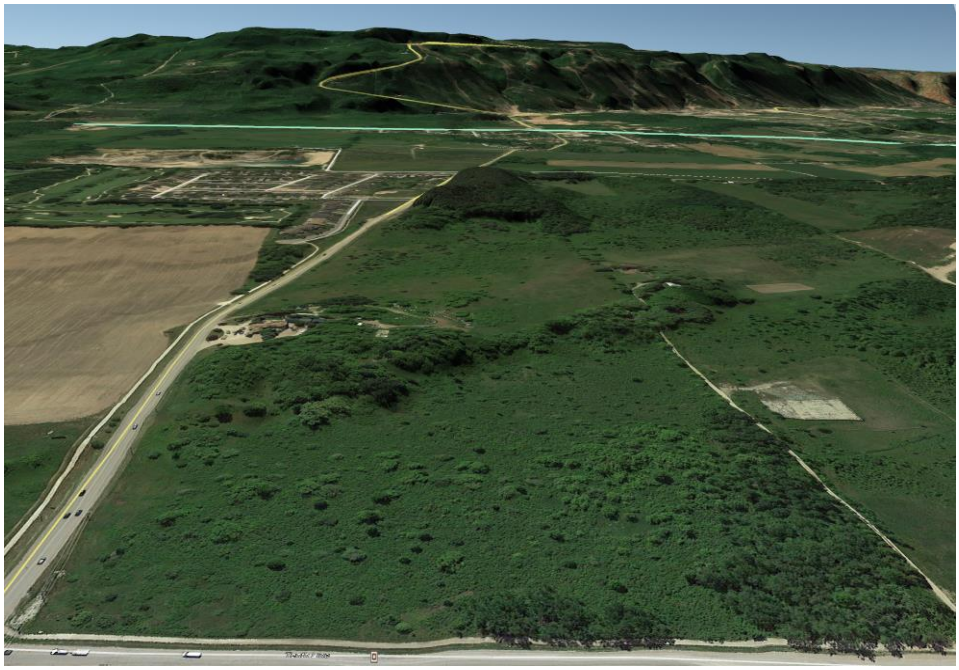
Peto MacCallum Ltd.
CONSULTING ENGINEERS

GEOTECHNICAL INVESTIGATION
PROPOSED PANORAMA NORTH RESIDENTIAL DEVELOPMENT
295 MOUNTAIN ROAD
COLLINGWOOD, ONTARIO
FOR
TED NORTH (295 MOUNTAIN ROAD) LTD.
c/o TATHAM ENGINEERING LIMITED



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PML Ref.: 17CF022
Report: 3
February 2020

Peto MacCallum Ltd.
CONSULTING ENGINEERS

February 28, 2020

PML Ref.: 17CF022
Report: 3

Ted North (295 Mountain Road) Ltd.
c/o Mr. Allan Brownridge, P.Eng.
Tatham Engineering Limited
115 Sandford Fleming Drive
Suite 200
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Dear Mr. Brownridge

Geotechnical Investigation
Proposed Panorama North Residential Development
295 Mountain Road
Collingwood, Ontario

Peto MacCallum Ltd. (PML) is pleased to present the results of the geotechnical investigation recently completed at the above noted project site. Authorization for the original work was provided by Mr. A. Brownridge of Tatham Engineering Limited (Tatham) on behalf of the Client, in an email dated October 24, 2017, with authorization for updating the report provided by Mr. P. Graham in an email dated February 12, 2020.

The Panorama North residential development is proposed on the approximate 20.1 ha property located at 295 Mountain Road in Collingwood. The current concept plan shows that the development will comprise a mix of residential units. Full depth basements are proposed. The development will be fully serviced beneath a network of roads, with storm and sanitary sewers and watermain services assumed to have inverts of 2 to 3 m below existing grade. A Storm Water Management (SWM) Pond will be incorporated in the northeast corner of the development. Site grading has not been finalized. The current site concept plan is shown on Drawing 3-1, appended.

Reference is made to Report 1, dated November 19, 2018 for the original geotechnical investigation results and geotechnical engineering recommendations for the site and Report 2, dated June 7, 2019 for results of chemical testing for arsenic on soil samples from the site.

Since the time of the original geotechnical report, additional ground water level monitoring has been carried out by PML.

This Report 3 incorporates and supersedes the two previous reports and also incorporates the ground water level monitoring data. Lastly, this report has been adjusted as required to address comments received from the review from the draft plan submission.

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

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

INVESTIGATION PROCEDURES

Boreholes 101 to 105 and 107 to 110 were advanced across the site for this investigation and were carried out during November 22 to 24, 2017 to depths of 6.2 to 6.6 m. Boreholes locations are shown on the Borehole Location Plan, Drawing 3-1, appended. Borehole 106 was not drilled as there was no cleared access to the proposed location.

Co-ordination of clearances of underground utilities was provided by PML. The locations of the boreholes were established in the field by PML based on access and site coverage. Boreholes were drilled cognizant of underground utilities.

The boreholes were advanced using continuous flight hollow stem augers, powered by a rubber track mounted D-120 drill rig, equipped with an automatic hammer, supplied and operated by a specialist drilling contractor working under the full-time supervision of a member of PML's engineering staff.

Representative samples of the overburden in the boreholes 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 substrata. The ground water conditions in the boreholes were assessed during drilling by visual examination of the soil samples, the sampler, and drill rods as the samples were retrieved, and measurement of the water level in the open boreholes, if any.

Monitoring wells comprising 50 mm diameter pipe with 1.5 m long screens, filter sand, bentonite seal and above grade protective covers were installed in five of the boreholes to permit ground water level monitoring. Boreholes without wells were backfilled in accordance with O.Reg. 903. It should be noted that the wells become the property of the Owner and will have to be decommissioned by the Owner when no longer required. PML would be pleased to assist in this regard.

Ground water levels were initially measured in the wells on November 27, and December 19, 2017. A six-month ground water level monitoring program was subsequently requested from December 2018 to June 2019. Data loggers were installed in the five wells. The loggers were downloaded and manual ground water levels were taken twice over the six-month period to check the data recorded on the data loggers.

Ground surface elevations of the boreholes were provided by Tatham.

All recovered soil samples were returned to our laboratory for moisture content determinations and detailed examination to confirm field classification. Grain size analyses were carried out on six samples of the major soil units, the results are presented on Figures 3-1 to 3-6, appended. Atterberg Limits testing was completed on all six of these samples.

Subsequent to the geotechnical investigation, two separate site visits were carried out to conduct hand dug test pits to collect soil samples for arsenic testing. Details of the work are provided in Report 2 in Appendix B, with a brief description later in this report.

SITE DESCRIPTION AND SUMMARIZED SUBSURFACE CONDITIONS

The approximately 20.1 ha undeveloped property is located in the northwest quadrant of the Mountain Road and Tenth Line intersection in Collingwood. Based on the topographic plan provided by Tatham, the site is relatively flat for the western two thirds of the site, gently sloping downward about 1 to 2 m from the west at Borehole 101 towards the approximate centre part of the site at Borehole 105, before dropping steeply for about 5 m. After the steep slope a gentle slope continues downward about 1 m within the eastern third of the site towards Tenth Line.

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 (N Values, blows per 300 mm penetration of the split spoon sampler), ground water observations, monitoring well installation details, and the results of laboratory moisture content determinations and Atterberg Limits testing.

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 should be retained to assist in determining geologic boundaries in the field during construction, if required.

The stratigraphy encountered in the boreholes consisted typically of a topsoil mantle over granular deposits of native sand, silt, sand and silt/silty fine sand/sandy silt and sand and silt till, with a local sandy gravel layer.

Topsoil

A 100 to 250 mm layer of topsoil was found at the surface of eight of nine boreholes.

Sand

A native sand layer was encountered below the topsoil in Boreholes 102 to 104 and 109, extending to 0.6 to 2.9 m depth (elevation 191.15 to 195.7). The material was very loose to compact (N Values of 3 to 17). Moisture contents ranged from 13 to 23% with the material being moist to wet.

Silt

A major silt layer dominated the western portion of the site (Boreholes 101 to 104) and was also encountered in Borehole 107 in the eastern part of the site. The material was found below the topsoil or sand, and was penetrated at 0.8 to 5.2 m depth (elevation 189.6 to 194.1) in Boreholes 101, 103, 104 and 107 and continued to the 6.2 m depth of exploration in Borehole 102. The layer graded from silt with some sand and trace clay to gravelly sandy silt with trace clay. Cobbles were noted locally. Four samples of the material were submitted for grain size analyses and the results are presented on Figures 3-1 to 3-4, appended. Atterberg Limits testing showed the unit to be non-plastic in one occurrence, with a plasticity index of 4 to 7% in the other the samples (plastic limits of 12 to 14% with liquid limits of 16 to 20%). The material was generally compact to very dense (N Values of 11 to greater than 50) and was moist to very moist with a water content of 6 to 18%.

Silty Fine Sand/Sand and Silt/Sandy Silt

Granular soil layers comprising silty fine sand/sand and silt/sandy silt deposits were noted in Boreholes 103, 104, 108 and 110. The material was noted at the surface of Borehole 110 and below the topsoil in Borehole 108, continuing to 1.4 to 2.1 m depth, respectively (elevation 189.0 to 188.7). A deeper layer was noted in Boreholes 103, 104, 108 and 110, below the silt or till extending to the 6.2 to 6.6 m depth of exploration. The material contained trace to some gravel and trace clay. A sample of the material from Borehole 108 was submitted for particle size analysis and the results are presented on Figure 3-5, appended. The relative density of the layers was very loose to very dense (N Values of 3 to greater than 50). The layers were very moist to wet with water contents of 6 to 19%.

Sand and Silt Till

A sand and silt till deposit was encountered in Boreholes 101, 105, and 107 to 110. The deposit extended to the 6.2 to 6.4 m depth of exploration below the silt in Borehole 101, topsoil in Borehole 105, and sand in Borehole 109. The material was found below the sand and silt, sandy silt or silt in Boreholes 107, 108 and 110, being penetrated at 4.0 to 5.5 m depth (elevation 184.9 to 186.4). The till contained some gravel and trace clay. Cobbles and boulders were noted. A sample of the material from Borehole 108 was submitted for gradation and the results are presented on Figure 3-6, attached. Atterberg Limits testing showed the sample had a plasticity index of 4% (plastic limit of 10% and a liquid limit of 14%). The material was typically dense to very dense with depth with N Values of 30 to greater than 50 (locally very loose to compact in the upper 1.0 m of the unit, N Values of 3 to 22). Moisture contents ranged from 4 to 12%, being moist with localized wet seams.

Sandy Gravel

A local sandy gravel layer was encountered below the till in Borehole 107, extending to the 6.6 m depth of exploration. The material was very dense (N Value of 73) and wet (moisture content of 7%).

Ground Water

The ground water levels measured in the boreholes during drilling (first water strike), upon completion of augering, and measured within the monitoring wells on November 27 and December 19, 2017, are summarized in the table below on a borehole by borehole basis:

BOREHOLE	FIRST WATER STRIKE DURING DRILLING DEPTH (m) / ELEVATION	WATER LEVEL/ WET CAVE IN BOREHOLES UPON COMPLETION DEPTH (m) / ELEVATION	WATER LEVEL IN WELLS ON 2017-11-27 DEPTH (m) / ELEVATION	WATER LEVEL IN WELLS ON 2017-12-19 DEPTH (m) / ELEVATION
101	0.6 / 197.5	No Water to 6.2/191.9	2.3 / 195.8	0.5 / 197.6
102	0.6 / 196.5	1.2 / 195.9	1.5 / 195.6	0.5 / 196.6
103	0.6 / 196.7	1.5 / 195.8	--	--
104	0.6 / 195.6	0.6 / 195.6	--	--
105	--	No Water to 6.2 / 190.8	0.8 / 196.2	0.9 / 196.1
107	4.0 / 186.4	2.4 / 188.0	--	--
108	4.0 / 186.8	2.4 / 188.4	1.9 / 188.9	1.1 / 189.7
109	--	No Water to 6.4 / 185.4	--	--
110	4.0 / 186.4	3.1 / 187.3	2.0 / 188.4	0.5 / 189.9

A six-month ground water level monitoring program was subsequently requested from December 2018 to June 2019. Data loggers were installed in the five wells. The loggers were downloaded and manual ground water levels were taken twice over the six-month period to check the data. The ground water level data is presented graphically on Figures 3-7 to 3-11. The highest ground water level for each well is typically within 0.5 m (+/-) of the ground surface.

