
Chromium VI	8283381	8283381	<5	<5	NA	< 5	101%	70%	130%	103%	80%	120%	102%	70%	130%
Cobalt	8285290		<0.5	<0.5	NA	< 0.5	99%	70%	130%	105%	80%	120%	101%	70%	130%
Copper	8285290		4.3	4.6	NA	< 1.0	109%	70%	130%	107%	80%	120%	101%	70%	130%
Cyanide	8282792		<2	<2	NA	< 2	100%	70%	130%	104%	80%	120%	87%	70%	130%
Electrical Conductivity	8283381	8283381	675	676	0.1%	< 2	104%	90%	110%	NA			NA		
Lead	8285290		<0.5	<0.5	NA	< 0.5	101%	70%	130%	100%	80%	120%	100%	70%	130%
Mercury	8283381	8283381	< 0.02	< 0.02	NA	< 0.02	97%	70%	130%	95%	80%	120%	93%	70%	130%
Molybdenum	8285290		11.2	11.4	1.8%	< 0.5	101%	70%	130%	102%	80%	120%	99%	70%	130%
Nickel	8285290		4.2	3.9	NA	< 1.0	104%	70%	130%	105%	80%	120%	101%	70%	130%
Selenium	8285290		1.1	<1.0	NA	< 1.0	101%	70%	130%	101%	80%	120%	102%	70%	130%
Silver	8285290		<0.2	<0.2	NA	< 0.2	107%	70%	130%	109%	80%	120%	116%	70%	130%
Sodium	8282971		61900	61300	1.0%	< 500	97%	70%	130%	97%	80%	120%	96%	70%	130%
Thallium	8285290		<0.3	<0.3	NA	< 0.3	107%	70%	130%	109%	80%	120%	105%	70%	130%
Uranium	8285290		4.6	4.5	2.2%	< 0.5	102%	70%	130%	102%	80%	120%	102%	70%	130%
Vanadium	8285290		1.7	1.7	NA	< 0.4	99%	70%	130%	101%	80%	120%	97%	70%	130%
Zinc	8285290		8.5	9.0	NA	< 5.0	105%	70%	130%	110%	80%	120%	113%	70%	130%
pH	8283381	8283381	8.15	8.07	1.0%	NA	100%	90%	110%	NA			NA		

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL

Certified By: Sofia Pehlyova

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Acenaphthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Acenaphthylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Chrysene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Chrysene-d12	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Fluorene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Phenanthrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
F1 (C6 to C10)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC E3421	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5010	MOE PHC E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC E3421	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5010	MOE PHC E3421	GC/FID
F4 (C34 to C50)	VOL -91- 5010	MOE PHC- E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PETO MACCALLUM

AGAT WORK ORDER: 17T200385

PROJECT: 17BF005

ATTENTION TO: Geoff White

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Water Analysis			
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cyanide	INOR-93-6052	MOE METHOD CN- 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only
Work Order #: 17T200385
Cooler Quantity:
Arrival Temperatures: 7.6 19.8 19.9 / 8.3 18.4 17.6
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Report Information:
Company: Peto MacCallum Ltd.
Contact: Geoff White
Address: 19 Churchill Dr Barrie ON
Phone: 705 734 3900 Fax: 705 734 9911
Reports to be sent to:
1. Email: akimberley@petomaccallum.com
2. Email: rblair@petomaccallum.com

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)
☒ Regulation 153/04 — Table (Indicate One) ☒ Ind/Com ☒ Res/Park ☐ Agriculture
Soil Texture (Check One): ☒ Coarse ☐ Fine
☐ Sewer Use — ☐ Sanitary ☐ Storm
Region: ____ (Indicate One)
☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ____ (Indicate One)

Turnaround Time (TAT) Required:
Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply): ____
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: 16 17Bfo05
Site Location: Lockhart
Sampled By: A. Kimberley / K. Stare
AGAT Quote #: ____ PO: ____
Please note: If quotation number is not provided, client will be billed full price for analysis

Is this submission for a Record of Site Condition? ☐ Yes ☒ No
Report Guideline on Certificate of Analysis: ☒ Yes ☐ No

Invoice Information: Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals)	ORPs: ☐ B-HWS ☐ Cr ☐ CN ☐ Cr6+ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH3 ☐ TKN ☐ NO3 ☐ NO2 ☐ NO2+NO3	Volatiles: ☒ VOC ☒ BTEX ☒ THM	CCME Fractions 1 to 4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use
BH 10	Mar 28	10:30		GW	Limited sample	Y	X					X X	X		X				
BH 3	" "	12:00		GW	" "	Y	X					X X	X		X				

Relinquished By (Print Name and Sign): A. Kimberley — Mar 28 — 12:30
Received By (Print Name and Sign): [signature] — 28/3/17 — 1:00
Relinquished By (Print Name and Sign): [signature] — 28/3/17 — 5:40
Samples Received By (Print Name and Sign): [signature]

Page 1 of 1
No. T 047788

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT — Date Issued: September 20, 2016

APPENDIX E

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.