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

GEOTECHNICAL ENGINEERING CONSIDERATIONS

General

The Panorama North residential development is proposed on the approximate 20.1 ha property located at 295 Mountain Road in Collingwood. The current concept plan shows that the development will comprise a mix of residential units. Full depth basements are proposed. The development will be fully serviced beneath a network of roads, with storm and sanitary sewers and watermain services assumed to have inverts of 2 to 3 m below existing grade. A SWM Pond will be incorporated in the northeast corner of the development. Site grading has not been finalized. The current site concept plan is shown on Drawing 3-1, appended.

Site Grading and Engineered Fill

Final grading was not available at the time of this investigation. For purposes of this report, it is assumed that only minor (less than 0.5 m) of cut and fill will be needed across the site considering the abutting Mountain Road and Tenth Line.

Where grades are to be raised under structures (house, buildings, services and roads) the grade raise will need to be constructed with engineered fill. The engineered fill will require removal of organics and very loose to loose soil prior to placement and fill will need to be placed in thin lifts and sufficiently compacted. Once site grades are established, further details regarding engineered fill can be provided.

Foundations

Under the topsoil mantle covering the site, native granular soils dominate the site. Available bearing capacities at varying depths and founding material are summarized below on a borehole by borehole basis:

BOREHOLE	DEPTH (m) / ELEVATION	GEOTECHNICAL BEARING RESISTANCE AT SLS (KPa)	FACTORED BEARING RESISTANCE AT ULS (KPa)	SOIL
101	0.7 / 197.4	300	450	Silt
102	0.7 / 196.4 1.5 / 195.6	100 300	150 450	Sand Silt
103	0.7 / 196.6	100	150	Sand
104	0.7 / 195.5	100	150	Sand
105	0.7 / 196.3 1.5 / 195.5	200 300	300 450	Till Till
107	0.5 / 189.9	300	450	Silt/Till
108	0.7 / 190.1	150	225	Sand and Silt
109	0.7 / 191.1	300	450	Till
110	0.7 / 189.7 1.5 / 188.9	100 300	150 450	Sandy Silt Till

SLS – Serviceability Limit State
ULS – Ultimate Limit State

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 insulation.

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

It is noted that in the native soils may be wet and easily disturbed. As such the contractor should adopt methodologies and equipment to accommodate these conditions, such as concrete skim coats.

Seismic Design

Based on the soil profile revealed in the boreholes (N Values), 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

Based on water level monitoring to date the high ground water table is anticipated typically about 0.5 m (+/-) of the existing ground surface, however is subject to seasonal variation. In general, it is recommended that basements be established a minimum 0.5 m above the ground water level.

Full-depth basements are proposed. 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 backfill = 0.5
- h = depth below grade (m) at which lateral pressure is calculated
- γ = unit weight of compacted granular backfill = 21.0 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 in conjunction with a weeping tile system. In lieu of imported Granular B, a proprietary drainage board product can be utilized with on-site soils as backfill. The weeping tiles should be protected by a properly designed granular filter or geotextile to prevent migration of fines into the system. The drainage pipe should be placed on a positive grade and lead to a frost-free outlet. The basement walls should be damp proofed.

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. A minimum 200 mm thick base layer of crushed stone (nominal 19 mm size) is recommended directly under the slab. Underfloor drains are recommended in addition to a polyethylene sheet vapour barrier under basement slabs within 1.0 m of the ground water table.

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

Reference is made to appended Figure 3-12, for general recommendations regarding drainage and backfill requirements for basement walls and floor slabs.

Site Servicing

Design details were not finalized at the time of this report. However, inverts are generally assumed to be 2.0 to 3.0 m below existing grade.

Trench Excavation and Ground Water Control

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

Bedding

It is anticipated that services will be supported in native soils where 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 A 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, the bedding material should comprise OPSS Granular A and cover material may comprise select native soil free of oversized material (150 mm diameter or less) or excessively wet material.

Trench 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 150 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 the potential for differential frost heave.

The excavated inorganic soil will comprise the predominant native granular soils which should be suitable for use as trench backfill subject to moisture content adjustments. Soil below the ground water table will require time to dry out. 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

Excavation for the buildings is assumed to be as much as 1.5 m below existing grade for basements. Excavation for site servicing is assumed to be 2.0 to 3.0 m below existing grade. Excavation will encounter topsoil and granular soils (sand, silt, sandy silt/sand and silt/silty fine sand, and till). Harder digging and the presence of cobbles and boulders should be anticipated in the till.

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.

The ground water table is believed to stabilize about 0.5 to 2.0 m below existing grade, however is subject to seasonal variations. For the shallow excavation to 1.5 to 2.0 m depth, sump pumping should generally suffice to control seepage provided excavation is carried out in small manageable sections during the dry time of the year when the ground water table is usually at its lowest.

The use of well points may be needed to temporarily lower the ground water table in areas of greater seepage potential (where sand is present, Boreholes 102 to 104) or if excavation is carried out deeper than described above. Depending on the length and size of excavation, sheet pile shoring may also be employed. Parameters for design can be provided if required.

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 notify the Ministry of Environment, Conservation and Parks (MECP). 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, for the shallow excavation assumed for houses and servicing, a PTTW or registry on the EASR system may possibly be required, considering the sand in Boreholes 102 to 104.

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 registry on the EASR system.

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.

Storm Water Management Pond

A SWM pond is proposed at the northeast corner of the site. The preliminary grading for the pond was provided by Tatham. The bottom of the pond is proposed at elevation 187.90, and the bottom of the forebay is proposed at elevation 188.00. The top of the pond (top of bank) is currently planned at elevation 190.00 and the permanent pool at elevation 189.00. Interior side slopes of 5H:1V or flatter are proposed.

Borehole 108 was conducted in the SWM Pond area. Beneath 220 mm of topsoil, very loose to compact sand and silt was encountered to 2.1 m depth (elevation 188.7), over compact to very dense sand and silt till to 5.5 m (elevation 185.3), overlying very dense silty sand. Ground water was measured in the monitoring well at 1.1 m (elevation 189.7) on December 19, 2017, about four weeks after installation, with higher water levels noted in the more recent ground water level monitoring program. 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. Berm material should have a permeability of 1.0×10^{-6} cm/sec or less;

- The proposed 5H:1V (or flatter) interior side slopes are acceptable. The slopes should be protected from erosion by provision of vegetation cover, granular blanket, rip rap or the like. Any exterior slopes should be constructed no steeper than 3H:1V;
- The pond will be cut through the sand and silt and into the underlying till. The permeability of the soil layers is variable and an impermeable liner will be required for the proposed wet pond;

It is recommended that when the final 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.

Geotechnical review of the SWM Pond Maintenance Manual will be completed at a later date in support of the final design.

Pavement Design and Construction

Grading has not been determined and importation of fill may be required. The frost susceptibility of the pavement subgrade soil and recommended pavement structure will be updated when grading details and subgrade soil conditions are known. For purposes of this report, it is anticipated that the pavement subgrade will comprise near surface soils being typically moderately to highly frost susceptible native sand/silt soils. The following preliminary pavement structure thicknesses are recommended:

	LIGHT DUTY	HEAVY DUTY
Asphalt (mm)	90	110
Granular A Base Course (mm)	150	150
Granular B Subbase Course (mm)	350	500
Total Thickness (mm)	590	760

It is recommended that following rough grading, subgrade preparation should include proofrolling and compacting the exposed subgrade with a heavy compactor to minimum 95% Standard Proctor maximum dry density under geotechnical review. Any unstable zones

identified during this process should be sub-excavated and replaced with compacted select material.

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. If wet subgrade is encountered, then additional excavation and/or subbase material or the use of Granular B Type II and/or geogrid may be required, subject to geotechnical review during construction.

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

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

Preliminary Infiltration Assessment

A preliminary assessment for permeability for infiltration features has been requested. At this time the location and depth of any proposed infiltration features is not know.

Grain size analysis testing was carried out on six samples of the native site soils. The grain size analyses results are presented on Figures 3-1 to 3-6, with the estimated coefficient of permeability, K, of the tested site soils summarized below:

BH	DEPTH (m)	SOIL TYPE	ESTIMATED COEFFICIENT OF PERMEABILITY, K (cm/sec)
101	0.8 – 1.2	Silt, Some Fine Sand, Trace Clay	1.5×10^{-5}
101	2.3 – 2.7	Silt, Some Fine Sand, Trace Clay	6.5×10^{-5}
102	2.3 – 2.7	Gravelly Sandy Silt, Trace Clay	2.0×10^{-5}
103	3.0 – 3.5	Silt, Some Sand, Trace Clay	5.0×10^{-7}
108	0.8 – 1.2	Sand and Silt, Trace Clay	4.0×10^{-4}
108	2.3 – 2.7	Till: Sand and Silt, Some Gravel, Trace Clay	4.0×10^{-7}

The Puckett et al (1985) method was used to asses K.

A grain size analysis was not carried out on a sample of the sand in the upper parts of Boreholes 102 to 104. The estimated coefficient of Permeability, K, for the sand is on the order of $1x10^{-3}$ to $1x10^{-4}$ cm/sec.

The K value derived from the particle size distribution curves do not take into consideration site specific details such as compaction, soil structure, organic content and/or the degree of saturation.

It is noted that the design of infiltration features will have to take into account the ground water level and the requirement for a buffer of about 1.0 m between the bottom of the feature and the high ground water level. In this regard, the implementation of LID features does not appear to be feasible.

Geotechnical Review and Construction Inspection and Testing

It is recommended that the final drawings be submitted to PML for general 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 that the specified compaction standards are achieved throughout fill materials.

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

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

Arsenic Testing

Subsequent to the geotechnical investigation, two separate site visits were carried out to conduct hand dug test pits to collect soil samples for arsenic testing. The chemical testing from the initial site visit showed one exceedance. As the exceedance was not that high and suspected to be an anomaly, replicate sampling and chemical testing was conducted to establish an average less than the applicable Site Condition Standards (SCSs). The replicate chemical testing results, in combination with the original chemical testing results, achieved an average value less than the applicable SCSs.

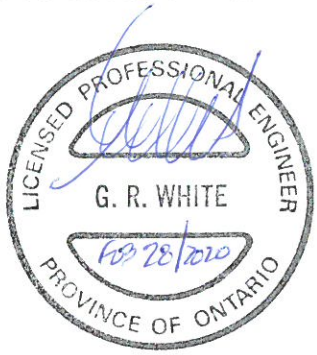
Details of the work are provided in Report 2 in Appendix B.

CLOSURE

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

Sincerely

Peto MacCallum Ltd.



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

GRW:jlb/tc

Enclosure(s):
Figures 3-1 to 3-6 - Particle Size Distribution Charts
Figures 3-7 to 3-11 – Ground Water Level Data Graphs
Figure 3-12 - General Recommendations Regarding Drainage and Backfill Requirements for Basement Wall and Floor Slab Construction
List of Abbreviations
Log of Borehole Nos. 101 to 105, 107 to 110
Drawing No. 3-1 - Borehole Location Plan
Appendix A – Statement of Limitations
Appendix B – Arsenic Letter, Report 2, dated June 7, 2019

Peto MacCallum Ltd.
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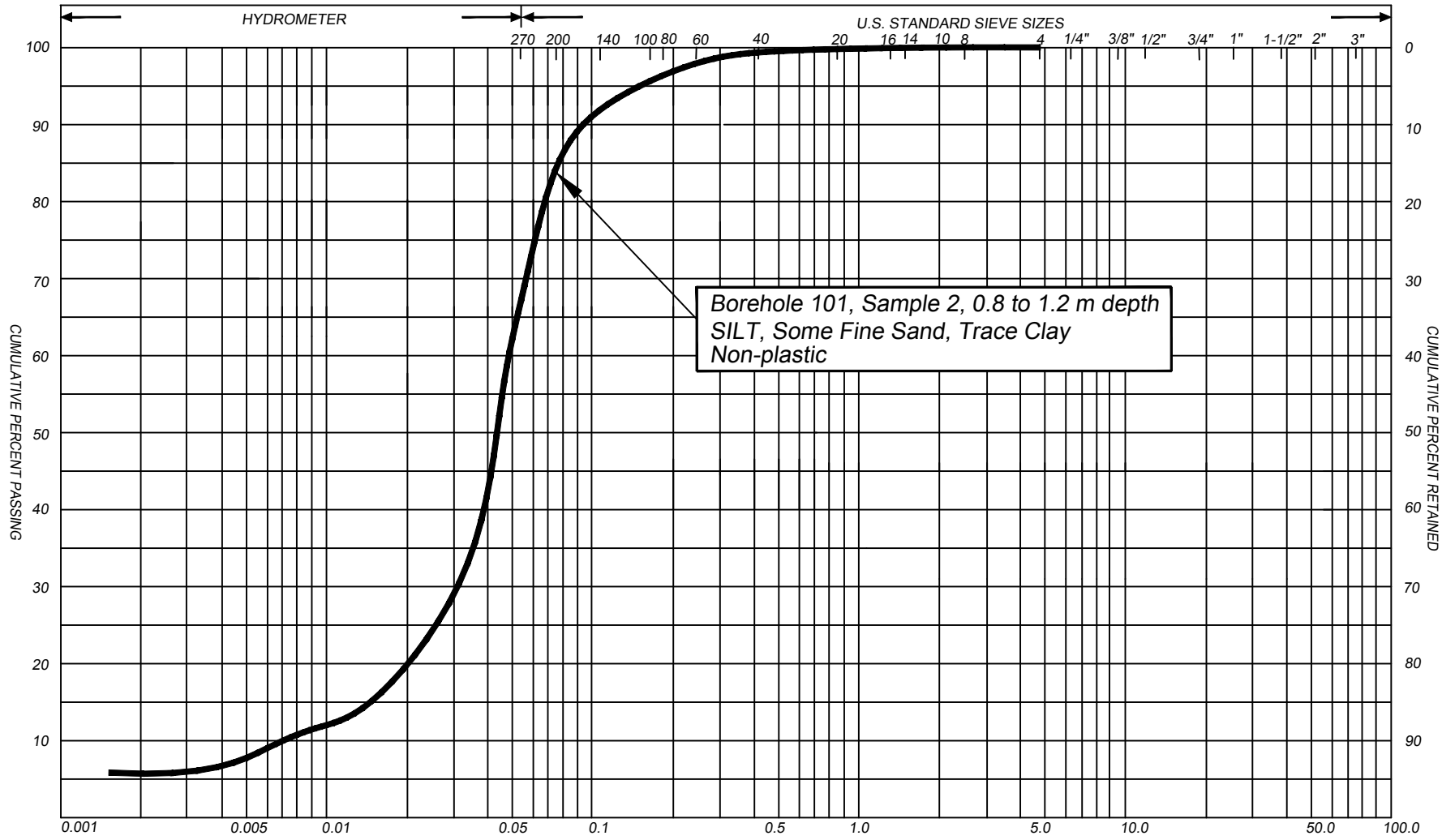
PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17CF022
Figure No.: 3-1

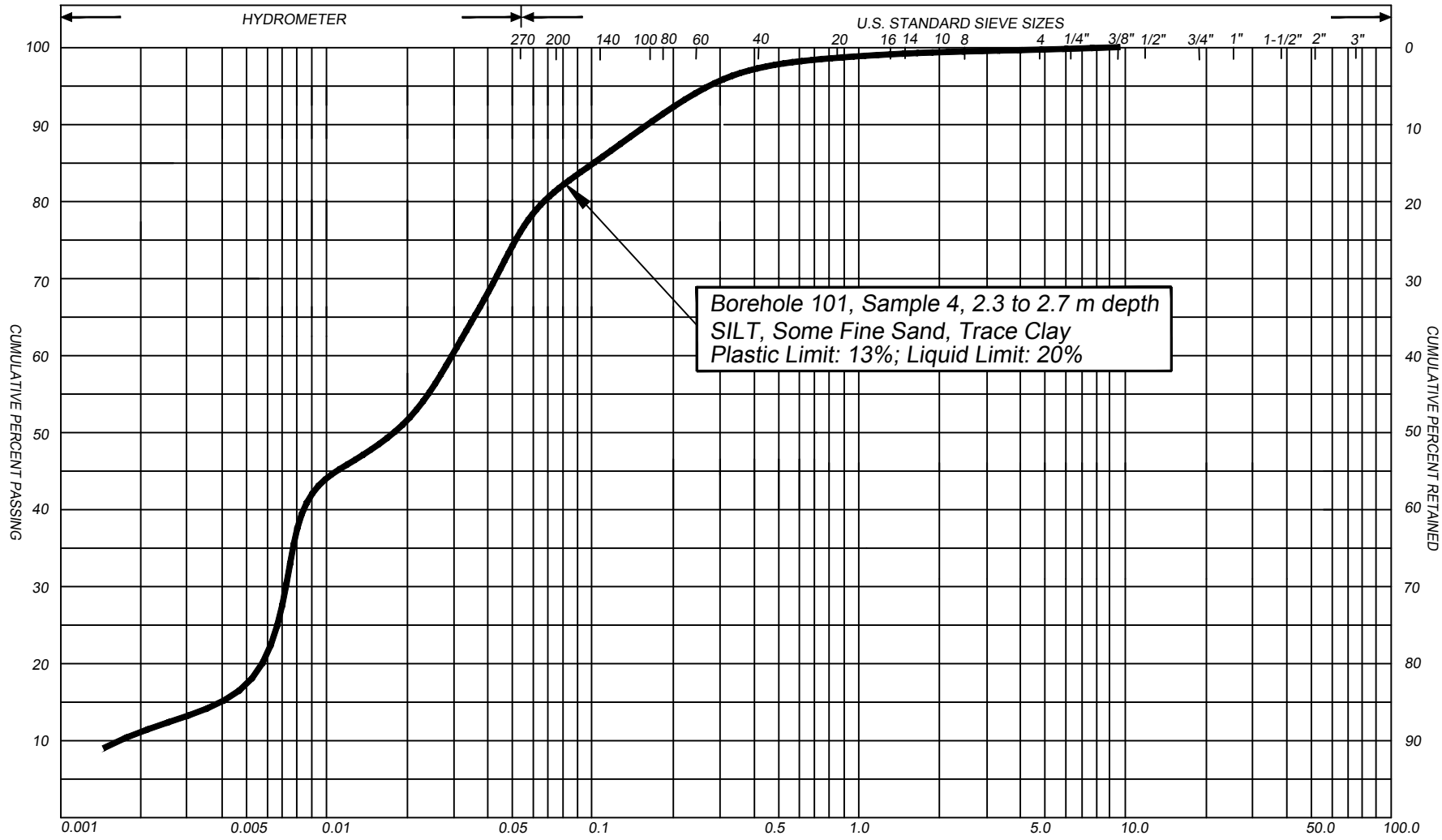


SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T.
	SILT			SAND						
CLAY	SILT		V. FINE	FINE	MED	COARSE	GRAVEL			U.S. BUREAU
			SAND							

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17CF022
Figure No.: 3-2

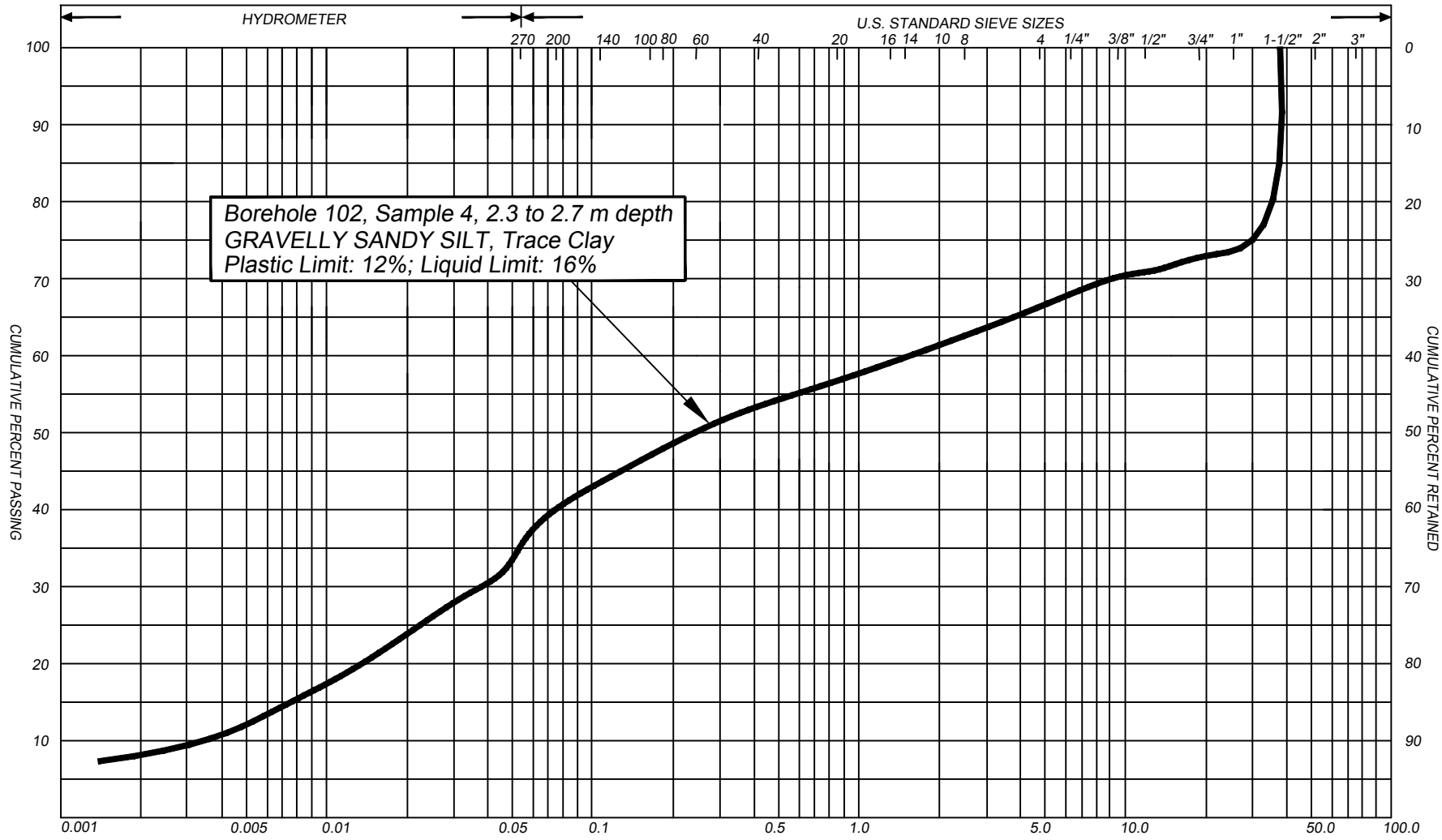


SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T.
	SILT			SAND						
CLAY	SILT		V. FINE	FINE	MED	COARSE	GRAVEL			U.S. BUREAU
			SAND							

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17CF022
Figure No.: 3-3

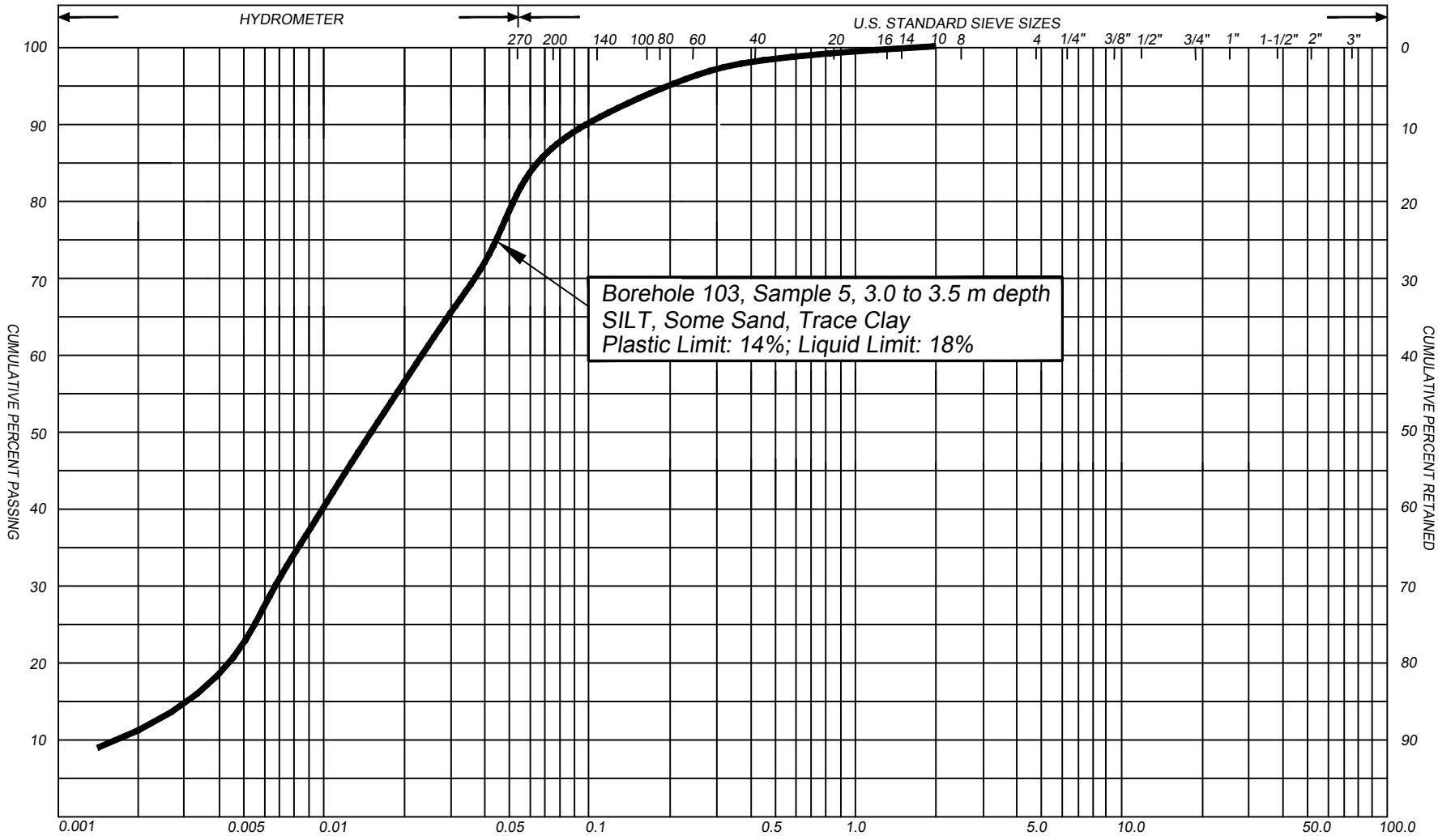


SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COB BLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T.
	SILT			SAND							
CLAY	SILT			V. FINE	FINE	MED	COARSE	GRAVEL			U.S. BUREAU
				SAND							

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17CF022
Figure No.: 3-4

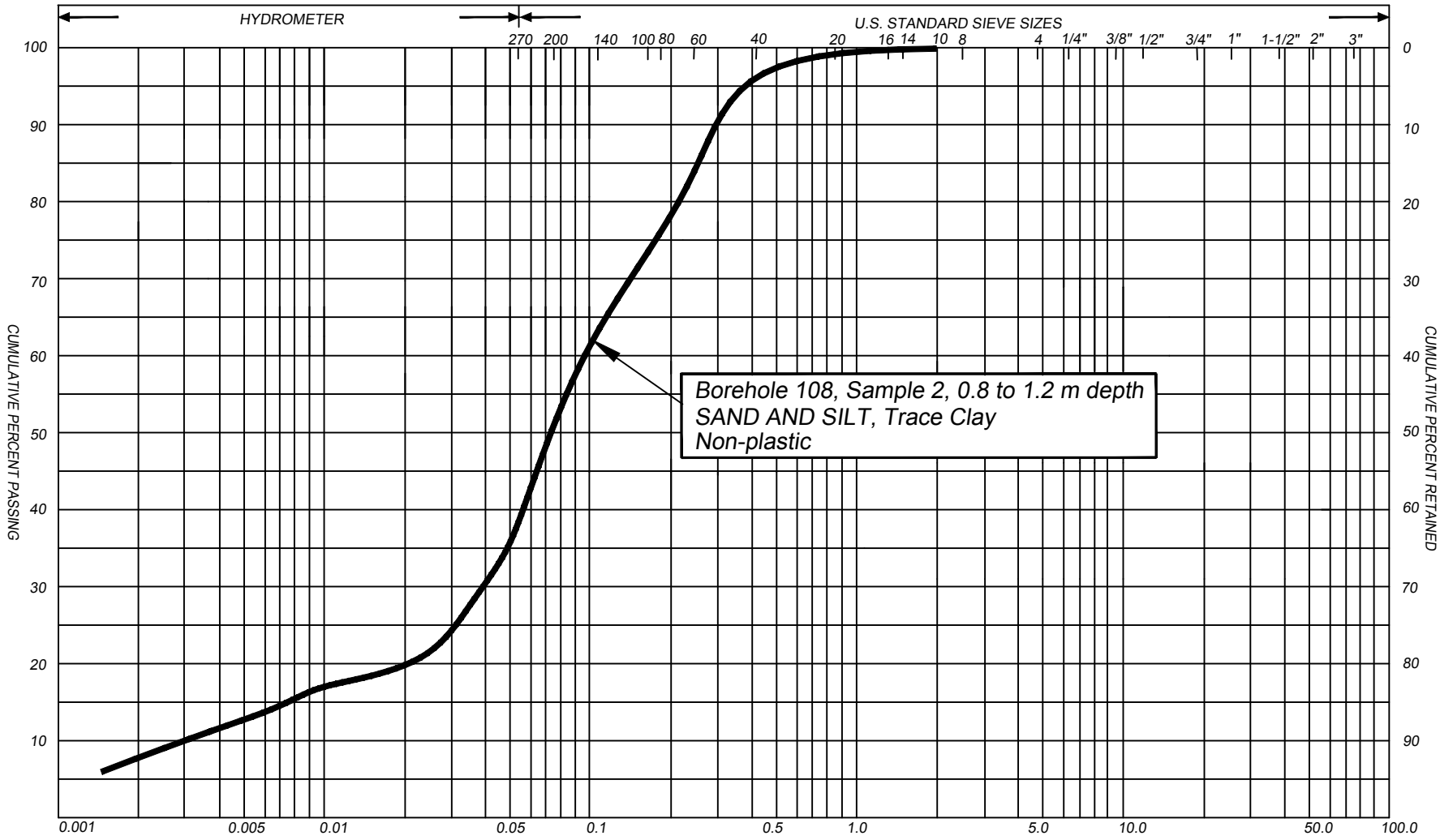


SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COB BLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T.
	SILT			SAND							
CLAY	SILT			V. FINE	FINE	MED	COARSE	GRAVEL			U.S. BUREAU
				SAND							

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17CF022
Figure No.: 3-5

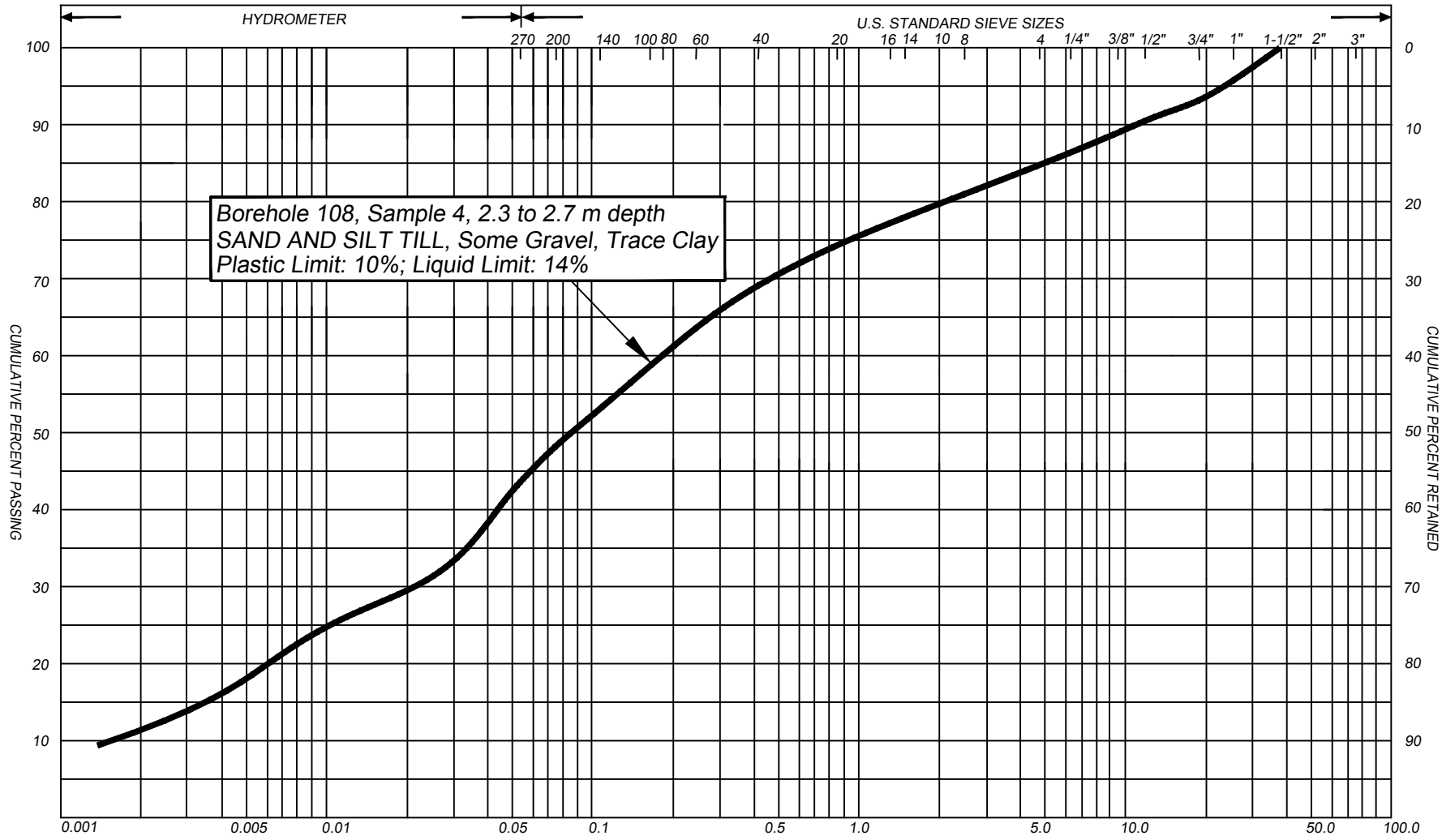


SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
				SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T.
	SILT			SAND						
CLAY	SILT			V. FINE	FINE	MED	COARSE	GRAVEL		U.S. BUREAU
				SAND						

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 17CF022
Figure No.: 3-6



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							

Figure 3-7

Ground Water Levels - BH101 - December 2018 to June 2019

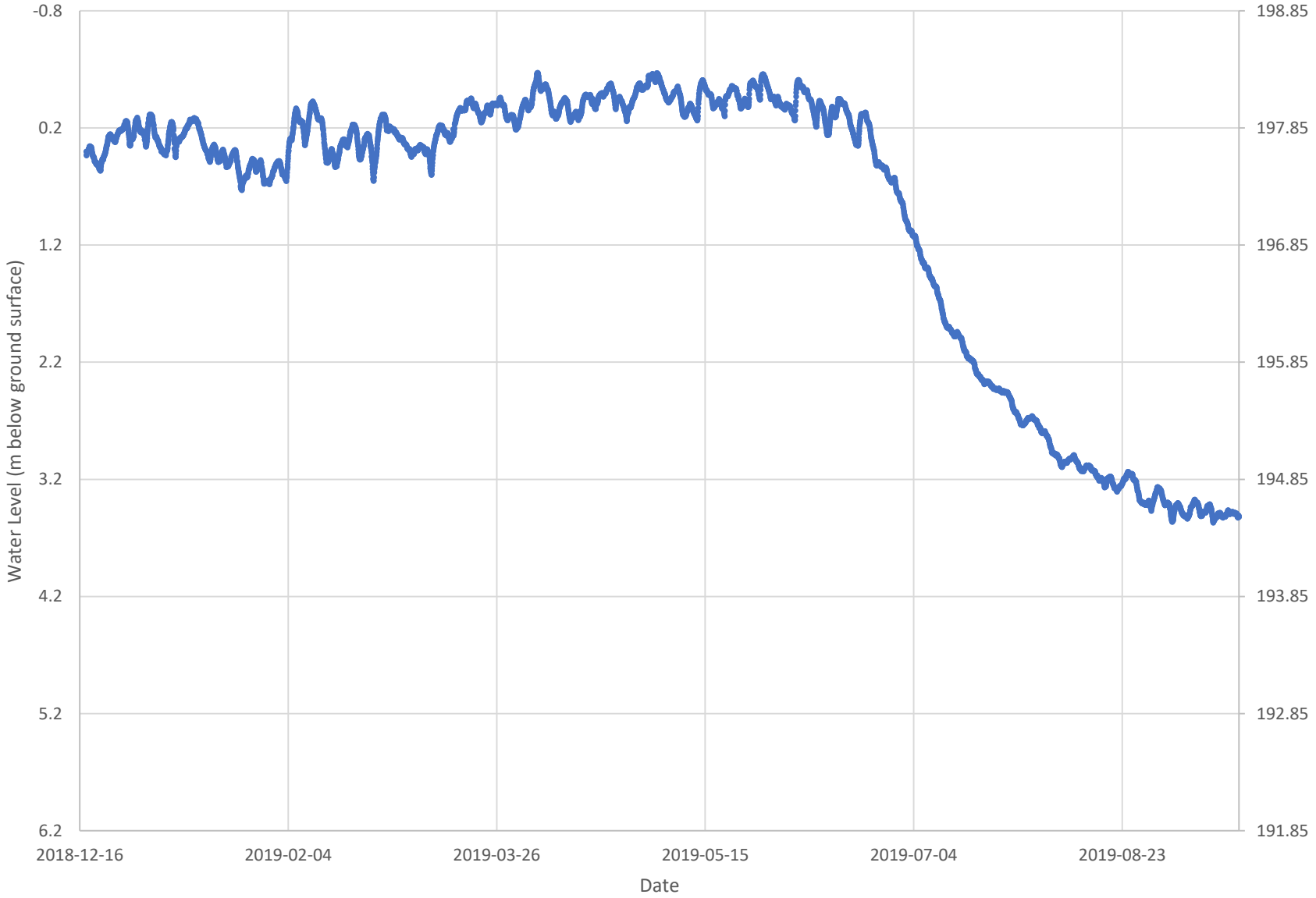


Figure 3-8

Ground Water Levels - BH102 - December 2018 to June 2019

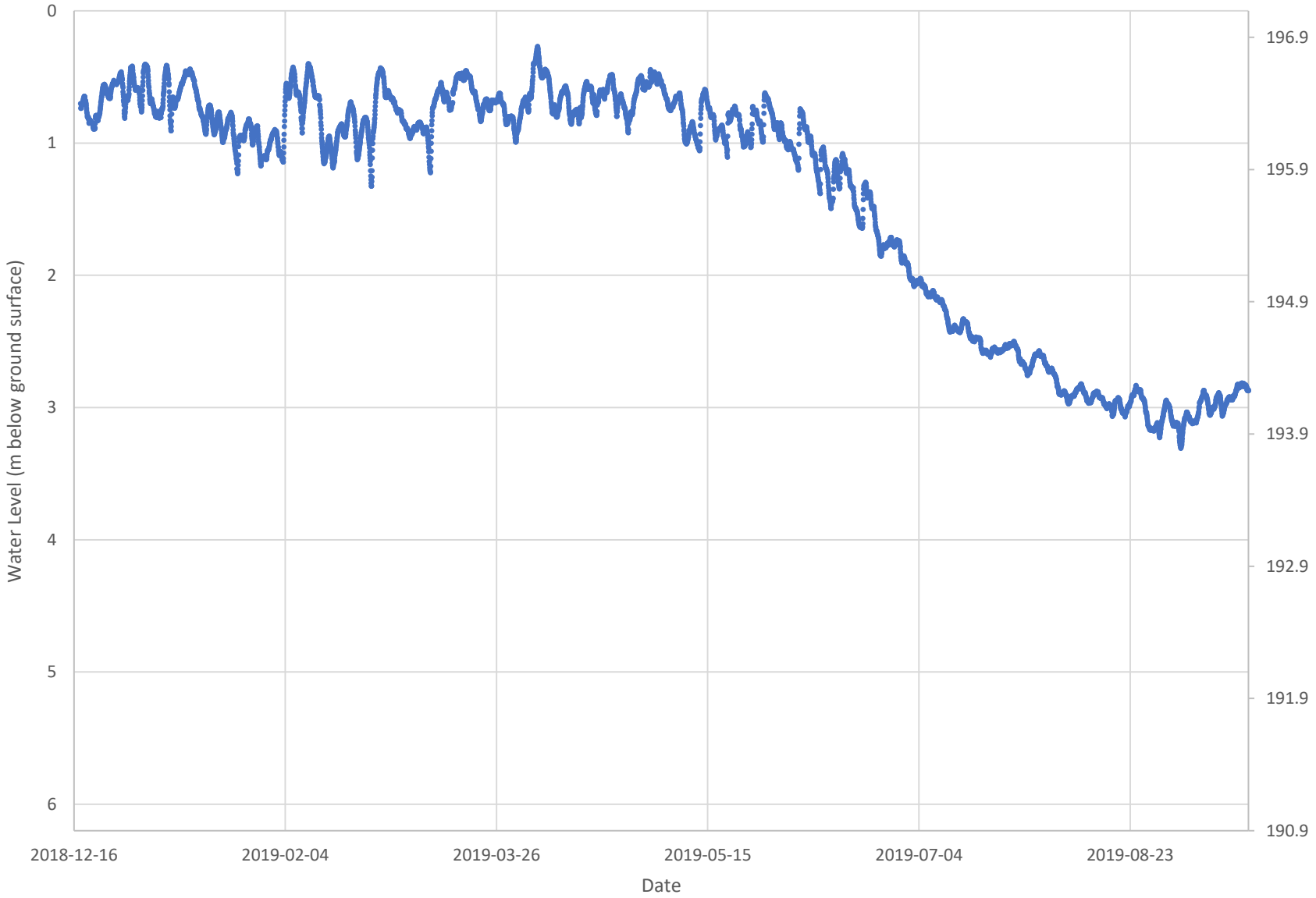


Figure 3-9:

Ground Water Levels - BH105 - December 2018 to June 2019

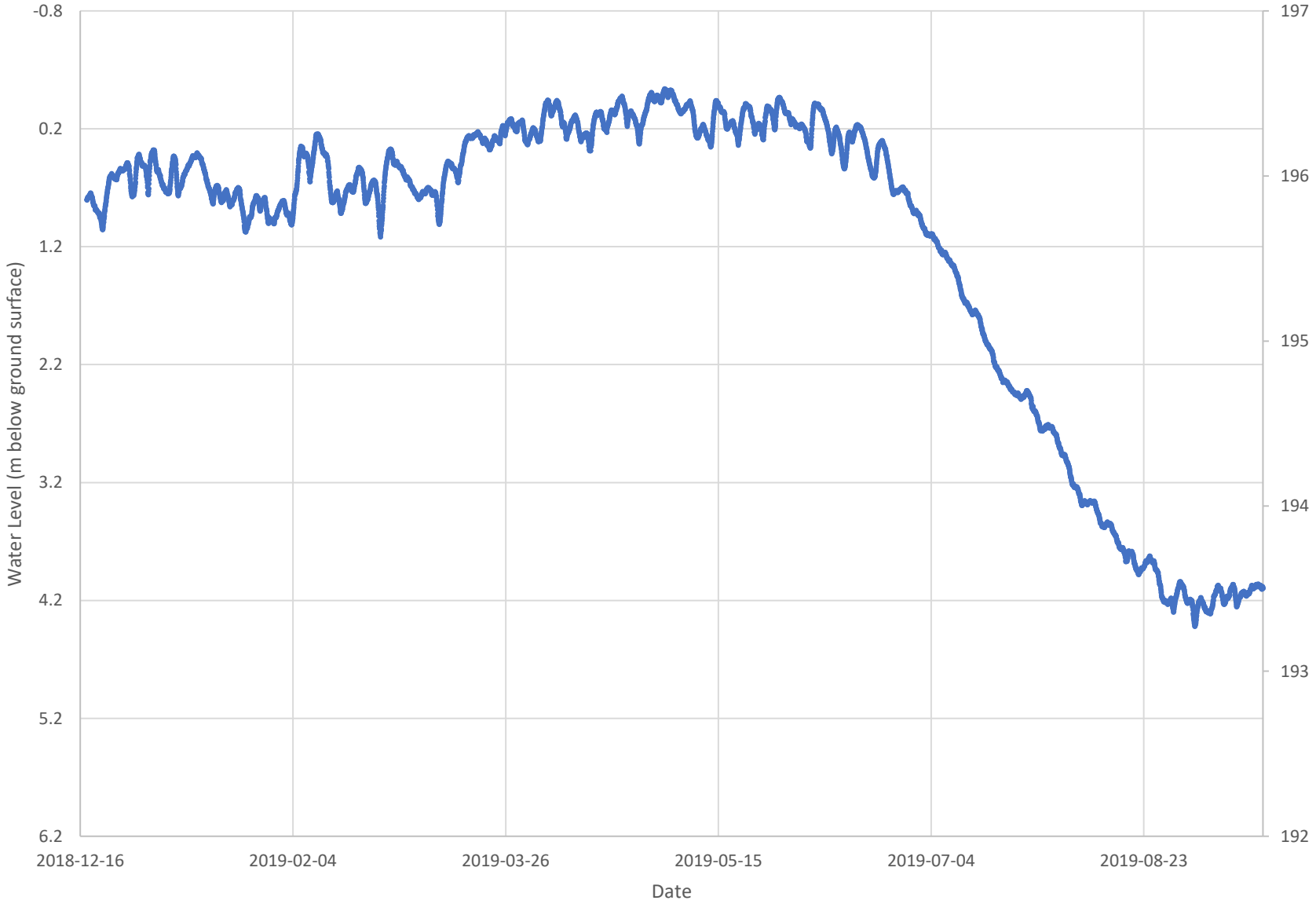


Figure 3-10

Ground Water Levels - BH108 - December 2018 to June 2019

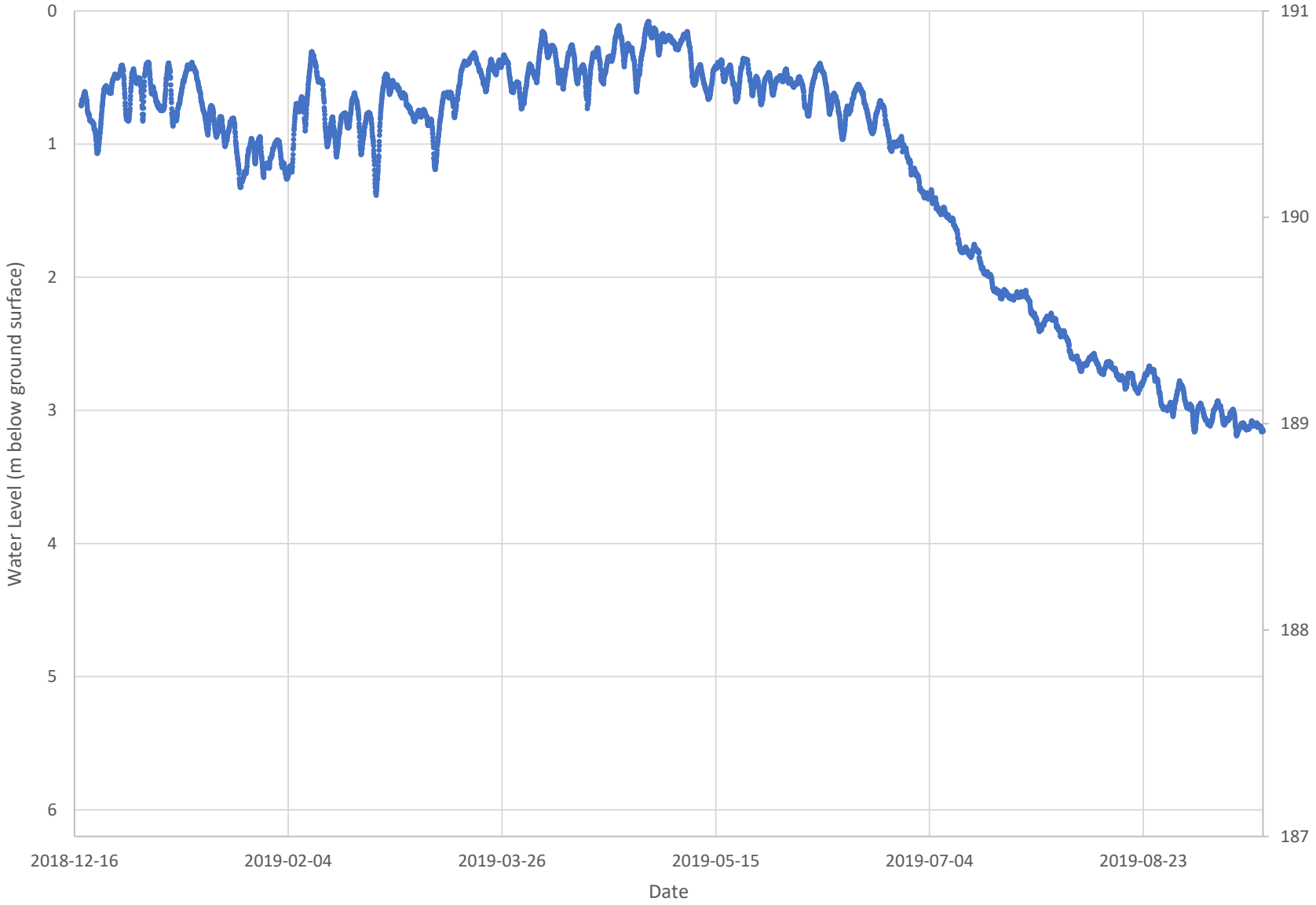
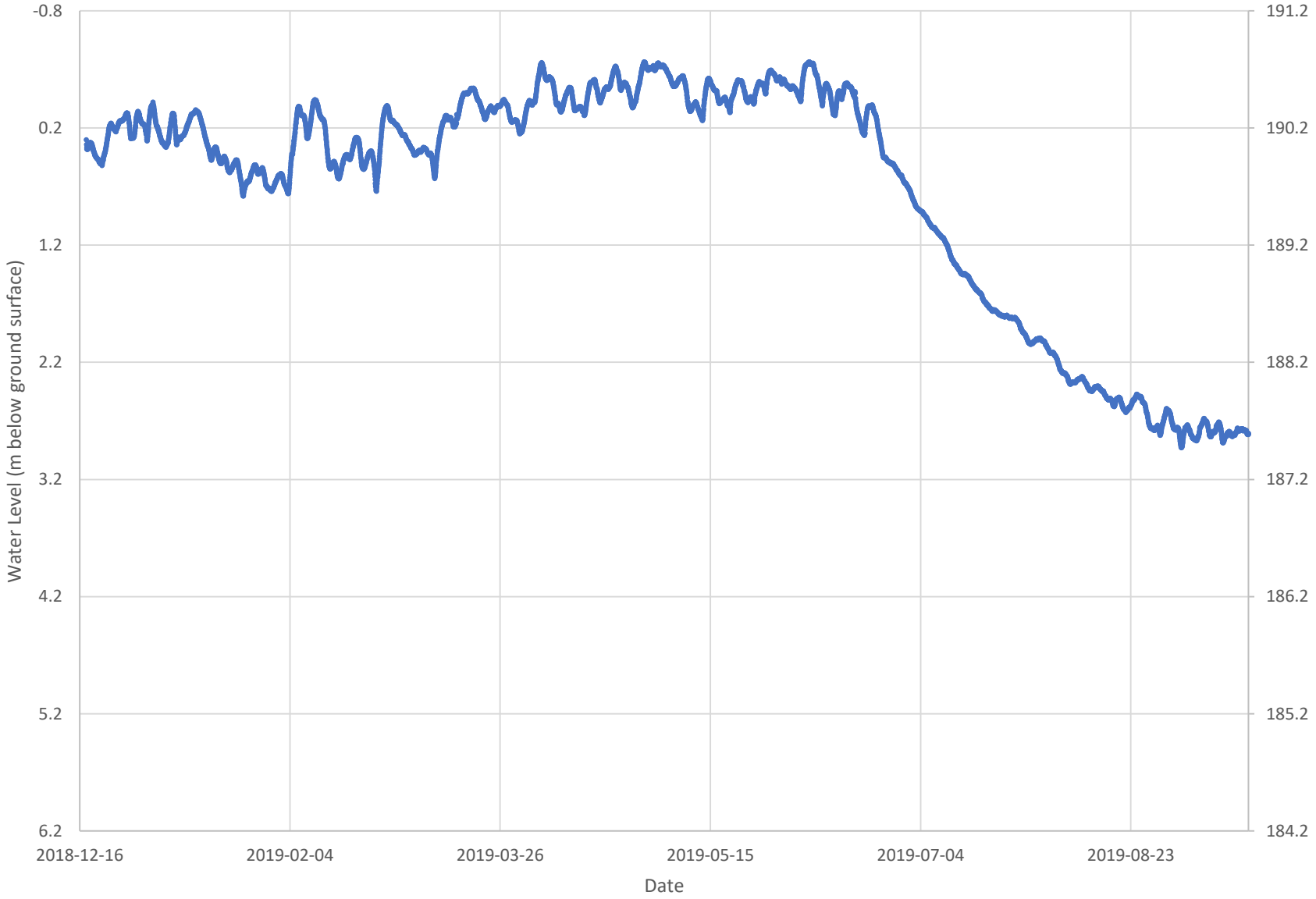
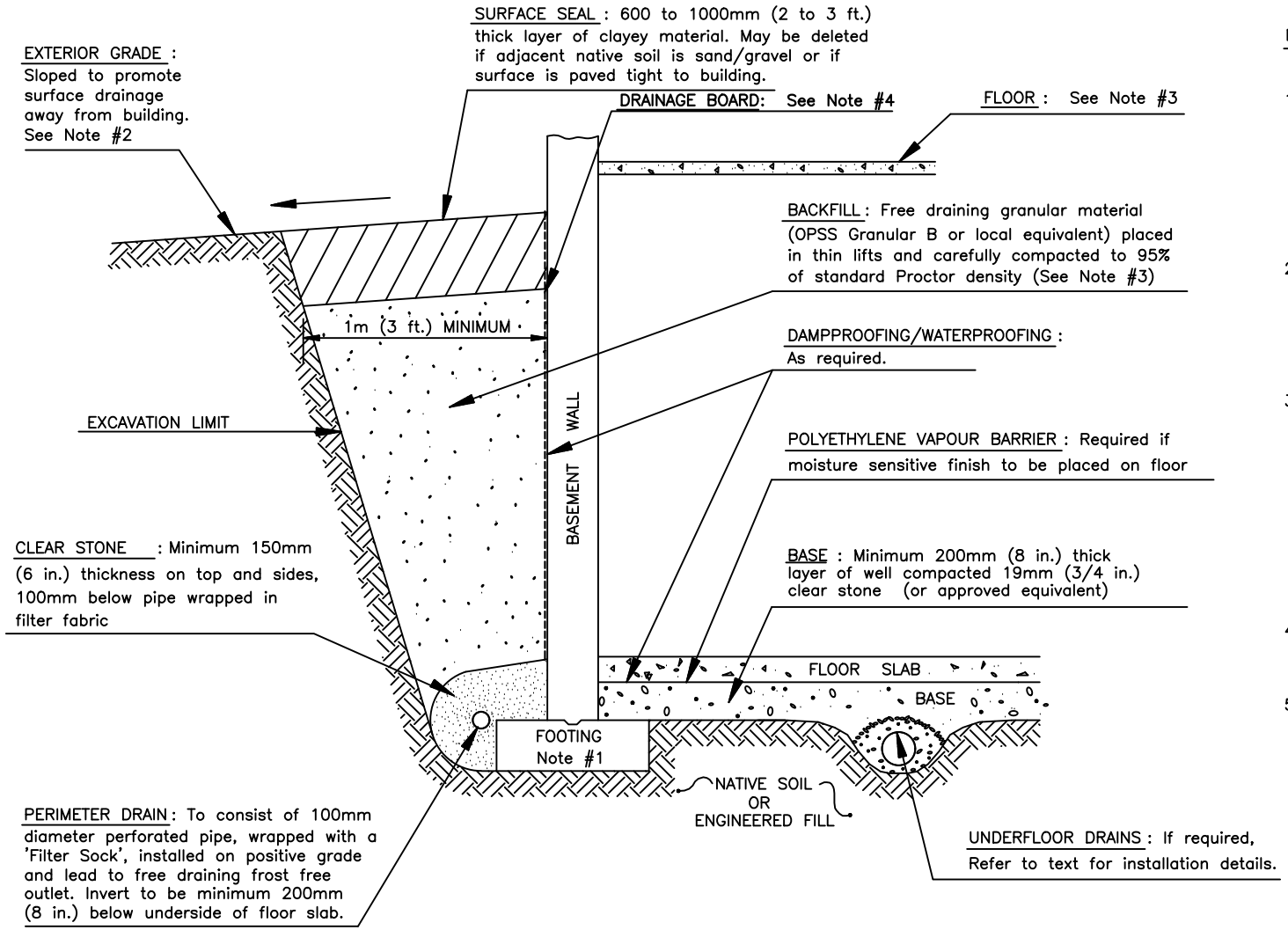


Figure 3-11

Ground Water Levels - BH110 - December 2018 to June 2019





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	FEB. 2020	N.T.S.	17CF022	3–12
APPROVED:	GW				

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

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

TYPE OF SAMPLE

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

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

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

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 101

17T 558760E 4427695N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 23, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 198.05				
0.25	TOPSOIL: Dark brown, sandy silt, moist				
197.80	SILT: Compact to very dense, brown, silt, some fine sand, trace gravel, trace clay, very moist		1	SS	14
			2	SS	32
			3	SS	47
			4	SS	85
			5	SS	81/260 mm
4.0					
194.1	SAND AND SILT TILL: Very dense, grey, silty sand/sandy silt, some gravel, trace clay, cobbles and boulders, moist		6	SS	50/70 mm
6.2			7	SS	50/50 mm
191.9	BOREHOLE TERMINATED AT 6.2 m				

ELEVATION SCALE: 197, 196, 195, 194, 193, 192

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 casing
Concrete

First water strike at 0.6 m

Bentonite seal

50 mm slotted pipe
Filter sand

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

Date	Depth	Elev.
2017-11-27	2.3	195.8
2017-12-19	0.5	197.6

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 102

17T 558919E 4927609N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 23, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 197.10				
0.10	TOPSOIL: Dark brown, sandy silt, moist				
197.00	SAND: Very loose to loose, brown, sand, some silt, moist to wet		1	SS	3
			2	SS	10
1.4					
195.7	SILT: Dense to very dense, brown, sandy silt, trace gravel to gravelly, trace clay, cobbles, till-like, moist		3	SS	68
			4	SS	90/230 mm
			5	SS	90/250 mm
			6	SS	41
6.2			7	SS	50/80 mm
190.9	BOREHOLE TERMINATED AT 6.2 m				

ELEVATION SCALE: 197, 196, 195, 194, 193, 192, 191

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 casing
Concrete

First water strike at 0.6 m

Bentonite seal

50 mm slotted pipe
Filter sand

Upon completion of augering
Wet cave at 1.2 m

Water Level Readings:

Date	Depth	Elev.
2017-11-27	1.5	195.6
2017-12-19	0.5	196.6

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 103

17T 558997E 4927749N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 22, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE
	SURFACE ELEVATION 197.30					
0.16	TOPSOIL: Dark brown, sandy silt, moist					
197.14	SAND: Loose to compact, brown, sand, some silt, wet		1	SS	4	197
			2	SS	11	196
			3	SS	11	
			4	SS	13	195
2.9						
194.4	SILT: Compact, brown, silt, some sand, trace clay, very moist		5	SS	24	194
3.7						
193.6	SILTY FINE SAND: Loose to very dense, brown, silty fine sand, trace gravel, wet					193
			6	SS	8	
						192
6.6			7	SS	71	191
190.7	BOREHOLE TERMINATED AT 6.6 m					

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

First water strike at 0.6 m

Upon completion of augering
Water at 1.5 m
Cave at 2.7 m

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 104

17T 559099E 4927612N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 22, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE
	SURFACE ELEVATION 196.15					
0.16	TOPSOIL: Dark brown, sandy silt, moist					
195.99	SAND: Loose to compact, brown, sand, some silt, moist to wet		1	SS	8	
			2	SS	14	
			3	SS	17	
			4	SS	12	
2.9						
193.3	SILT: Compact, brown, silt, some sand, trace clay, very moist		5	SS	15	
			6	SS	11	
5.2						
191.0	SILTY FINE SAND: Loose, brown, silty fine sand, some gravel, wet		7	SS	6	
6.6						
189.6	BOREHOLE TERMINATED AT 6.6 m					

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

First water strike at 0.6 m

Upon completion of augering
Water at 0.6 m
Cave at 0.9 m

NOTES

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CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 105

17T 559192E 4927742N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 23, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

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 w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 197.00									
0.18 / 196.82	TOPSOIL: Dark brown, sandy silt, moist									
	SAND AND SILT TILL: Very loose to very dense, brown, silty sand, some gravel, cobbles and boulders, moist		1	SS	3					Stick-up casing Concrete
			2	SS	22	196				Bentonite seal
			3	SS	75/260 mm	195				
			4	SS	50/130 mm	194				50 mm slotted pipe Filter sand
			5	SS	50/100 mm					
4.0 / 193.0	Becoming grey					193				
			6	SS	50/70 mm	192				
6.2 / 190.8	BOREHOLE TERMINATED AT 6.2 m		7	SS	50/100 mm	191				Upon completion of augering No water No cave Water Level Readings: Date / Depth / Elev. 2017-11-27 0.8 196.2 2017-12-19 0.9 196.1

SHEAR STRENGTH (kPa): +FIELD VANE △TORVANE ○ Qu ▲POCKET PENETROMETER O Q; DYNAMIC CONE PENETRATION ×; STANDARD PENETRATION TEST ●; scale 20 40 60 80

PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT; WATER CONTENT (%) 10 20 30 40

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 107

17T 559537E 4927730N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 24, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	ELEVATION SCALE
		SURFACE ELEVATION 190.40					
0.0	190.30	TOPSOIL: Dark brown, silty sand, moist					190
0.10		SILT: Dense, brown, sandy silt, some gravel, moist		1	SS	49	
0.80	189.60	SAND AND SILT TILL: Very dense, brown, silty sand/sandy silt, some gravel, trace clay, cobbles and boulders, moist		2	SS	60	189
1.0				3	SS	68	
2.0	188.3	Becoming grey		4	SS	50/140 mm	188
2.1				5	SS	80	187
3.0							
4.0							186
5.0				6	SS	50/140 mm	
5.5	184.9	SANDY GRAVEL: Very dense, grey, sandy gravel, wet					185
6.0				7	SS	73	184
6.6	183.8	BOREHOLE TERMINATED AT 6.6 m					
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 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

First water strike at 4.0 m

Upon completion of augering
Water at 2.4 m
Cave at 3.7 m

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 108

17T 559518E 4927869N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 24, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH (metres)	ELEV	DESCRIPTION	NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 190.75			
0.22	190.53	TOPSOIL: Dark brown, sandy silt, moist	1	SS	3
		SAND AND SILT: Very loose to compact, brown, sand and silt, trace clay, sand layers, very moist	2	SS	15
			3	SS	16
2.1	188.7	SAND AND SILT TILL: Compact to very dense, brown, silty sand/sandy silt, some gravel, trace clay, cobbles and boulders, moist, wet seams	4	SS	11
2.9	187.9	Becoming grey	5	SS	92
5.5	185.3	SILTY SAND: Very dense, brown, silty sand, trace gravel, wet	6	SS	93
6.5	184.3	BOREHOLE TERMINATED AT 6.5 m	7	SS	88/250 mm

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 casing
Concrete
Bentonite seal
50 mm slotted pipe
Filter sand
First water strike at 4.0 m

Upon completion of augering
Water at 2.4 m
No cave
Water Level Readings:

Date	Depth	Elev.
2017-11-27	1.9	188.9
2017-12-19	1.1	189.7

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 109

17T 559391E 4297650N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 24, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

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 191.75									
0.25 / 191.50	TOPSOIL: Dark brown, sandy silt, moist		1	SS	4					
0.60 / 191.15	SAND: Loose, brown, sand, some silt, moist					191				
	SAND AND SILT TILL: Dense to very dense, brown, silty sand/sandy silt, some gravel, trace clay, cobbles and boulders, moist		2	SS	42					
1.4 / 190.4	Becoming grey		3	SS	82	190				
			4	SS	88					
						189				
			5	SS	83					
						188				
			6	SS	95/250 mm	187	>>			
						186				
6.4 / 185.4	BOREHOLE TERMINATED AT 6.4 m		7	SS	78/250 mm		>>			Upon completion of augering No water No cave

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

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

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 110

17T 559529E 4927675N

PROJECT Proposed Panorama North Residential Development
PML REF. 17CF022
LOCATION 295 Mountain Road, Collingwood, Ontario
BORING DATE November 24, 2017
ENGINEER GW
BORING METHOD Continuous Flight Hollow Stem Augers
TECHNICIAN WP

DEPTH (metres) / ELEV	DESCRIPTION	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 190.40			
0.0	SANDY SILT: Compact, brown, sandy silt, trace gravel, very moist to moist	1	SS	10
1.0		2	SS	11
1.4 / 189.0	SAND AND SILT TILL: Dense to very dense, brown, silty sand/sandy silt, trace gravel, trace clay, cobbles and boulders, moist	3	SS	42
2.0				
2.1 / 188.3	Becoming grey	4	SS	75/250 mm
3.0		5	SS	40
4.0 / 186.4	SILTY SAND: Compact to very dense, grey, silty sand, trace gravel, wet			
5.0		6	SS	18
6.0 / 6.2		7	SS	50/50 mm
184.2	BOREHOLE TERMINATED AT 6.2 m			

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

ELEVATION SCALE: 190, 189, 188, 187, 186, 185

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 casing
Concrete
Bentonite seal
50 mm slotted pipe
Filter sand
First water strike at 4.0 m

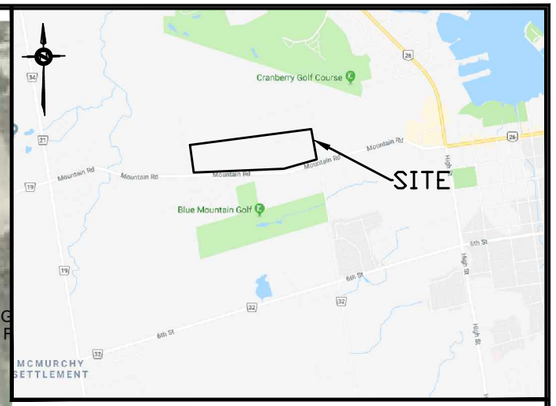
Upon completion of augering
Water at 3.1 m
Cave at 5.5 m
Water Level Readings:

Date	Depth	Elev.
2017-11-27	2.0	188.4
2017-12-19	0.5	189.9

NOTES

	UNITS	%
	126	21.0%
	82	13.7%
	84	14.0%
	208	34.7%
	50	8.3%
	50	8.3%
	600	

AREA SCHEDULE	UNITS	AREA (ha)	AREA (ac)
Single Detached Residential	126	4.64	11.46
Multi-unit Residential	474	10.28	25.40
Park / Trail		1.11	2.74
Stormwater Management		0.80	1.98
Hydro Substation		0.08	0.20
Public Streets		2.84	7.02
Public Streets (Road Widening)		0.37	0.92
TOTAL	600	20.12	49.72



KEY PLAN
COLLINGWOOD, ONTARIO

LEGEND:

BH 101 EL. 198.05 — BOREHOLE 101 (WITH MONITORING WELL) SURFACE ELEVATION

BH 103 EL. 197.30 — BOREHOLE 103 SURFACE ELEVATION

SITE LIMIT

REFERENCE:

BASE PLAN PROVIDED BY CLIENT.

0m 40 80 120 160 200

SCALE

BOREHOLE LOCATION PLAN

PROPOSED PANORAMA NORTH
RESIDENTIAL DEVELOPMENT
295 MOUNTAIN ROAD
COLLINGWOOD, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	RB	FEB. 2020	AS SHOWN	17CF022	3–1
CHECKED	GW				
APPROVED	GW				

APPENDIX A

Statement of Limitations

STATEMENT OF LIMITATIONS

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

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

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

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

STATEMENT OF LIMITATIONS
(continued)

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

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

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

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

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

APPENDIX B

Arsenic Letter, Report 2, dated June 7, 2019

Peto MacCallum Ltd.
CONSULTING ENGINEERS

June 7, 2019

PML Ref.: 17CF022
Report: 2

Mr. Pete Graham
Ted North (295 Mountain Road) Ltd.
7 Edinburgh Road South
Guelph, Ontario
N1H 5N8

Dear Mr. Graham

Arsenic Testing
Proposed Panorama North Residential Development
295 Mountain Road
Collingwood, Ontario

As requested, Peto MacCallum Ltd. (PML) has completed arsenic testing at the above noted site. Authorization to proceed with this work was provided by Mr. P. Graham in several emails.

It is understood that an orchard previously occupied the west end of the site and as such arsenic is a potential contaminant of concern. Soil sampling and chemical testing was requested to check for arsenic contamination in the near surface soils.

Methodology and Analytical Findings

Original Testing

PML attended site on December 19, 2017 and collected four grab samples from hand dug test pits about 0.5 m depth. The locations of the test pits are shown on Drawing 2-1.

The four soil samples were submitted to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for testing of arsenic. The chemical testing results are summarized below and certificates of analysis are included in Appendix A.

Sample ID	Table 1 Site Condition Standard for Arsenic (µg/g)	Measured Concentration of Arsenic (µg/g)
1	18	7.6
2		28.4
3		7.9
4		7.2

The measured concentration of arsenic in all samples tested met the applicable Table 1 Site Condition Standards (SCSs), with the exception of Sample 2.

Supplemental Testing

In accordance with Section 48 (2) of O. Reg. 153/04, as amended, if the average of two or more replicate samples from the same sampling location meets the applicable SCSs, the original exceedance is not considered an exceedance.

The collection of three replicate samples was completed by PML on December 17, 2018 by hand dug test pits. Three replicate samples were collected in the vicinity (<2.0 m) of Sample 2 and were submitted to a CALA accredited laboratory for arsenic testing. The chemical testing results are summarized below and certificates of analysis are included in Appendix A.

Sample ID	Table 1 Site Condition Standard for Arsenic (µg/g)	Measured Concentration of Arsenic (µg/g)	Average
2	18	28.4	14.1
GS 1		8.9	
GS 2		9.8	
GS 3		9.1	

Based on the results of chemical analyses, the average of the tested samples met Table 1 SCSs.

Conclusions and Recommendations

Based on the results of the original chemical analyses the measured concentrations of arsenic in the near surface soil on site met the Table 1 SCSs, with the exception of Sample 2. Based on the results of the replicate chemical testing, Sample 2 is also considered to meet Table 1 SCSs.

Closure

We trust this report is complete within our Terms of Reference. Please do not hesitate to call if you have any questions.

Sincerely

Peto MacCallum Ltd.

PROFESSIONAL GEOSCIENTIST
ALICIA KIMBERLEY
PRACTISING MEMBER
2949
ONTARIO

Alicia Kimberley, M.Sc., P.Geo.
Manager, Hydrogeological Services

LICENSED PROFESSIONAL ENGINEER
G. R. WHITE
PROVINCE OF ONTARIO

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

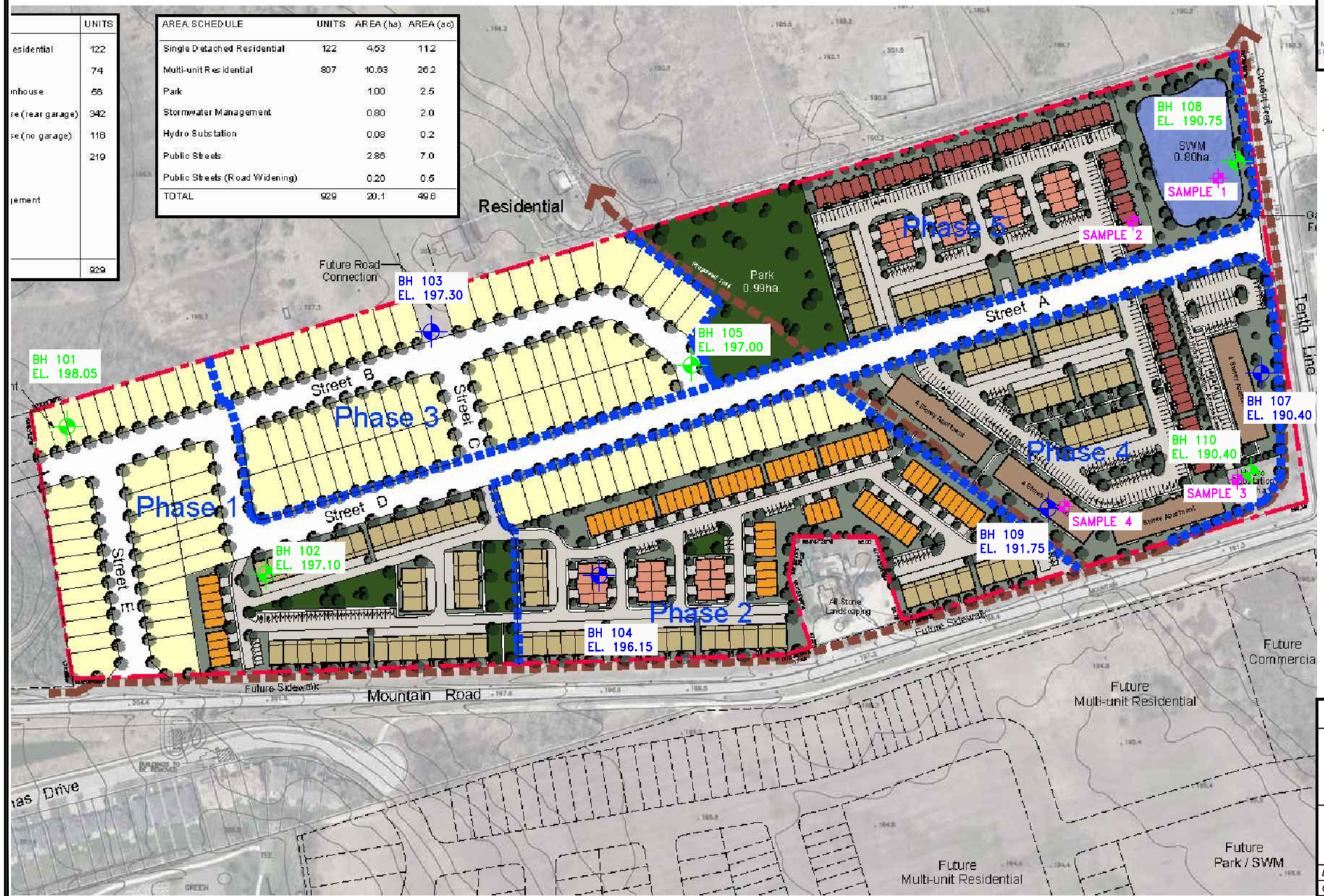
AK/GRW:jlb/tc

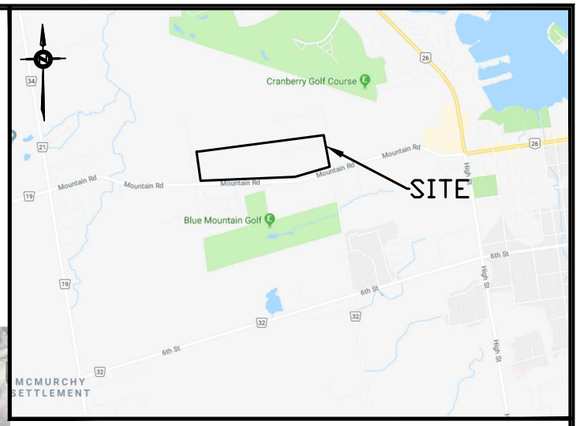
Enclosure(s):
Drawing 2-1 – Sample Location Plan
Appendix A – Certificates of Analysis
Appendix B – Statement of Limitations

Distribution:
1 cc: Ted North (295 Mountain Road) Ltd. (email only: pgraham@gwdevelopments.ca)
1 cc: Tatham Engineering Limited (email only: abrownridge@tathameng.com)
1 cc: PML Barrie

	UNITS
esidential	122
	74
nhouse	66
se (rear garage)	342
se (no garage)	116
	219
lement	
	929

AREA SCHEDULE	UNITS	AREA (ha)	AREA (ac)
Single Detached Residential	122	4.53	11.2
Multi-unit Residential	807	10.63	26.2
Park		1.00	2.5
Stormwater Management		0.80	2.0
Hydro Substation		0.08	0.2
Public Streets		2.86	7.0
Public Streets (Road Widening)		0.20	0.5
TOTAL	929	20.1	49.6





KEY PLAN
COLLINGWOOD, ONTARIO

LEGEND:

- SAMPLE 1 — SAMPLE 1 FOR ARSENIC TESTING
- BH 101 EL. 198.05 — BOREHOLE 101 (WITH MONITORING WELL) SURFACE ELEVATION
- BH 103 EL. 197.30 — BOREHOLE 103 SURFACE ELEVATION
- SITE LIMIT

REFERENCE:
BASE PLAN PROVIDED BY CLIENT.

0m 40 80 120 160 200
SCALE

SAMPLE LOCATION PLAN

PROPOSED PANORAMA NORTH
RESIDENTIAL DEVELOPMENT
295 MOUNTAIN ROAD
COLLINGWOOD, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	RB	JUNE 2019	AS SHOWN	17CF022	2–1
CHECKED	AK				
APPROVED	GW				

APPENDIX A

Certificates of Analysis

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G72835 **REPORT No. B18-38291**

Report To:

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

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

DATE RECEIVED: 17-Dec-18
DATE REPORTED: 21-Dec-18
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 17CF022
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Metals - ICP-MS	3	Holly Lane	TPR	21-Dec-18	D-ICPMS-01 (o)	EPA 6020

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

Christine Burke
Lab Manager

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

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Final Report

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

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

DATE RECEIVED: 17-Dec-18
DATE REPORTED: 21-Dec-18
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 17CF022
WATERWORKS NO.

	Client I.D. / Sample I.D. / Date Collected		GS 1 B18-38291-1 17-Dec-18	GS 2 B18-38291-2 17-Dec-18	GS 3 B18-38291-3 17-Dec-18		O. Reg. 153 Tbl. 1 - All	
Parameter	**Units**	**R.L.**						
Arsenic	µg/g	0.5	8.9	9.8	9.1		18	

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

Christine Burke
Lab Manager

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

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

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

DATE RECEIVED: 17-Dec-18
DATE REPORTED: 21-Dec-18
SAMPLE MATRIX: Soil

JOB/PROJECT NO.:
P.O. NUMBER: 17CF022
WATERWORKS NO.

Summary of Exceedances

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

Christine Burke
Lab Manager

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

CADUCEON ENVIRONMENTAL LABORATORIES
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TESTING REQUIREMENTS

- [X] O.Reg 153 — Table 1
- [ ] Surface Soil — [ ] Sub Surface Soil (O.Reg 153)
- [ ] Yes [ ] No — Record of Site Condition (O.Reg 153)
- [ ] Provincial Water Quality Objectives
- [ ] Sewer Use By-Law:
- [ ] MISA Guidelines
- [ ] O.Reg 558 Leachate Analysis
- Disposal Site:
- [ ] Landfill Monitoring
- [ ] Other:

REPORT NUMBER (Lab Use): B18-38291

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

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

Organization: PML	Address and Invoicing Address (if different): barrie@petermaccallum.com
Contact: A. Kimberley	
Tel: 705 734 3900	
Fax: 705 734 9911	Quote No.:
Email: akimberley@petermaccallum.com	P.O. No.:
	Project Name: 17CF022
	Additional Info:

ANALYSES REQUESTED (Print Test in Boxes): Arsenic; Suspected Highly Contaminated

TURNAROUND SERVICE REQUESTED (see back page)

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

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

Lab No:	Sample Identification	S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	Indicate Test For Each Sample By Using A Check Mark In The Box Provided	✓	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered(Y/N)
1	GS1		S	18-12-17	11:30	X				1	
2	GS2		↓	↓	11:40	↓				↓	
3	~~GS3~~ GS3		↓	↓	11:50	↓				↓	
	Jars → Ottawa										

SAMPLE SUBMISSION INFORMATION

	Sampled by:	Submitted by:
Print:	A. Kimberley	A. Kimberley
Sign:		
	18-12-17	18-12-17
	Date (yy-mm-dd)/Time:	Date (yy-mm-dd)/Time:

SHIPPING INFORMATION

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

Invoice [ ]

# of Pieces

REPORTING / INVOICING

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

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)

- Received By (print): S. Hutton — Signature: SH
- Date Received (yy-mm-dd): 18/12/17 — Time Received: 1536
- Laboratory Prepared Bottles: [✓] Yes [ ] No
- Sample Temperature °C: 3.4
- Labeled by: SH

Comments:

Page 1 of 1

G 72835

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

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G75047 **REPORT No. B17-38148**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Geoff White

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

DATE RECEIVED: 19-Dec-17
DATE REPORTED: 29-Dec-17
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 17CF022
P.O. NUMBER:
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Metals - ICP-MS	4	Holly Lane	RPE	21-Dec-17	D-ICPMS-01 (o)	EPA 6020

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

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

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

Christine Burke
Lab Manager

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

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G75047 **REPORT No. B17-38148**

Report To:

Peto MacCallum Ltd
19 Churchill Drive,
Barrie ON L4N 8Z5
Attention: Geoff White

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

DATE RECEIVED: 19-Dec-17
DATE REPORTED: 29-Dec-17
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 17CF022
P.O. NUMBER:
WATERWORKS NO.

	Client I.D. / Sample I.D. / Date Collected		Sample 1 B17-38148-1 19-Dec-17	Sample 2 B17-38148-2 19-Dec-17	Sample 3 B17-38148-3 19-Dec-17	Sample 4 B17-38148-4 19-Dec-17	O. Reg. 153 Tbl. 1 - Agricultural	O. Reg. 153 Tbl. 1 - All
Parameter	**Units**	**R.L.**						
Arsenic	µg/g	0.5	7.6	**28.4**	7.9	7.2	11	18

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

Christine Burke
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112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 19-Dec-17
DATE REPORTED: 29-Dec-17
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 17CF022
P.O. NUMBER:
WATERWORKS NO.

Summary of Exceedances

Table 1 - Agricultural/Other Soil Std

Sample 2	Found Value	Limit
Arsenic (µg/g)	28.4	11

Table 1 - Res/Park/Institutional/Indus/Com/Commun

Sample 2	Found Value	Limit
Arsenic (µg/g)	28.4	18

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

Christine Burke
Lab Manager

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

CADUCEON ENVIRONMENTAL LABORATORIES
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TESTING REQUIREMENTS

- [x] O.Reg 153 — Table 1
- [ ] Surface Soil — [ ] Sub Surface Soil (O.Reg 153)
- [ ] Yes [ ] No — Record of Site Condition (O.Reg 153)
- [ ] Provincial Water Quality Objectives
- [ ] Sewer Use By-Law: _____
- [ ] MISA Guidelines
- [ ] O.Reg 558 Leachate Analysis
- Disposal Site: _____
- [ ] Landfill Monitoring
- [ ] Other: _____

REPORT NUMBER (Lab Use): B17-38148

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

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

Organization: Peto MacCallum LTD	Address and Invoicing Address (if different): PML invoices to barrie@petomaccallum.com
Contact: Geoff White	
Tel: 705-734-3900	
Fax: 705-734-9911	Quote No.: P17-PETO-COMP — Project Name: 17CF022
Email: rblair@petomaccallum.com	P.O. No.: 17CF022 — Additional Info:

ANALYSES REQUESTED (Print Test in Boxes): Arsenic; Suspected Highly Contaminated

TURNAROUND SERVICE REQUESTED (see back page)

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

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

Lab No:	Sample Identification	S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	Indicate Test For Each Sample By Using A Check Mark In The Box Provided	✓	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered(Y/N)
	Sample 1		S	Dec 19		✓				1	
	Sample 2		S	"		✓				1	
	Sample 3		S	"		✓				1	
	Sample 4		S	"		✓				1	
	jars → 0										

SAMPLE SUBMISSION INFORMATION

	Sampled by:	Submitted by:
Print:	R. Blair	R Blair
Sign:		
	2017-12-19	2017-12-18
	Date (yy-mm-dd)/Time:	Date (yy-mm-dd)/Time:

SHIPPING INFORMATION

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

Invoice [ ] — # of Pieces: 1

REPORTING / INVOICING

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

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)

- Received By (print): Stel — Signature: [signature]
- Date Received (yy-mm-dd): 17/12/19 — Time Received: 10:50
- Laboratory Prepared Bottles: [x] Yes [ ] No
- Sample Temperature °C: 10.5
- Labeled by: [signature]

Comments:

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

APPENDIX B

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.

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.

STATEMENT OF LIMITATIONS

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 any way 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.

Environmental site assessment studies are performed in different phases by the application of different levels of effort and expense. The phase or phases in this report and the level of effort proposed for this assignment were based solely on PML's understanding of the client's needs as described in the scope of services contained in this report.

This assessment does not wholly eliminate uncertainty regarding the potential for existing or future costs, hazards or losses in connection with the subject property and must be viewed as a mechanism to reduce risk rather than eliminate the risk of contamination concerns.

The parties agree that PML cannot and does not warrant or represent that bids or negotiated prices will not vary from the Environmental Remediation/Cleanup and Restoration or Soil and Ground Water Management Plan Cost Estimate. The parties further agree that nothing in their agreement shall be deemed to be a cost condition or representation that the project cleanup can be completed for the amount of the Environmental Remediation/Cleanup and Restoration or Soil and Ground Water Management Plan Cost Estimate or any other amount.